



U.S. DEPARTMENT OF  
**ENERGY**

# **Annual Report on Federal Government Energy Management and Conservation Programs, Fiscal Year 2011**

**Report to Congress  
March 2014**

**United States Department of Energy  
Washington, DC 20585**

# Message from the Assistant Secretary

We are enclosing the *Annual Report to Congress on Federal Government Energy Management and Conservation Programs, Fiscal Year (FY) 2011*.

This report on Federal energy management for FY 2011 responds to section 548 of the National Energy Conservation Policy Act (NECPA; Pub. L. No. 95-619), as amended, and provides information on energy consumption in Federal buildings, operations, and vehicles.

This report documents activities conducted by Federal agencies under:

- The energy management and energy consumption requirements of section 543 of NECPA, as amended (42 U.S.C. § 8253);
- The energy savings performance contract authority of section 801 of NECPA, Pub. L. No. 95-619, as amended (42 U.S.C. §§ 8287-8287d);
- The renewable energy purchase goal of section 203 of the Energy Policy Act of 2005 (EPACT 2005), Pub. L. No. 109-58 (codified at 42 U.S.C. § 15852);
- The Federal building performance standard requirements under Section 109 of EPACT 2005, Pub. L. No. 109-58 (codified at 42 U.S.C. § 6834(a));
- The requirements on the procurement and identification of energy efficient products under section 161 of the Energy Policy Act of 1992 (EPACT 1992), Pub. L. No. 102-486 (codified at 42 U.S.C. § 8262g);
- Sections 431, 432, and 434 of the Energy Independence and Security Act of 2007 (EISA), Pub. L. No. 110-140 (42 U.S.C. § 8253) and section 527 of EISA (42 U.S.C. § 17143);
- Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management," 72 Fed. Reg. 3,919 (Jan. 26, 2007); and
- Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," 74 Fed. Reg. 52,117 (Oct. 5, 2009).

The following are highlights from the report:

- In FY 2011, the Federal Government consumed 1.1 quadrillion British Thermal Units (Btu) of site-delivered energy in buildings, vehicles (including ships and aircraft), and operations; 1.8 percent less than in FY 2003, and 0.4 percent more than in FY 2010.
- Total cost of the 1.1 quads was \$26.1 billion in FY 2011 and represented 0.7 percent of the total Federal expenditures of \$3.819 trillion for all purposes in FY 2011. In constant 2011 dollars, this equates to an increase of 27.2 percent from \$20.5 billion in FY 2010 to \$26.1 billion in FY 2011.

- Compared to FY 2010, the combined unit costs of all fuels increased 26.7 percent in FY 2011. Transportation fuel prices were a significant reason for the overall increase in energy costs in FY 2011 compared to the prior year. Significant changes in energy per unit costs (as-spent dollars per million Btu) include:
  - Jet fuel – 52.6 percent increase,
  - Gasoline – 25.2 percent increase,
  - Diesel – 23.9 percent increase,
  - Fuel oil – 18.9 percent increase,
  - Natural gas – 10.0 percent decrease, and
  - Electricity – 2.7 percent increase.
- NECPA, as amended, requires that Federal buildings reduce their FY 2011 energy consumption by 18 percent as compared with FY 2003. Including the credit for renewable energy purchases and improvements in the efficiency of certain energy generating facilities included under Department of Energy guidance, the Federal Government decreased energy use per gross square foot by 16.5 percent in FY 2011 relative to FY 2003 for buildings subject to the NECPA energy reduction requirement. Based strictly on total site energy use per gross square foot (excluding the credits for renewable energy purchases and primary energy savings from improved generating efficiency), the Federal Government cut its energy intensity by 13.2 percent.
- The Federal Government collectively surpassed the FY 2011 renewable energy goal of a minimum of five percent of electricity use set in section 203 of EPACK 2005. Federal agencies reported purchasing or producing 3,234.2 gigawatthours (GWh) of renewable electric energy in FY 2011, equivalent to 5.6 percent of the Federal Government’s electricity use of 57,495.0 GWh in FY 2011.
- During FY 2011, Federal agencies invested \$3,100.1 million in energy efficiency, water conservation, and renewable energy projects in buildings and facilities. This funding came from three primary sources:
  - Direct appropriated funding – \$2,565.7 million
  - Energy savings performance contracts (ESPCs) – \$369.0 million
  - Utility energy service contracts (UESCs) – \$165.4 million
- This \$3,100.1 million investment was 25.7 percent less than the \$4,170.9 million investment reported in FY 2010.

This report is being provided to the following Members of Congress:

- **The Honorable Joseph R. Biden, Jr.**  
President of the Senate
- **The Honorable John Boehner**  
Speaker of the House of Representatives
- **The Honorable Barbara Mikulski**  
Chairwoman, Senate Committee on Appropriations

- **The Honorable Richard C. Shelby**  
Ranking Member, Senate Committee on Appropriations
- **The Honorable Mary Landrieu**  
Chairman, Senate Committee on Energy and Natural Resources
- **The Honorable Lisa Murkowski**  
Ranking Member, Senate Committee on Energy and Natural Resources
- **The Honorable Harold Rogers**  
Chairman, House Committee on Appropriations
- **The Honorable Nita M. Lowey**  
Ranking Member, House Committee on Appropriations
- **The Honorable Fred Upton**  
Chairman, House Committee on Energy and Commerce
- **The Honorable Henry A. Waxman**  
Ranking Member, House Committee on Energy and Commerce
- **The Honorable Dianne Feinstein**  
Chairman, Senate Subcommittee on Energy and Water Development
- **The Honorable Lamar Alexander**  
Ranking Member, Senate Subcommittee on Energy and Water Development
- **The Honorable Mike Simpson**  
Chairman, House Subcommittee on Energy and Water Development
- **The Honorable Marcy Kaptur**  
Ranking Member, House Subcommittee on Energy and Water Development

If you need additional information concerning the report, please contact me or Brad Crowell, Assistant Secretary for Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,

Dr. David T. Danielson  
Assistant Secretary  
Energy Efficiency and Renewable Energy

# List of Acronyms

## Agency Acronyms

Broadcasting Board of Governors/ International Broadcasting Bureau	BBG/IBB
Department of Agriculture	USDA
Department of Commerce	DOC
Department of Defense	DOD
Department of Energy	DOE
Department of Health and Human Services	HHS
Department of Homeland Security	DHS
Department of Housing and Urban Development	HUD
Department of the Interior	Interior
Department of Justice	Justice
Department of Labor	DOL
Department of State	State
Department of Transportation	DOT
Department of the Treasury	Treasury
Department of Veterans Affairs	VA
Environmental Protection Agency	EPA
General Services Administration	GSA
National Aeronautics and Space Administration	NASA
National Archives and Records Administration	Archives
Nuclear Regulatory Commission	NRC
Office of Federal Procurement Policy	OFPP
Office of Management and Budget	OMB
Office of Personnel Management	OPM
Pension Benefit Guaranty Corporation	PBGC
Railroad Retirement Board	RRB
Smithsonian Institution	Smithsonian
Social Security Administration	SSA
Tennessee Valley Authority	TVA
U.S. Army Corps of Engineers	USACE
United States Postal Service	USPS
White House Council on Environmental Quality	CEQ

### Other Acronyms

American Society of Heating, Refrigerating and Air Conditioning Engineers	ASHRAE
British Thermal Unit(s)	Btu
British Thermal Units(s) per Gross Square Foot	Btu/GSF
Combined Heat and Power	CHP
Compressed Natural Gas	CNG
Compliance Tracking System	CTS
Emissions & Generation Resource Integrated Database	eGRID
Energy Independence and Security Act of 2007	EISA
Energy Policy Act of 1992	EPACT 1992
Energy Policy Act of 2005	EPACT 2005
Energy Savings Performance Contract	ESPC
Executive Order	E.O.
Federal Energy Management Program	FEMP
Fiscal Year	FY
Gallon	Gal
Greenhouse Gas	GHG
Gross Square Foot	GSF
Industrial, Landscaping, and Agricultural	ILA
Liquefied Petroleum Gas	LPG
Megawatthours	MWH
Million British Thermal Units	MMBtu
Million Metric Tons of Carbon Dioxide Equivalent	MMTCO <sub>2</sub> e
National Energy Conservation Policy Act	NECPA
Quadrillion British Thermal Units	Quad
Renewable Energy Certificate	REC
Utility Energy Service Contract	UESC

## Executive Summary

This report on Federal energy management for FY 2011 responds to section 548 of the National Energy Conservation Policy Act, (NECPA; Pub. L. No. 95-619) as amended, and provides information on energy consumption in Federal buildings, operations, and vehicles. It also documents activities conducted by Federal agencies under:

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- Sections 431, 432, and 434 of the Energy Independence and Security Act of 2007 (EISA), Pub. L. No. 110-140 (42 U.S.C. § 8253) and section 527 of EISA (42 U.S.C. § 17143);
- Executive Order 13423, “Strengthening Federal Environmental, Energy, and Transportation Management,” 72 Fed. Reg. 3,919 (Jan. 26, 2007); and
- Executive Order 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” 74 Fed. Reg. 52,117 (Oct. 5, 2009).

The following page contains a summary of Federal Government-wide progress toward the key statutory and Executive Order goals.

Goal/Requirement	FY 2011 Federal Performance
<p><b>E.O. 13423/NECPA:</b> Reduce energy intensity (Btu/GSF) by 18 percent compared to 2003; 30 percent reduction required in FY 2015.</p>	<p>Government decreased energy intensity by 16.5 percent in FY 2011 relative to FY 2003 (13.2 percent without additional credits).</p>
<p><b>EPACT 2005/E.O. 13423:</b> Use renewable electric energy equivalent to a least five percent of total electricity use; at least half of which must come from sources developed after January 1, 1999.</p>	<p>Government purchased or produced renewable energy in FY 2011 equivalent to 5.6 percent of total electricity use.</p>
<p><b>E.O. 13423/13514:</b> Reduce water consumption intensity (Gal/GSF) by eight percent relative to 2007 baseline; 16 percent by the end of FY 2015; 26 percent by FY 2020.</p>	<p>Government reduced water consumption intensity by 10.2 percent in FY 2011 relative to FY 2007.</p>
<p><b>E.O. 13514:</b> Reduce Government-wide scope 1 and 2 greenhouse gas emissions from targeted sources by 28 percent in FY 2020 compared to FY 2008</p>	<p>Government reduced scope 1 and 2 GHG emissions by 8.2 percent in FY 2011 relative to FY 2008.</p>





# ANNUAL REPORT ON FEDERAL GOVERNMENT ENERGY MANAGEMENT AND CONSERVATION PROGRAMS FISCAL YEAR 2011

## Table of Contents

- I. Overview of Federal Energy Consumption ..... 1
  - A. GOAL BUILDINGS ..... 6
  - B. EXCLUDED BUILDINGS ..... 6
  - C. VEHICLES AND EQUIPMENT..... 7
- II. Federal Government Performance in FY 2011 ..... 8
  - A. FACILITY ENERGY INTENSITY REDUCTION REQUIREMENT ..... 8
  - B. RENEWABLE ENERGY GOAL..... 10
  - C. WATER INTENSITY REDUCTION GOAL ..... 12
  - D. GREENHOUSE GAS REDUCTION..... 13
- III. Other Energy Management Activities..... 16
  - A. FACILITY EFFICIENCY INVESTMENT ..... 16
  - B. MANAGEMENT OF ENERGY AND WATER EFFICIENCY IN BUILDINGS..... 17
  - C. METERING ..... 17
  - D. FEDERAL BUILDING PERFORMANCE STANDARDS ..... 18
  - E. ENERGY EFFICIENT PROCUREMENT..... 19

# I. Overview of Federal Energy Consumption

This report on Federal energy management for FY 2011 responds to section 548 of the National Energy Conservation Policy Act, as amended (NECPA; Pub. L. No. 95-619), and provides information on energy consumption in Federal buildings, operations, and vehicles. It also documents activities conducted by Federal agencies under:

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This report summarizes the findings contained in data tables with agency-specific details located online at: <http://www1.eere.energy.gov/femp/docs/FY11AnnualRpt.xlsx>. Agency-specific performance is also detailed on their annual Office of Management and Budget (OMB) Sustainability and Energy Scorecards and in their Strategic Sustainability Performance Plans at <http://sustainability.performance.gov>. Also described in these resources are agency activities undertaken under Title V of EISA.

During FY 2011, reports were submitted by the 25 Federal agencies assessed on OMB Sustainability/ Energy Scorecards, as well as by a number a smaller agencies, many of which began reporting in FY 2010. These reports show that total primary or source energy

consumption of the U.S. Government, including energy consumed to produce, process, and transport energy, was 1.6 quadrillion British thermal units (Btu) or “quads” during FY 2011.<sup>1</sup> These 1.6 quads represent 1.6 percent of the 98.1 quads<sup>2</sup> used in the United States. The total primary energy consumption in FY 2011 was 14.3 percent less than in FY 1985, 1.9 percent less than in FY 2003, and 0.4 percent more than in FY 2010.

Site-delivered energy consumption by the Government was about 1.1 quads during FY 2011. Unless otherwise noted, this report uses the site-measured conversion factors to convert common units for electricity and steam to British thermal units. Site-delivered energy consumption in FY 2011 was 23.0 percent less than in FY 1985, 1.8 percent less than in FY 2003, and 0.4 percent more than in FY 2010.

Total cost of the 1.1 quads was \$26.1 billion in FY 2011 and represented 0.7 percent of the total Federal expenditures of \$3.819 trillion<sup>3</sup> for all purposes in FY 2011.<sup>4</sup> In constant 2011 dollars, this equates to an increase of 27.2 percent from \$20.5 billion in FY 2010 to \$26.1 billion in FY 2011.

Compared to FY 2010, the combined unit costs of all fuels increased 26.7 percent in FY 2011. Transportation fuel prices were a significant reason for the overall increase in energy costs in FY 2011 compared to the prior year. The most significant changes in per unit costs (as-spent dollars per million Btu) include:

- Jet fuel – 52.6 percent increase,
- Gasoline – 25.2 percent increase,
- Diesel – 23.9 percent increase,
- Fuel oil – 18.9 percent increase,
- Natural gas – 10.0 percent decrease, and
- Electricity – 2.7 percent increase.

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<sup>1</sup>Primary or source energy consumption considers all energy resources used to generate and transport electricity and steam. For this report, DOE uses a source conversion factor for electricity of 11,850 Btu/kWh and site-delivered factor of 3,412 Btu/kWh.

<sup>2</sup>DOE/EIA, *Monthly Energy Review March 2012*, Table 1.1.  
<http://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf>

<sup>3</sup>*Updated Summary Tables, Budget of the United States Government, Fiscal Year 2011*  
<http://www.gpo.gov/fdsys/pkg/BUDGET-2012-BUD/pdf/BUDGET-2012-BUD.pdf>

<sup>4</sup>Unless otherwise noted, all costs cited in this report are in constant 2011 dollars, calculated using Gross Domestic Product implicit price deflators. See Bureau of Economic Analysis web site, <http://www.bea.gov/national/xls/gdplev.xls>. Costs noted as nominal dollars have not been adjusted to remove the effect of changes in the spending power of the dollar.

In addition to prices and Federal energy management activities, many other variables contribute to changes in annual energy use and costs, including changes in square footage, building stock, weather, tempo of operations, fuel mix, and vehicle, naval, and aircraft fleet composition.

In FY 2011, the Department of Defense (DOD) spent about \$21.4 billion for energy use, 82.0 percent of the total Federal energy expenditure of \$26.1 billion. DOD used 0.1 percent more site-delivered energy in FY 2011 than in FY 2010.

Figures 1 and 2 depict the Federal Government’s FY 2011 energy consumption and costs. As illustrated, jet fuel and electricity account for 65.1 percent of the total energy consumption by energy type and 73.1 percent of total energy costs by energy type.

Federal agencies now report energy consumption under three end-use sectors:

1. Buildings subject to the energy reduction requirements of NECPA, as amended (“goal buildings”);
2. Buildings excluded from the energy reduction requirements of NECPA, as amended (“goal-excluded buildings”); and
3. Vehicles and equipment.

Total Federal energy consumption and costs are summarized below by end-use sector:

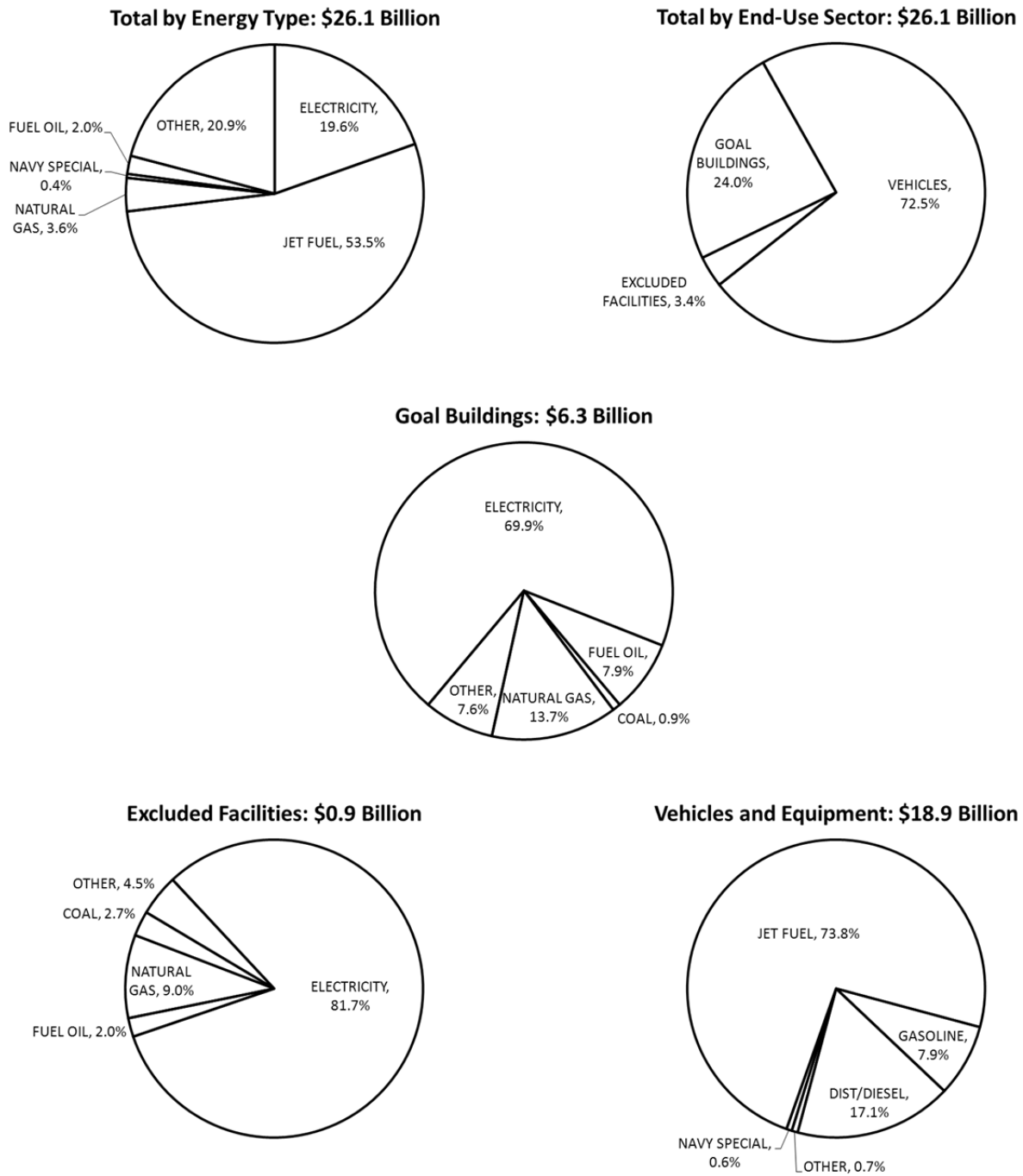
<b>Energy Use</b>	<b>Trillion Btu</b>	<b>Percentage</b>
Goal Buildings	337.7	30.2%
Excluded Buildings	46.7	4.2%
Vehicles & Equipment	732.2	65.6%
<i>Total</i>	<i>1,116.6</i>	<i>100.0%</i>

<b>Energy Cost</b>	<b>\$Billion</b>	<b>Percentage</b>
Goal Buildings	\$6.3	24.0%
Excluded Buildings	\$0.9	3.4%
Vehicles & Equipment	\$18.9	72.5%
<i>Total</i>	<i>\$26.1</i>	<i>100.0%</i>

**Figure 1**  
**Federal Energy Consumption by Fuel Type and End-Use Sector, FY 2011**



**Figure 2  
Federal Energy Costs by Fuel Type and End-Use Sector, FY 2011**



## A. GOAL BUILDINGS

Goal buildings are those buildings not designated by an agency as excluded from the energy intensity performance requirement. See 42 U.S.C. § 8253(a).

In FY 2011, the Federal Government used 337.1 trillion Btu to provide energy to 3.0 billion square feet of building space subject to the energy consumption reduction requirements of NECPA (42 U.S.C. 8253(a)(1)). This consumption represents a 31.8 percent decrease compared to FY 1985, a 12.2 percent decrease relative to FY 2003 and a 3.3 percent decrease from FY 2010. The significant drop from FY 1985 levels reflects the success of Federal energy management efforts in reducing fossil fuel use in Federal buildings as well as a 44.5 percent reduction in defense-related facility energy use from FY 1985. The energy cost for goal buildings in FY 2011 was \$6.3 billion, a decrease of \$279.8 million from FY 2010 expenditures, and an increase of 30.1 percent from FY 2003 expenditures of \$4.8 billion.<sup>5</sup> Of the \$6.3 billion energy costs for goal buildings, \$3.6 billion was spent by DOD with the remaining \$2.7 billion spent by the civilian agencies.

The 337.7 trillion Btu used in goal buildings comprised 30.2 percent of the total 1.1 quads used by the Federal Government. Electricity constitutes 49.3 percent of the energy used in goal buildings; 34.4 percent is accounted for by natural gas, 7.0 percent by fuel oil, and 3.5 percent by coal. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and “other” energy account for the remaining 5.8 percent.

Primary energy consumption considers all resources used to generate and transport electricity and steam in addition to the energy delivered to the site of use. The Federal Energy Management Program (FEMP) uses National-level source conversion factors of 11,850 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam to estimate primary energy consumption. See Appendix B for background on the conversion factors for calculating both primary and site-delivered energy consumption.

Total primary energy use in Federal buildings subject to the NECPA energy reduction requirement decreased 14.7 percent in FY 2011 compared to FY 1985, from 883.1 trillion Btu to 753.0 trillion Btu. Compared to FY 2003 consumption of 820.7 trillion Btu, FY 2011 primary energy use decreased 8.2 percent and decreased 1.8 percent compared to the previous year.

## B. EXCLUDED BUILDINGS

Excluded buildings are those facilities designated by agencies that are not subject to the energy intensity performance requirement in accordance with the Department of Energy’s (DOE) *Guidelines Establishing Criteria for Excluding Buildings from the Energy Performance Requirements of Section 543 of the National Energy Conservation Policy Act* (42 U.S.C. § 8253(c)(3)).

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<sup>5</sup>Cost and consumption figures for prior years may be different from those published in last year’s annual report due to conversion to current year dollars and Federal agency updates and data revisions.

These *Guidelines* are available at:

[http://www1.eere.energy.gov/femp/pdfs/exclusion\\_criteria.pdf](http://www1.eere.energy.gov/femp/pdfs/exclusion_criteria.pdf).

Fifteen agencies have chosen to exclude certain buildings from energy intensity reduction requirements:

- Broadcasting Board of Governors,
- Department of Homeland Security
- Department of Commerce
- Department of Defense
- Department of Energy
- Department of the Interior
- Department of the Treasury
- Department of Transportation
- General Services Administration
- Health and Human Services
- National Aeronautics and Space Administration
- Department of State
- Tennessee Valley Authority
- U.S. Army Corps of Engineers
- U.S. Postal Service

Energy used in excluded buildings totaled 46.7 trillion Btu in FY 2011, 4.2 percent of the total 1.1 quads used by the Federal Government. Electricity constitutes 58.4 percent of the energy used in excluded buildings, 20.1 percent is accounted for by natural gas, 14.7 percent by coal, and 2.3 percent by fuel oil. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and energy reported as “other” account for the remaining 4.5 percent. The energy used in excluded buildings in FY 2011 accounted for 3.4 percent of the total Federal energy bill. The Federal Government spent \$886.9 million for this category’s energy during the fiscal year.

### C. VEHICLES AND EQUIPMENT

Vehicles and equipment energy includes aircraft and naval fuels; automotive gasoline; diesel fuel; and alternative fuels consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business. Also included is energy used in Federal construction.

In FY 2011, the Federal Government used approximately 732.2 trillion Btu of energy in vehicles and equipment, 65.6 percent of the total 1.1 quads consumed. Total energy consumption in vehicles and equipment decreased 21.6 percent relative to FY 1985 and increased 1.1 percent from the FY 2010 consumption of 724.2.0 trillion Btu. DOD consumed 675.1 trillion Btu, or 92.2 percent, of all vehicles and equipment energy used by the Federal Government.

The Federal Government spent \$18.9 billion on vehicles and equipment energy in FY 2011, \$5.7 billion more than the FY 2010 expenditure, a 43.5 percent increase in constant dollars. For all fuels, the cost per million Btu increased from \$18.21 in FY 2010 to \$25.83 in FY 2011. The real unit cost of the most-used fuel — jet fuel — increased 52.6 percent from the previous year. Gasoline prices paid by the Government increased 25.2 percent from the previous year.

In FY 2011, Federal agencies reported using 2,681.8 billion Btu of alternative fuels in their fleets at a cost of \$71.0 million. Alternative fuels comprise 0.4 percent of the Government’s vehicle and equipment energy consumption costs.



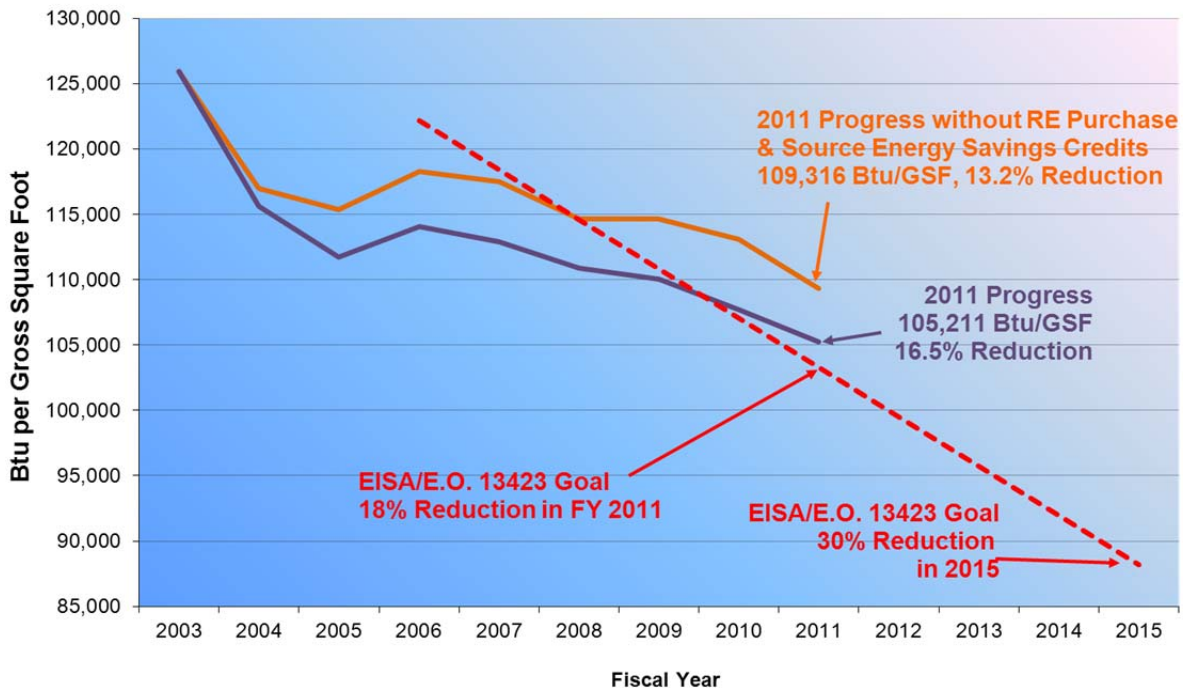
## II. Federal Government Performance in FY 2011

### A. FACILITY ENERGY INTENSITY REDUCTION REQUIREMENT

The National Energy Conservation Policy Act (NECPA), as amended, requires Federal agencies to improve energy management in their facilities and operations. *See* 42 U.S.C. § 8253. The requirement was most recently amended by section 431 of the Energy Independence and Security Act of 2007 (EISA) which requires each Federal agency to achieve targeted reductions of three percent per year in energy use per square foot, leading to a 30 percent reduction by FY 2015 compared to the FY 2003 base year.

Federal agencies reported that buildings subject to the NECPA energy reduction goals collectively decreased energy use per gross square foot (Btu/GSF) by 16.5 percent in FY 2011 relative to FY 2003. This falls short of the 18 percent reduction requirement for FY 2011.

**Figure 3**  
Overall Government Progress Toward Facility Energy Efficiency Goals, FY 2003 – FY 2011



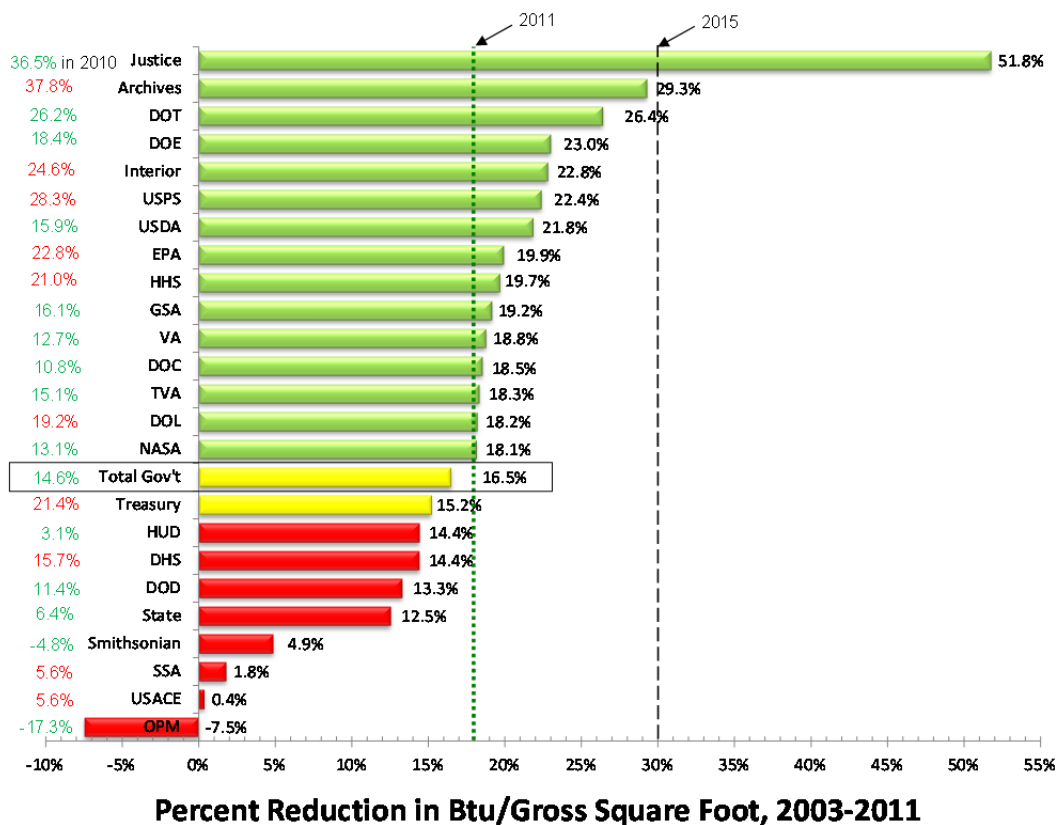
The 16.5 percent reduction in energy intensity includes the subtraction of 12.5 trillion Btu for renewable energy purchases and for projects that reduce source energy use (as opposed to site-delivered energy). When measured strictly on the basis of reduced energy intensity without

these allowable adjustments, the reduction in terms of Btu/GSF was only 13.2 percent.<sup>6</sup>

Individual agency performance in FY 2011, compared to FY 2003, is illustrated below in Figure 4. Fifteen out of 24 OMB Scorecard-assessed agencies that operate buildings reported that they reduced energy use per gross square foot in goal buildings by more than 18 percent from FY 2003.

Improvements are observed in those agencies that either add additional low energy intensive space or take advantage of renewable energy credits and primary energy project reduction credits. Seven agencies achieved the 18 percent reduction goal without additional credits. Eight agencies (Department of Commerce, Department of Labor, Environmental Protection Agency, General Services Administration, Health and Human Services, National Aeronautics and Space Administration, Tennessee Valley Authority, and Veterans Administration) achieved the goal through use of credits.

**Figure 4**  
**Individual Agency Progress in Facility Energy Efficiency Goals, FY 2011**



<sup>6</sup> Overall energy intensity for prior years may be different than reported in previous Annual Reports due to revisions and minor corrections to prior year data later provided by agencies.

Per DOE's *Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423* (See [http://www1.eere.energy.gov/femp/pdfs/epact05\\_fedrenewenergyguid.pdf](http://www1.eere.energy.gov/femp/pdfs/epact05_fedrenewenergyguid.pdf)), contributions to the energy reduction requirement by Renewable Energy Certificate (RECs) purchases are being phased out. DOE guidance phases out long-term renewable purchases and RECs a bit more slowly than regular renewables and RECs in order to continue to promote the development of renewable generation. The limits on applicability of RECs and purchased renewables on the energy intensity goal are 3.6 percent and 1.8 percent for long-term and regular respectively for FY 2011 before dropping to zero in 2012.

## **B. RENEWABLE ENERGY GOAL**

Under section 203 of EPACT 2005, the Secretary of Energy must seek to ensure that, to the extent economically feasible and technically practicable, of the total amount of *electric* energy the Federal Government consumes, the following amounts must come from renewable energy as defined in section 203 of the Act:

- Not less than three percent in FYs 2007 through 2009.
- Not less than five percent in FYs 2010 through 2012.
- Not less than 7.5 percent in FY 2013 and each FY thereafter.  
(42 U.S.C. § 15852(a))

In calculating the amount of renewable energy used by a Federal agency for the purpose of the goal, an amount of renewable energy is doubled if it is produced on-site and used at a Federal facility, produced on Federal lands and used at a Federal facility, or produced on Indian land and used at a Federal facility. See 42 U.S.C. § 15852(c).

Section 203(b) of EPACT 2005 defines the term “renewable energy” to mean electric energy generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project. See 42 U.S.C. § 15852(b).

Executive Order 13423 adds the following requirements to these EPACT 2005 goals:

- At least half of the statutorily required renewable energy consumed by each agency in a fiscal year must come from new renewable sources, and
- To the extent feasible, each agency should implement renewable energy generation projects on agency property for agency use.

In terms of total use of Federal goal-eligible renewable energy, DOD consumed 29.3 percent of all renewable energy utilized by Federal agencies, followed by DOE with 15.3 percent; VA with 13.7 percent; GSA with 13.6 percent; and EPA with 4.7 percent. Federal agencies reported

purchasing or producing 3,234.2 gigawatthours of renewable electric energy in FY 2011, equivalent to 5.6 percent of the Federal Government’s FY 2011 electricity use.

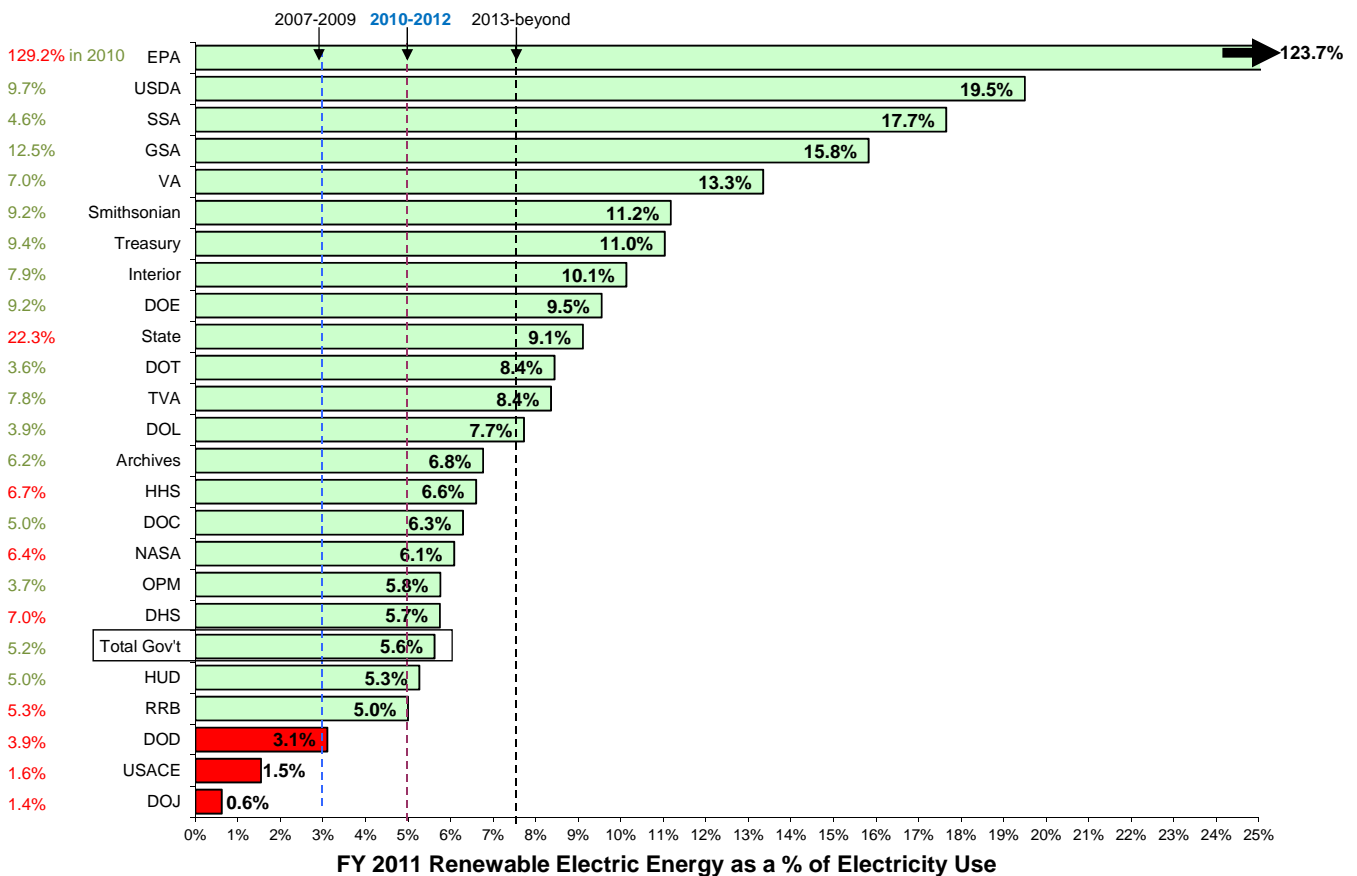
Figure 5 ranks each agency’s performance under the renewable energy goal in terms eligible renewable energy use as a percentage of their electricity use.

In FY 2011, 21 agencies obtained the equivalent of not less than 5.0 percent of total electricity consumption from renewable sources.

EPA’s renewable energy use of 123.7 percent of its electricity use was achieved through purchases of renewable electricity for space that it leases, but for which is not responsible for payment or reporting of energy costs and consumption and for electricity used to generate chilled water delivered to its facilities.

More information on the progress of the Federal Government in meeting the renewable energy goals of EPACT 2005 and Executive Order 13423 will be available in the report required under Section 203 of EPACT 2005 (42 U.S.C. § 15852(d)). This report is prepared every two years.

**Figure 5**  
**Individual Agency Renewable Energy Goal Performance, FY 2011**



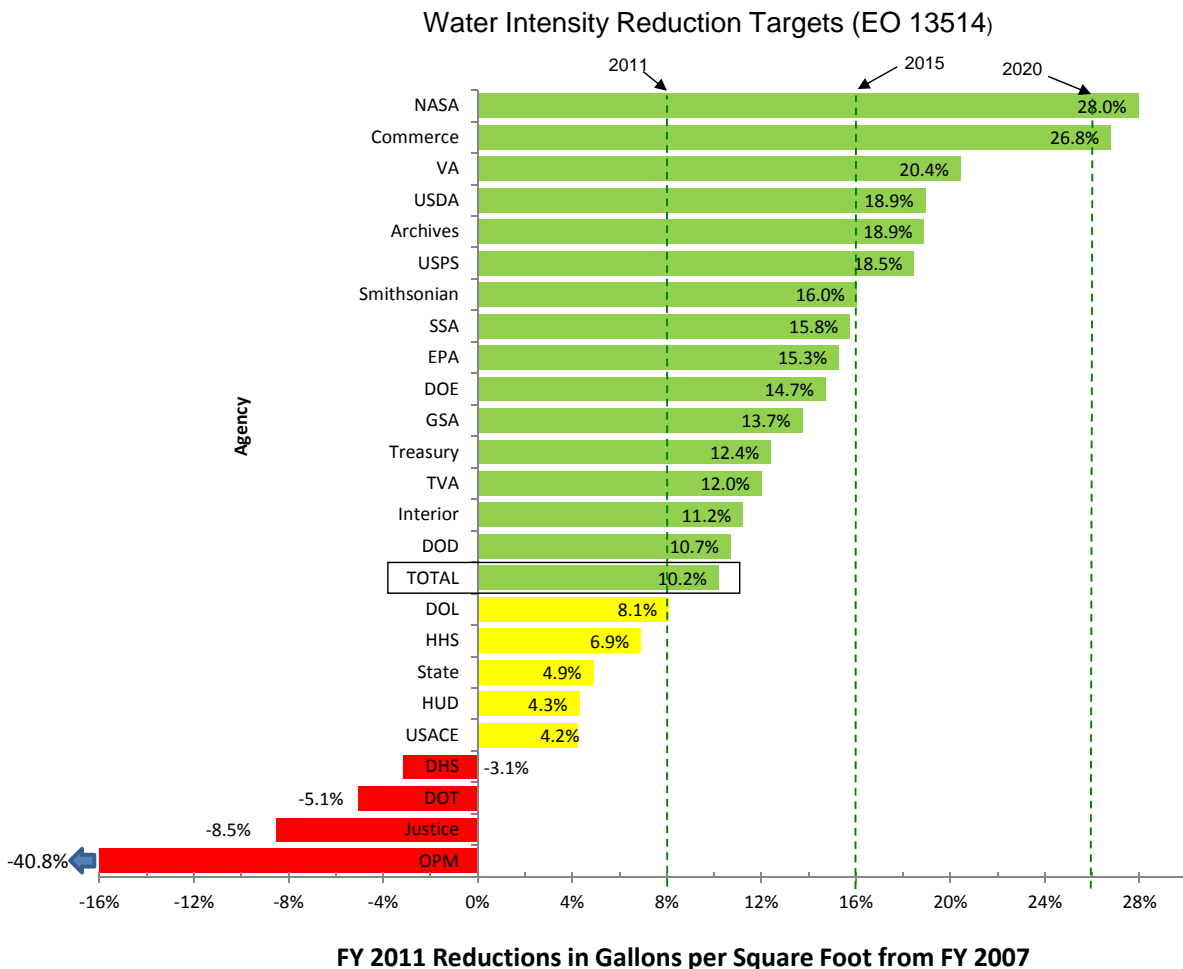
### C. WATER INTENSITY REDUCTION GOAL

Section 2(c) of Executive Order 13423 establishes a water use reduction goal for agencies beginning in FY 2008. Agencies are required to reduce water consumption intensity from the FY 2007 baseline by two percent annually through the end of FY 2015, using life-cycle cost-effective measures, for a cumulative reduction of 16 percent by the end of FY 2015. Executive Order 13514 extended this goal for potable water intensity to 26 percent by FY 2020.

As reported by the agencies, the Federal Government as a whole used 148.5 billion gallons of water in FY 2011 at a cost of \$683.4 million, for an average price of \$4.60 per 1,000 gallons.

Agency progress toward meeting the water intensity reduction goal for FY 2011 is illustrated below in Figure 6. Overall, the Federal Government’s water intensity in FY 2011 was 47.5 gallons per gross square foot, a reduction of 10.2 percent from the 52.9 gallons per gross square foot reported in FY 2007.

**Figure 6**  
**Individual Agency Water Intensity Reduction Goal Performance, FY 2011**



The Department of Defense represents the largest Federal water consumer. DOD facilities covered approximately 1.9 billion square feet and utilized 101.3 billion gallons of water in FY 2011, representing 68.2 percent of the Federal Government's water consumption for the fiscal year. The Department of Justice was the second largest Federal water consumer, consuming 6.8 percent of the total Federal water consumption in FY 2012 using a total of 10.1 billion gallons.

The Department of Justice also reported the highest water use intensity, 144.2 gallons per gross square foot. This is due to its large percentage of facility space dedicated to custodial housing. DOE and the HHS reported the second and third highest water use intensity, with 60.1 and 60.0 gallons per gross square foot respectively. DOD also has a higher than average intensity with a reported 53.2 gallons per gross square foot. Agencies such as GSA, and SSA, which are chiefly comprised of office space, have water intensity rates lower than 16 gallons per gross square foot.

As required by Executive Order 13514, agencies began reporting Industrial, Landscaping and Agricultural (ILA) water use for the first time in 2010. In FY 2011, Agencies reported using 127.9 billion gallons of the non-potable ILA water with TVA using 89.2 percent of the total.

#### **D. GREENHOUSE GAS REDUCTION**

Executive Order 13514 required Federal agencies to set individual targets for reduction of combined Scope 1 and 2 GHG emissions in FY 2020 compared to FY 2008. When all agency targets are aggregated, the overall target for the entire Federal Government is a 28 percent reduction in FY 2020 compared to FY 2008. GHG emissions from certain types of activities are not subject to the reduction targets, including emissions from generation of electric power sold to others and from fuels used in excluded vehicles and equipment (tactical, combat support, law enforcement, emergency response, and spaceflight operations). The White House Council on Environmental Quality's (CEQ's) *Federal Greenhouse Gas Accounting and Reporting Guidance* under Executive Order 13515 is located here:

<http://www.whitehouse.gov/administration/eop/ceq/sustainability/fed-ghg>.

Scope 1 GHG emissions are direct emissions and include the following sources:

- **On-Site Fuel Combustion:** Emissions from stationary combustion of fuels for heat or the generation of electricity, steam, or hot water from sources purchased and controlled by the agency (natural gas, fuel oil, propane, coal, etc.). Includes emissions from use of boilers, furnaces, turbines, and emergency generators.
- **Non-Highway Mobility and Equipment:** Emissions from fuels used in aircraft, ships, construction equipment, fork-lifts, etc., including jet fuel, diesel, gasoline, aviation gas, propane, etc.

- **Passenger Fleet Vehicles:** Emissions from fuels used in over-the-road vehicles, including gasoline, diesel, compressed natural gas, propane, and alternative fuels.
- **Fugitive Emissions & Incinerators:** Emissions that are not physically controlled, but result from the intentional or unintentional releases of GHGs.
- **Industrial Process Emissions**

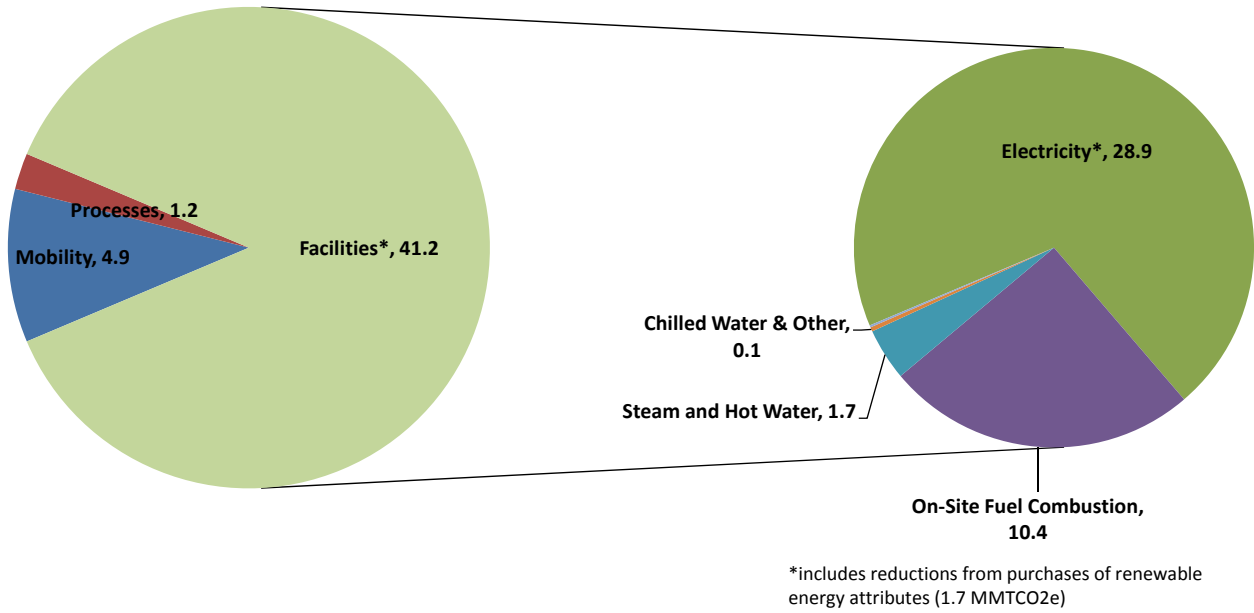
Scope 2 emissions are indirect emissions and include:

- **Purchased Electricity:** Emissions from electricity consumption as determined using the baseload subregional factors of the Emissions & Generation Resource Integrated Database (eGRID). Does not include transmission and distribution losses which are considered Scope 3.
- **Purchased Steam and Hot Water:** Emissions from fuel combustion (usually natural gas, fuel oil, or coal) required to generate and transport steam and/or hot water purchased by an agency.
- **Purchased Chilled Water:** Emissions from electricity use or fuel combustion required to generate and transport chilled water purchased by an agency
- **Purchased Biomass and CHP Energy:**
  - For purchased biomass (electricity, fuel or landfill gas), emissions of methane and nitrous oxide resulting from the combustion of the source biomass. The biogenic CO<sub>2</sub> is accounted for separately.
  - For purchased electricity, steam, or hot water from a combined heat and power (CHP facility), the emissions from fuel combustion (usually natural gas, fuel oil, or coal) required to generate and transport electricity, steam and/or hot water purchased by an agency.

Overall, the Federal Government reduced combined Scope 1 and 2 GHG emissions by 8.3 percent, from 51.4 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub>e) in FY 2008 to 47.2 MMTCO<sub>2</sub>e in FY 2011. Approximately 1.7 MMTCO<sub>2</sub>e of the 4.2 MMTCO<sub>2</sub>e in GHG reductions came in the form of purchases of renewable energy or the attributes of renewable energy in the form of RECs.

Figure 7 illustrates the sources of the 47.2 MMTCO<sub>2</sub>e of Scope 1 and 2 GHG emissions subject to the E.O. 13514 reduction targets. Emissions from facility energy use comprise approximately 87 percent of the targeted Scope 1 and 2 GHG emissions with emissions from electricity use alone 65 percent of the total (61percent if reductions from renewable electricity use are included). Scope 1 on-site fuel combustion (natural gas, fuel oil, coal, LPG/propane, etc.) comprises approximately 22 percent of targeted emissions. Biomass energy emissions under the target comprise methane and nitrous oxide only. Carbon dioxide from biomass combustion is considered biogenic (not included under the target).

**Figure 7**  
**FY 2011 Federal Government Scopes 1 & 2 GHG Emissions Covered by**  
**Reduction Target (47.2 MMTCO<sub>2</sub>e)**





### III. Other Energy Management Activities

#### A. FACILITY EFFICIENCY INVESTMENT

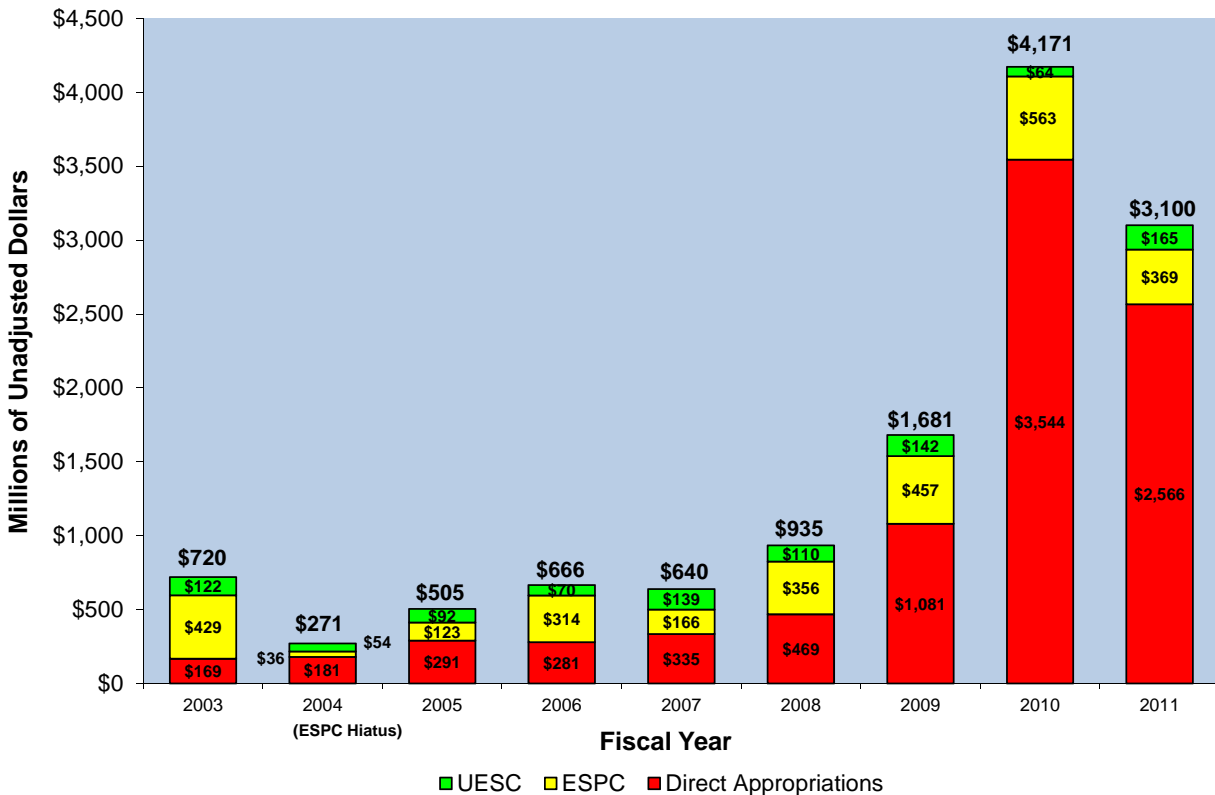
During FY 2011, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings: 1) direct appropriated funding, 2) energy savings performance contracts (ESPCs), and 3) utility energy service contracts (UESCs).

Known funding from the three sources totaled approximately \$3,100.1 million in FY 2011.

- Direct appropriations accounted for approximately \$2,565.7 million.
- ESPC contract awards by agencies resulted in approximately \$369.0 million in estimated project investment in FY 2011, and
- Approximately \$165.4 million in project investment came from UESCs.

As Figure 8 illustrates, since 2003 the Government has invested approximately \$12.7 billion in energy efficiency, \$8.9 billion of which was direct agency expenditures, \$2.8 billion was from ESPCs and \$960 million was from UESCs.

**Figure 8**  
**Investment in Energy Efficiency and Renewable Energy, FY 2003 to FY 2011**  
**(Millions of As-Spent Dollars)**



## **B. MANAGEMENT OF ENERGY AND WATER EFFICIENCY IN BUILDINGS**

Section 432 of EISA amended section 543 of the NECPA by adding a new subsection, *Use of Energy and Water Efficiency Measures in Federal Buildings*. See 42 U.S.C. § 8253(f). The new subsection outlines a framework for facility energy and water project management and benchmarking, including the following requirements for Federal agencies:

- Designate “covered facilities” and assign “facility energy managers” for ensuring compliance of “covered facilities” subject to the requirements;
- Conduct “comprehensive energy and water evaluations;”
- Implement identified efficiency measures;
- Follow-up on implemented efficiency measures;
- Report data into FEMP’s web-based tracking system for covered facilities’ energy use, evaluations, projects, follow-up, and analysis;
- Benchmark metered buildings that are, or are part of, covered facilities; and
- Disclose agency progress in evaluating covered facilities, project implementation, follow-up status, and benchmarked building performance monitoring status.

Information on FEMP’s EISA Compliance Tracking System (CTS) along with the most recent Government-wide findings can be found here:

[http://www1.eere.energy.gov/femp/regulations/facility\\_cts.html](http://www1.eere.energy.gov/femp/regulations/facility_cts.html).

In FY 2011, the energy used in EISA covered facilities comprised 334 trillion Btu or 87 percent of all Government facility energy use. EISA requires that agencies “cover” at a minimum, Federal facilities that constitute at least 75 percent of facility energy use at each agency under the requirement.

As of December 2011, Federal agencies have performed comprehensive evaluations of half of the Federal Government facilities covered by the requirements, with 2,639 of 5,196 covered facilities evaluated (50.8 percent) or 1.36 billion square feet of 2.88 billion square feet (47.3 percent). The facility evaluations conducted by the agencies identified \$8.8 billion in potential investment in facility energy/water efficiency and conservation measures (ECMs).

Approximately 55,800 potential ECMs were identified by agencies in audits conducted since 2006. Potential annual cost savings from the identified ECMs is approximately \$852 million per year.

## **C. METERING**

Section 103 of EPACT 2005 “Energy Use Measurement and Accountability” amended NECPA to require that all Federal buildings be metered for the purposes of efficient energy use and

reduction in the cost of electricity used in such buildings by October 1, 2012 (42 U.S.C. § 8253(e)). The Act specified that the agencies use advanced meters or metering devices that provide data at least daily and measure the consumption of electricity at least hourly to the maximum extent practicable. The law directed the Secretary of Energy to develop guidelines for implementation (42 U.S.C. § 8253(e)(2)). The “Guidance for Electric Metering in Federal Buildings” was published on February 3, 2006 and can be found at [http://www1.eere.energy.gov/femp/pdfs/adv\\_metering.pdf](http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf).

Agencies were required to submit to DOE an implementation plan identifying personnel responsible for achieving the requirements, and any determination by the agency that advanced meters or metering systems are not practicable in their specific situation.

Section 434(b) of EISA amended NECPA to stipulate that agencies must also meter natural gas and steam usage by October 1, 2016.

For FY 2011, agencies were required to report progress on both buildings with standard meters and buildings with advanced meters. Based on reports submitted to DOE, 12 agencies reported that all appropriate buildings were metered for electricity use with at least standard electricity meters. The 12 agencies meeting the 100 percent target are the Department of Labor; Department of Housing and Urban Development; the Department of the Treasury; Environmental Protection Agency; General Services Administration, National Archives and Records Administration; Nuclear Regulatory Commission; Office of Personnel Management; Railroad Retirement Board; Social Security Administration; United States Postal Service; and Veterans Administration. Six agencies — the Department of Labor, the Department of Housing and Urban Development, National Archives and Records Administration, Nuclear Regulatory Commission, Railroad Retirement Board, and the Veterans Administration reported that they have already have advanced metering in 100 percent of their buildings.

Overall, agencies identified 101,356 buildings for which separate electricity meters are appropriate. Of these buildings, 72,477 had standard electricity meters installed and 18,521 had advanced meters installed. Accounting for instances of agencies reporting both the advanced and standard meters in a single building as well as reporting meters in buildings not considered appropriate, overall compliance with the electric metering goal was 89.8 percent.

#### **D. FEDERAL BUILDING PERFORMANCE STANDARDS**

Section 109 of EPACK 2005, “Federal Building Performance Standards,” amended the Energy Conservation and Production Act and directed the Secretary of Energy, to issue a rule that establishes Federal building energy efficiency performance standards (42 U.S.C. § 6834(a)). The standards require that, if life-cycle cost-effective, all new Federal buildings must be designed to achieve energy consumption levels 30 percent below those of the current version of the applicable ASHRAE standard or the International Energy Conservation Code (42 U.S.C. § 6834(a)(3)(A)(i)(I)).

Ten agencies did not achieve full compliance with the mandate, but only six of these were below 95 percent compliance. Overall, agencies reported over 94.9 percent of buildings designed since 2007 are 30 percent more efficient than relevant code. Agencies also have an opportunity to revisit designs to bring them into compliance. Some agencies are also assessing performance of designs underway to determine compliance and will report these findings in future reports.

## **E. ENERGY EFFICIENT PROCUREMENT**





This section responds to the reporting requirement established in 42 U.S.C. § 8262g for the Secretary of Energy to “report on the progress, status, activities, and results of [Federal identification and procurement of energy efficient products].” As part of this report, the Secretary is directed to provide an estimate of the potential cost savings to the Federal Government from the procurement of energy-efficient products and to report on the actual quantities of energy-efficient products acquired by the Federal Government (42 U.S.C. § 8262g(d)).

Additional requirements governing the Federal procurement of energy efficient products are set forth in 42 U.S.C. § 8259b. Pursuant to this statutory mandate, each Federal agency is required to procure energy consuming products covered by the ENERGY STAR program or listed as a FEMP-designated product unless the head of the agency finds in writing that such product is neither lifecycle cost-effective nor reasonably available to meet the functional requirements of the agency (42 U.S.C. § 8259b(b)(1)-(2)). Each agency also is required to incorporate into the specifications for all procurements involving energy-consuming products and systems criteria for energy efficiency that are consistent with the criteria used for rating ENERGY STAR products and for rating FEMP-designated products (42 U.S.C. § 82659b(b)(3)).

Moreover, GSA and DLA are required to “list in their catalogues, represent as available, and supply only Energy Star products or FEMP designated products for all product categories covered by the Energy Star program or [FEMP],” except where the head of the agency finds in writing that that no such product is available to meet the agency's functional requirements or that no such product is lifecycle cost-effective (42 U.S.C. § 8259b(c)).

FEMP publishes a full listing of product categories covered by either FEMP-designated efficiency requirements or the ENERGY STAR program online at [www.femp.energy.gov/coveredproducts](http://www.femp.energy.gov/coveredproducts). This web page includes links to product overview pages, which describes the types and functions of each product identified under 42 U.S.C. § 8262g(b). FEMP is unable to determine the actual quantities of energy-consuming products acquired by the Federal Government, but undertook an extensive study to estimate these quantities and the potential cost savings associated with more energy-efficient purchases.

**Figure 9**  
**Status of Federal Compliance with Energy Efficient Product Procurement Requirements**

Requirement	Status	Description of Status
<p>GSA, DoD, and DLA, in consultation with DOE, must identify energy efficient products in its supply system (42 U.S.C. § 8262g(b))</p>		<p>GSA, DoD, and DLA identify energy-efficient products in their respective supply systems: GSA Advantage! and DoD EMALL. Both systems allow users to limit their search to energy efficient products.</p> <p>DLA has an internal process for coding products into its electronic supply systems. In contrast, GSA depends on vendors to provide information about whether or not their products are energy efficient. GSA, DoD, and DLA are collaborating with ENERGY STAR and FEMP to increase the accuracy with which they identify energy-efficient products.</p>
<p>GSA and DLA must list in their catalogues, represent as available, and supply only Energy Star products or FEMP-designated products for all product categories, except when the head of the agency ordering a product specifies in writing that an exception is warranted based on either functional needs or lifecycle cost-effectiveness (42 U.S.C. § 8259b(c))</p>		<p>Both GSA and DLA list and supply non-ENERGY STAR and FEMP-designated products in their catalogs. Despite the widespread availability of ENERGY STAR and FEMP-designated products, neither GSA nor DLA consistently prominently displays them; often non-ENERGY STAR and non-FEMP products are the first or only products listed. GSA Advantage! warns buyers who select a product that is in a covered product category but does not meet ENERGY STAR or FEMP-designated.</p>
<p>Agencies must incorporate criteria for energy efficiency into all applicable procurements (including guide specifications, project specifications, and construction, renovation, and services contracts, and into the factors for the evaluation of offers received for procurement) that are consistent with the criteria used for rating Energy Star products and for rating FEMP-designated products (42 U.S.C. § 8259b(b)(3) and FAR 23.2)</p>		<p>A 2010 FEMP review of federal agency solicitations appearing in Federal Business Opportunities found that 46 percent of the solicitations reviewed included some form of energy efficiency requirement in relevant product categories. A similar review in 2007 found that seven percent of the solicitations reviewed contained some form of energy efficiency requirement in relevant product categories.</p>
<p>Agencies must procure energy-efficient products unless the head of the agency finds in writing that an ENERGY STAR or FEMP-designated product is not life-cycle cost effective or is not reasonably available that meets the functional requirements of the agency (42 U.S.C. § 8259b and FAR 23.2)</p>		<p>Of the contracts reviewed by FEMP, over 50 percent reflected the procurement of subject products that were not ENERGY STAR or FEMP-designated products. FEMP was unable to determine if these procurement were excepted because the statute does not require agencies to file written notices of exception publically.</p>