

**Annual Report to Congress
on Federal Government
Energy Management and
Conservation Programs
Fiscal Year 2005**

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Washington, DC 20585**

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EXECUTIVE SUMMARY

OVERVIEW OF CONSUMPTION AND COSTS

This report on Federal energy management for fiscal year (FY) 2005 provides information on energy consumption in Federal buildings, operations, and vehicles and documents activities conducted by Federal agencies to meet the requirements of:

- Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended (42 U.S.C. §§ 8251-8259, 8262b-k);
- Title VIII of NECPA (42 U.S.C. § 8287-8287c);
- The Energy Policy Act of 1992 (EPACT) (42 U.S.C. § 8262c); and
- Executive Order 13123, Greening the Government Through Efficient Energy Management.

The reporting requirements of the Energy Policy Act of 2005 will be addressed in the report for FY 2006.

Overall Energy Consumption and Costs

- The Government consumed 1.1 quadrillion British thermal units (Btu) or “quads” during FY 2005 when measured in terms of energy delivered to the point of use (site-delivered energy consumption).
- The total site-delivered energy consumption in FY 2005 was 20.8 percent less than the FY 1985 base year and 2.5 percent less than in the previous year.
- The total cost of the 1.1 quads was \$14.5 billion in FY 2005.
 - Federal energy costs represented approximately 0.6 percent of the total Federal expenditures of \$2.472 trillion for all purposes in FY 2005.
- In constant 2005 dollars, Federal energy costs decreased 25.0 percent from \$19.3 billion in FY 1985 to \$14.5 billion in FY 2005.
- The Federal energy bill for FY 2005 increased 24.1 percent compared to FY 2004.
 - Overall, the unit cost of all fuel types used increased 27.2 percent, from \$9.90 per million Btu in FY 2004 to \$12.59 per million Btu.
 - Contributing to the overall increase in unit costs were increases in the prices paid by the Government for:
 - Jet fuel (47.9 percent increase),
 - Navy special fuel oil (44.6 percent increase),
 - Fuel oil (33.5 percent increase),
 - Natural gas (16.1 percent increase),
 - Diesel fuel (33.4 percent increase), and
 - Electricity (4.6 percent increase).

Four Federal Energy End-Use Sectors

- Federal agencies report energy consumption under four end-use sectors: 1) standard buildings; 2) industrial, laboratory and other energy intensive facilities; 3) exempt facilities; and 4) vehicles and equipment. Total Federal energy consumption and costs are summarized below by end-use sector:

<i>End Use</i>	<i>Trillion Btu</i>	<i>Cost</i>	<i>Cost Percentage</i>
Standard Buildings	300.0	\$4.26 Billion	29.5%
Energy Intensive Facilities	74.2	\$0.93 Billion	6.4%
Exempt Facilities	23.2	\$0.42 Billion	2.9%
Vehicles & Equipment	750.6	\$8.86 Billion	61.3%

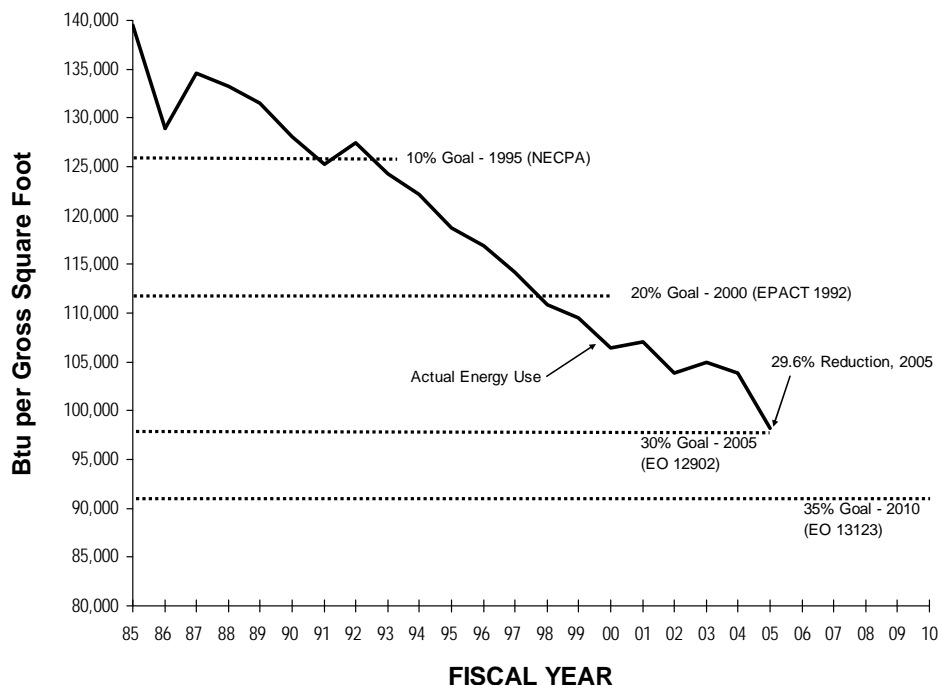
PROGRESS MADE TOWARD FEDERAL ENERGY GOALS IN FY 2005

Energy Efficiency Improvement Goals for Standard Buildings

- Section 202 of Executive Order 13123 requires each agency to reduce energy consumption per gross square foot of its standard buildings by 30 percent by 2005 and 35 percent by 2010 relative to 1985.
- Eight agencies have reduced energy use per gross square foot in standard buildings by more than 30 percent from 1985. (Purchases of certain types of renewable energy are treated as energy use reductions).
- During FY 2005, the Government as a whole decreased energy consumption per gross square foot by 29.6 percent relative to FY 1985.
 - Although the 30 percent reduction goal was narrowly missed for 2005, the Government is on track to meet the 35 percent goal for 2010 (28 percent reduction by 2005 is the goal path for meeting 35 percent reduction by 2010).
- The Government's performance for each year since FY 1985 is illustrated below.

Overall Government Progress Toward the Energy Efficiency Goals for Standard Buildings, FY 1985 through FY 2005

(Certain types of renewable energy purchases are treated as energy reductions)



Goals for Industrial, Laboratory, and Other Energy Intensive Facilities

- Section 203 of the Executive Order requires agencies to reduce energy consumption per square foot, per unit of production, or per other applicable unit, by 20 percent by 2005 and 25 percent by 2010 relative to 1990 in industrial, laboratory, and other energy intensive facilities.
- During FY 2005, eight agencies had achieved reductions greater than 20 percent compared to FY 1990. (Purchases of certain types of renewable energy are treated as energy use reductions).
- In total, the Government achieved a reduction of 17.6 percent in Btu per gross square foot in its industrial, laboratory, and other energy intensive facilities compared to FY 1990.

Greenhouse Gas Reduction Goals

- Section 201 of the Executive Order establishes a greenhouse gas reduction goal of 30 percent by 2010 compared to such emissions levels in 1990. (This goal applies to standard buildings and industrial, laboratory, and other energy-intensive facilities.)
- DOE estimates carbon emissions from agency-reported energy use using national fuel-specific emission factors, except for emissions from electricity use which are calculated using regional coefficients derived from Energy Information Administration (EIA) data. (See Appendix B for more information on the methodology.)
- The Government shows a reduction of 22.1 percent from 14.9 million metric tons of carbon equivalent (MTCE) in FY 1990 to 11.6 million MTCE in FY 2005.
- Carbon emissions decreased by 411,221 MTCE or 3.4 percent from FY 2004.

Renewable Energy Goal

- Section 503 of the Executive Order directed the Secretary of Energy, in collaboration with the heads of other agencies, to develop a goal for increased renewable energy use in the Federal Government.
- In July 2000, the Secretary of Energy approved a goal that an equivalent of 2.5 percent of electricity consumption from Federal facilities should come from *new* renewable energy sources by 2005.
 - New renewable energy only includes energy from projects or purchases of renewable energy contracted or built after 1990.
- Ten agencies have surpassed the goal of obtaining the equivalent of more than 2.5 percent of total electricity consumption from new renewable sources.
- As a whole, the Government reported purchasing or producing 13,003.8 billion Btu of new renewable energy in FY 2005, equivalent to 6.9 percent of the Federal Government's electricity use, and greatly surpassing the goal of 2.5 percent.
- Reported consumption of new renewable energy in FY 2005 was nearly double the amount reported by the agencies in FY 2004.
 - The main contributors to this increase were DOD and GSA.
 - DOD reported more than two-and-a-half times the amount of self-generated and purchased renewable energy than the previous year's accounting.

- Much of this increase is a result of DOD reporting large-scale geothermal projects and waste-to-energy systems in FY 2005 that were not accounted for in previous years.
 - In FY 2005, GSA quadrupled its purchases of renewable energy over FY 2004.
- Purchases of renewable electricity, renewable electricity certificates, and landfill gas comprised 75.7 percent of Government renewable energy use in FY 2005.
- Self-generated energy, including electricity, solar thermal applications, and geothermal heat pump installations, comprised 24.3 percent of renewable energy use.
 - On-site electricity generation from photovoltaics, wind, and other renewable sources constituted 10.5 percent the Government's renewable energy total.

Petroleum Reduction

- Section 205 of Executive Order 13123 directs agencies to minimize the use of petroleum-based fuels in buildings and facilities.
- Federal agencies reduced petroleum-based fuels by 70.0 percent in FY 2005 compared to FY 1985, from 118.8 trillion Btu to 35.7 trillion Btu.
- Compared to the previous year, use of these fuels fell by 7.1 percent.

INVESTMENTS IN ENERGY EFFICIENCY

- During FY 2005, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities:
 - Direct appropriated funding,
 - Energy savings performance contracts (ESPCs), and
 - Utility energy service contracts (UESCs).
- Funding from the three sources totaled approximately \$463.0 million in FY 2005.
 - Direct appropriations accounted for approximately \$290.6 million (not including the incremental cost of purchasing green power, renewable energy certificates, or other renewable energy generated by other entities).
 - ESPC contract modifications and awards by agencies resulted in approximately \$96.8 million in estimated contractor investment in FY 2005.
 - \$72.2 million resulted from DOE Super ESPC delivery orders and \$24.6 million resulted from other agency ESPCs.
 - \$75.6 million in private sector investment came from UESCs.
- Since 1985, the Government has invested approximately \$7.3 billion in energy efficiency.
 - \$4.2 billion of which was direct appropriations.
 - \$3.1 billion from ESPCs and UESCs.
 - \$2.0 billion from ESPCs and \$1.1 billion from UESCs.

Direct Appropriations Increase Significantly from Previous Year

- Reports from Federal agencies indicated that \$290.6 million was spent on energy efficiency projects in FY 2005, compared with \$173.8 million in FY 2004, a 67.2 percent increase. Large increases were seen in three of the top energy using agencies below:

- DOD funded \$189.0 million for energy efficiency projects in FY 2005, an increase of 55.7 percent from the previous year.
- GSA spent \$35.2 million compared to \$5.0 million in FY 2004.
- VA reported funding \$18.7 million for energy efficiency compared to \$2 million in FY 2004.

I. OVERVIEW OF FEDERAL ENERGY CONSUMPTION AND COSTS

This report on Federal energy management for fiscal year (FY) 2005 provides information on energy consumption in Federal buildings, operations, and vehicles and documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended (42 U.S.C. § 8251-8259, 8262, 8262b-k) and Title VIII of NECPA (42 U.S.C. § 8287-8287c). Activities undertaken during FY 2005 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 13123, Greening the Government Through Efficient Energy Management, are also discussed in this report. The requirements of the Energy Policy Act of 2005 will be addressed in the annual report for FY 2006.

Based on reports submitted to the Department of Energy (DOE) by 25 Federal agencies, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was approximately 1.6 quadrillion British thermal units (Btu) or “quads” during FY 2005 (see Table A-1 in Appendix A, Energy Consumption and Cost Detail Tables).¹ These 1.6 quads, consumed by the Government in buildings and operations to provide essential services to its citizens, including the defense of the Nation, represent approximately 1.6 percent of the total 99.84 quads² used in the United States. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed geographically.

When measured in terms of energy delivered to the point of use or site-delivered energy consumption, the Government consumed 1.1 quads during FY 2005 (Table A-2). Unless otherwise noted, this report uses the site-measured conversion factors to convert common units for electricity and steam to British thermal units (Btu). The total site-delivered energy consumption in FY 2005 was 20.8 percent less than the FY 1985 base year. This reduction of 302.3 trillion Btu could satisfy the energy needs of the State of Montana for more than one year.³

The total cost of the 1.1 quads was \$14.5 billion in FY 2005 and represented approximately 0.6 percent of the total Federal expenditures of \$2.472 trillion⁴ for all purposes in FY 2005.⁵ In

¹Primary energy consumption considers all energy resources used to generate and transport electricity and steam. Tables 8, 9, A-1, and A-3 show primary energy consumption while the rest of the tables in the report reflect site-delivered consumption. See Appendix B for information on energy conversion factors.

²DOE/EIA, *Monthly Energy Review March 2006*, Table 1.1. www.eia.doe.gov/emeu/mer/pdf/pages/sec1_3.pdf

³Based on energy consumption estimates for 2001 in the residential, commercial, industrial, and transportation sectors (279.8 trillion Btu). Source: DOE/EIA-0214(01), *State Energy Data: Consumption, 2001*, Table R1.

⁴*Analytical Perspectives, Budget of the United States Government, Fiscal Year 2007*

⁵Unless otherwise noted, all costs cited in this report are in constant 2005 dollars, calculated using Gross Domestic Product implicit price deflators. See Bureau of Economic Analysis web site, www.bea.gov/bea/dn/gdplev.xls.

constant 2005 dollars, this equates to a decrease of 25.0 percent from \$19.3 billion in FY 1985 to \$14.5 billion in FY 2005 (Table A-12). The reductions in energy costs from 1985 are attributable primarily to reduced energy prices and reduced Government activity, although they also reflect the effects of agency energy management efforts.

Federal energy expenditures for FY 2005 increased 24.1 percent compared to the previous year in constant 2005 dollars. Overall, the unit cost of all fuel types used increased 27.2 percent, from \$9.90 per million Btu in FY 2004 to \$12.59 per million Btu. Contributing to the overall increase in unit costs were increases in the prices paid by the Government for:

- Jet fuel (47.9 percent increase),
- Navy special fuel oil (44.6 percent increase),
- Fuel oil (33.5 percent increase),
- Natural gas (16.1 percent increase),
- Diesel fuel (33.4 percent increase), and
- Electricity (4.6 percent increase).

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 2005, the Department of Defense (DOD) spent \$11.1 billion for energy out of the total Federal energy expenditure of \$14.5 billion. Overall, DOD used 25.5 percent less site-delivered energy in FY 2005 than in FY 1985—a reflection of reduced Defense-related activity and successful energy management efforts.

Figures 1 and 2 depict the percentage of total energy used by the Federal Government in FY 2005 and its cost. As illustrated, jet fuel and electricity account for approximately 59.3 percent of the total energy consumption represented in Figure 1 and approximately 71.1 percent of the total energy costs in Figure 2.

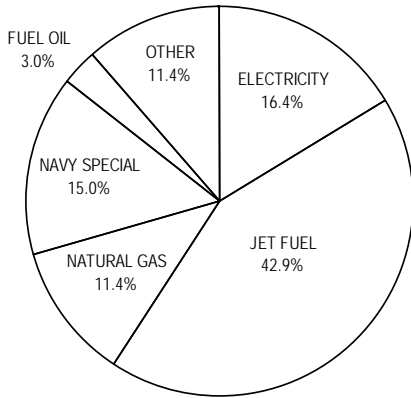
Federal agencies report energy consumption under four end-use sectors: 1) standard buildings; 2) industrial, laboratory and other energy intensive facilities; 3) exempt facilities; and 4) vehicles and equipment. Total Federal energy consumption and costs are summarized below by end-use sector:

<i>End Use</i>	<i>Trillion Btu</i>	<i>Cost</i>	<i>Cost Percentage</i>
Standard Buildings	300.0	\$4.26 Billion	29.5%
Energy Intensive Facilities	74.2	\$0.93 Billion	6.4%
Exempt Facilities	23.2	\$0.42 Billion	2.9%
Vehicles & Equipment	750.6	\$8.86 Billion	61.3%

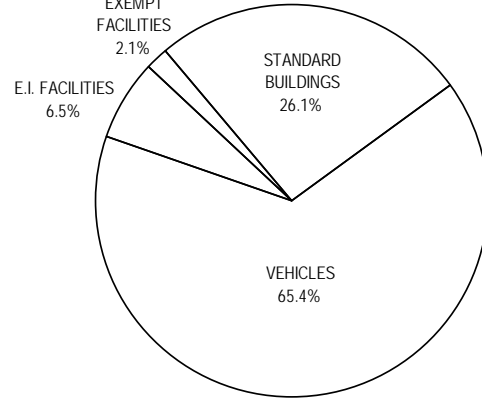
Costs noted as nominal dollars reflect the price paid at the time of the transaction and have not been adjusted to remove the effect of changes in the spending power of the dollar.

Figure 1
Federal Energy Consumption by Fuel Type and End-Use Sector, FY 2005

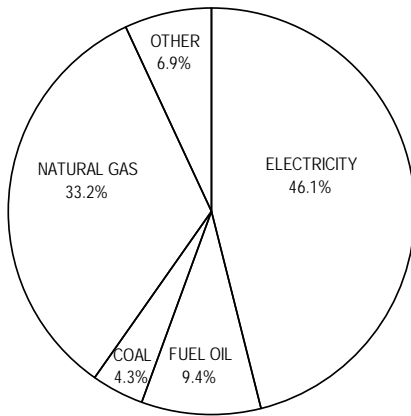
Total by Energy Type: 1.15 quads



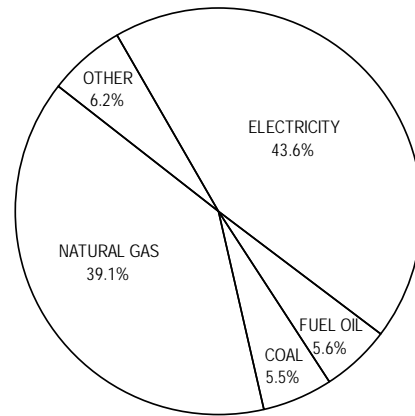
Total by End-Use Sector: 1.15 quads



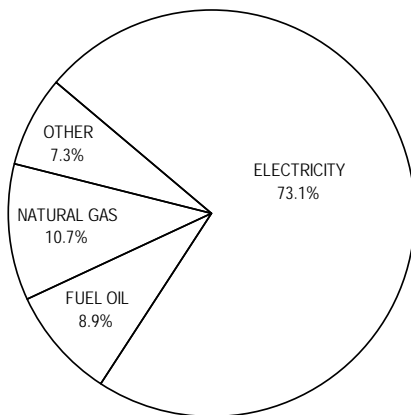
Standard Buildings: 0.30 quads



Energy Intensive Facilities: 0.07 quads



Exempt Facilities: 0.02 quads



Vehicles & Equipment: 0.75 quads

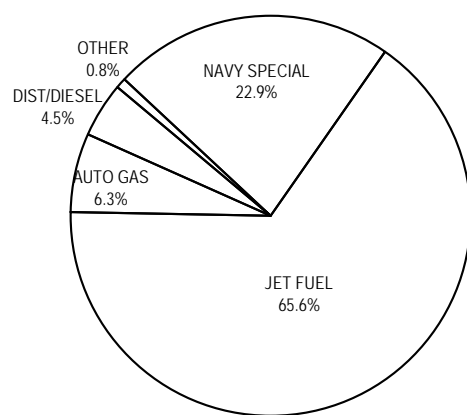
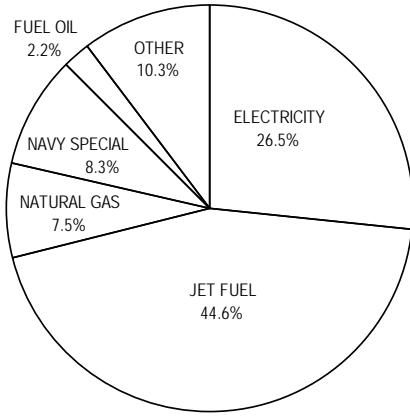
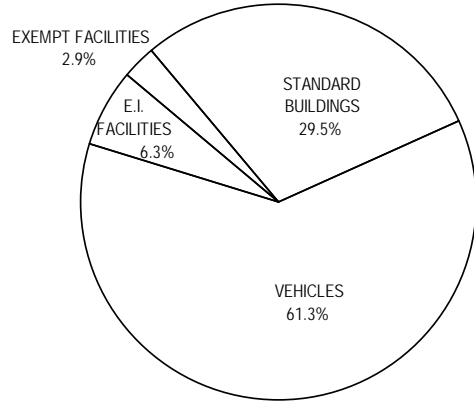


Figure 2
Federal Energy Costs by Fuel Type and End-Use Sector, FY 2005

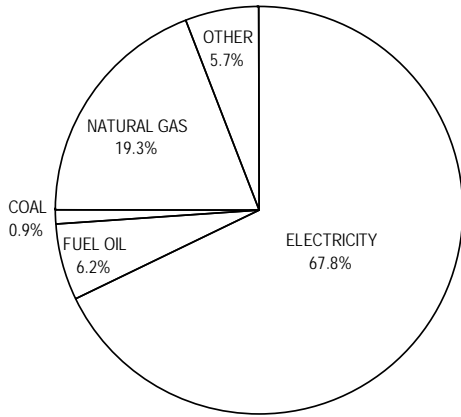
Total by Energy Type: \$14.5 Billion



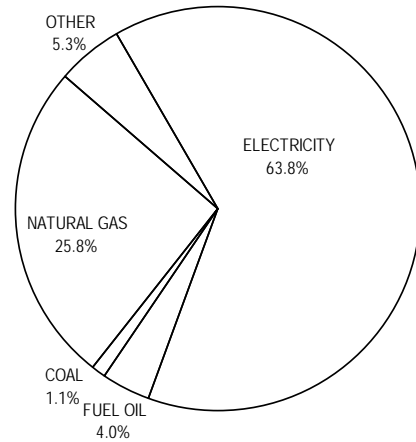
Total by End-Use Sector: \$14.5 Billion



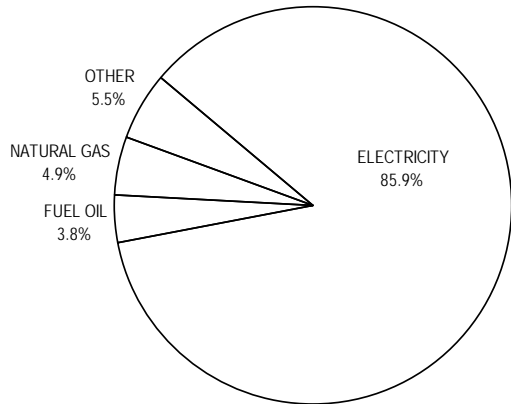
Standard Buildings: \$4.3 Billion



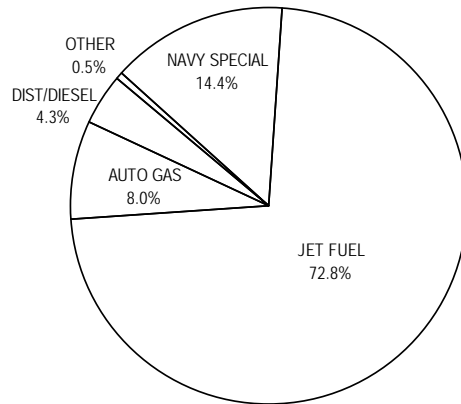
Energy Intensive Facilities: \$0.9 Billion



Exempt Facilities: \$0.4 Billion



Vehicles & Equipment: \$8.9 Billion



A. Standard Buildings

In FY 2005, the Federal Government used 300.0 trillion Btu to provide energy to 3.0 billion square feet of standard buildings space (Table A-4). This consumption represents a 27.7 percent decrease compared to FY 1985 and a 3.6 percent decrease relative to FY 2004. The significant drop from FY 1985 reflects the success of Federal energy management efforts in reducing fossil fuel use in Federal facilities as well as reduced defense-related activity. The cost of energy for buildings and facilities in FY 2005 was \$4.3 billion, an increase of approximately \$132.2 million from FY 2004 expenditures, and a decrease of 34.3 percent from the FY 1985 expenditure of \$6.5 billion (Table A-5).⁶ Of the \$4.3 billion spent for energy used in standard buildings, \$2,526.6 million was spent by DOD with the remaining \$1,731.7 million spent by the civilian agencies.

B. Industrial, Laboratory and Other Energy Intensive Facilities

In FY 2005, the Federal Government used 74.2 trillion Btu of energy in energy intensive operations, approximately 6.5 percent of the total 1.1 quads consumed. Total energy consumption in this category increased 6.5 percent relative to FY 1990 and 14.4 percent relative to FY 2004 (Table A-6). These increases resulted from changes in agency activity levels, changes in agency building classification, and energy management efforts.

The Federal Government spent \$927.1 million on energy intensive operations in FY 2005 (Table A-7), \$191.2 million more than the FY 2004 expenditure of \$735.9 million in 2005 constant dollars. Of the \$927.1 million spent for energy used in energy intensive operations, \$293.5 million was spent by DOD with the remaining \$633.5 million spent by the civilian agencies.

The industrial, laboratory, and other energy intensive facilities reported by the agencies under this category are listed at www.eere.energy.gov/femp/pdfs/eifacilities05.pdf.

C. Exempt Facilities

Ten agencies, DOD, DOE, the Departments of Health and Human Services, Homeland Security, State, and Transportation, the National Archives and Records Administration (NARA), the National Aeronautics and Space Administration (NASA), the General Services Administration (GSA), and the Tennessee Valley Authority have chosen to exempt facilities from energy management requirements. These facilities are listed at www.eere.energy.gov/femp/pdfs/exemptfac05.pdf and include:

- Structures such as outside parking garages which consume essentially only lighting energy, yet are classed as buildings.
- Buildings where energy usage is skewed significantly due to reasons such as: buildings entering or leaving the inventory during the year, buildings down-scaled operationally to

⁶Cost and consumption figures for FY 1985 may be different from those published in last year's annual report since Federal agencies update their files and provide revisions to their data.

prepare for decontamination, decommissioning and disposal, and buildings undergoing major renovation and/or major asbestos removal.

- Federal ships that consume “Cold Iron Energy” (energy used to supply power and heat to ships docked in port), and airplanes or other vehicles that are supplied with utility-provided energy.
- Buildings and facilities in which it is technically infeasible to implement energy efficiency measures or where conventional performance measures are rendered meaningless by an overwhelming proportion of process-dedicated energy.

In addition, the U.S. Postal Service has reported electricity consumption used in mail processing automation under the exempt category without reporting associated facility square footage. The Treasury Department also reported electricity used for parking lot lighting at two Internal Revenue Service sites because the electricity is separately metered.

Energy used in exempt facilities totaled 23.2 trillion Btu in FY 2005 (Table A-8), approximately 2.1 percent of the total 1.1 quads used by the Federal Government. Electricity constitutes 73.1 percent of the energy used in exempt facilities, 10.7 percent is accounted for by natural gas and 8.9 percent by fuel oil. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and “other” energy account for the remaining 7.3 percent.

The energy used in exempt facilities in FY 2005 accounted for approximately 2.9 percent of the total Federal energy bill. The Federal Government spent approximately \$416.2 million for this category’s energy during the fiscal year (Table A-9).

D. Vehicles and Equipment

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

In FY 2005, the Federal Government used approximately 750.6 trillion Btu of energy in vehicles and equipment, 65.4 percent of the total 1.1 quads consumed (Table A-10). Total energy consumption in vehicles and equipment decreased 19.7 percent relative to FY 1985 and 3.3 percent from the FY 2004 consumption of 776.4 trillion Btu. DOD consumed 697.5 trillion Btu or 92.9 percent of all vehicles and equipment energy used by the Federal Government.

The Federal Government spent almost \$8.9 billion on vehicles and equipment energy in FY 2005, almost \$2.5 billion more than the FY 2004 expenditure, a 38.7 percent increase in constant dollars. For all fuels, the cost per million Btu increased from \$8.22 in FY 2004 to \$11.80 in FY 2005. The unit cost of the most-used fuel, jet fuel, increased 47.9 percent from the previous year. Gasoline prices paid by the Government increased 8.0 percent from the previous year.

II. PROGRESS TOWARD THE GOALS OF THE NATIONAL ENERGY CONSERVATION POLICY ACT AND EXECUTIVE ORDER 13123

A. Overview of Federal Energy Management Policy and Legislative Mandates

This section of the report documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of NECPA, as amended (42 U.S.C. §§ 8251-8259, 8262, 8262b-k) and Title VIII of NECPA (42 U.S.C. § 8287-8287c). Implementation activities undertaken during FY 2005 by the Federal agencies under EPACT 1992 (42 U.S.C. § 8262c) and Executive Order 13123 are also discussed in this report.

NECPA requires Federal agencies to improve energy management in their facilities and operations. Amendments to NECPA made by the Federal Energy Management Improvement Act of 1988 (P.L. 100-615), required each agency to achieve a 10 percent reduction in energy consumption in its Federal buildings by FY 1995, when measured against a FY 1985 baseline on a Btu-per-gross-square-foot (Btu/GSF) basis (42 U.S.C. § 8253 (a)(1)). It also directed DOE to establish life-cycle costing methods and coordinate Federal conservation activities through the Interagency Energy Management Task Force. Section 543 of NECPA contained provisions requiring a reduction in Btu/GSF of 20 percent by 2000, life-cycle cost methods and procedures, budget treatment for energy conservation measures, incentives for Federal facility energy managers, reporting requirements, new technology demonstrations, and agency surveys of energy-saving potential.

On June 3, 1999, Executive Order 13123 was signed, superseding Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities. Executive Order 13123 established goals for 2005 and 2010 for both standard buildings and energy intensive facilities, addressed renewable energy use and greenhouse gas emissions from Federal facilities energy use, and provided tools to facilitate energy management at Federal agencies.

The key requirements of the statutory and Executive Order authorities are outlined in Table 1 along with findings for FY 2005.

**TABLE 1
KEY REQUIREMENTS OF STATUTORY AND EXECUTIVE ORDER AUTHORITIES**

Statute/Directive	Requirement	FY 2005 Findings	Annual Report Discussion
Section 543, NECPA Executive Order 13123	20 percent reduction (Btu/GSF) in Federal buildings by 2000 from 1985. 30 percent reduction (Btu/GSF) by 2005 from 1985. 35 percent reduction by 2010 from 1985.	Federal agencies reported a 29.6 percent decrease in energy consumption in buildings in FY 2005, compared to FY 1985.	Section II (B), page 10
Section 545, NECPA, as amended (42 U.S.C., § 8255)	Transmit to Congress the amount of appropriations requested in each agency budget for electric and energy costs incurred in operating and maintaining facilities and for compliance with applicable statutes and directives.	Approximately \$290.6 million was appropriated and spent on energy efficiency projects in Federal facilities.	Section II (I) (1), page 27
Section 546, NECPA (42 U.S.C., § 8256(a))	Establishment of a program of incentives within Federal agencies to expedite Energy Savings Performance Contracts.	In FY 2005, 20 ESPC contracts and delivery orders were awarded under DOE Super ESPCs and other agency contracts.	Section II (I) (2) page 27
Section 157, EPACKT 1992 (42 U.S.C., § 8262c)	Federal agencies to establish and maintain programs to train energy managers and to increase the number of trained energy managers within each agency.	During FY 2005, Federal agencies reported spending \$2.6 million to train 4,744 Federal personnel in energy efficiency, renewable energy, and water conservation subjects. During FY 2005, FEMP conducted 71 training workshops and symposia for more than 3,200 attendees.	Section III (B), page 33; Section IV, Agency Reports, page 37
Executive Order 13123	20 percent reduction for Federal industrial/laboratory facilities by 2005 from 1990. 25 percent reduction by 2010 from 1990.	Overall the Government reduced its energy use per gross square foot by 17.6 percent compared to FY 1990.	Section II (C), page 13 Section IV, Agency Reports, page 37

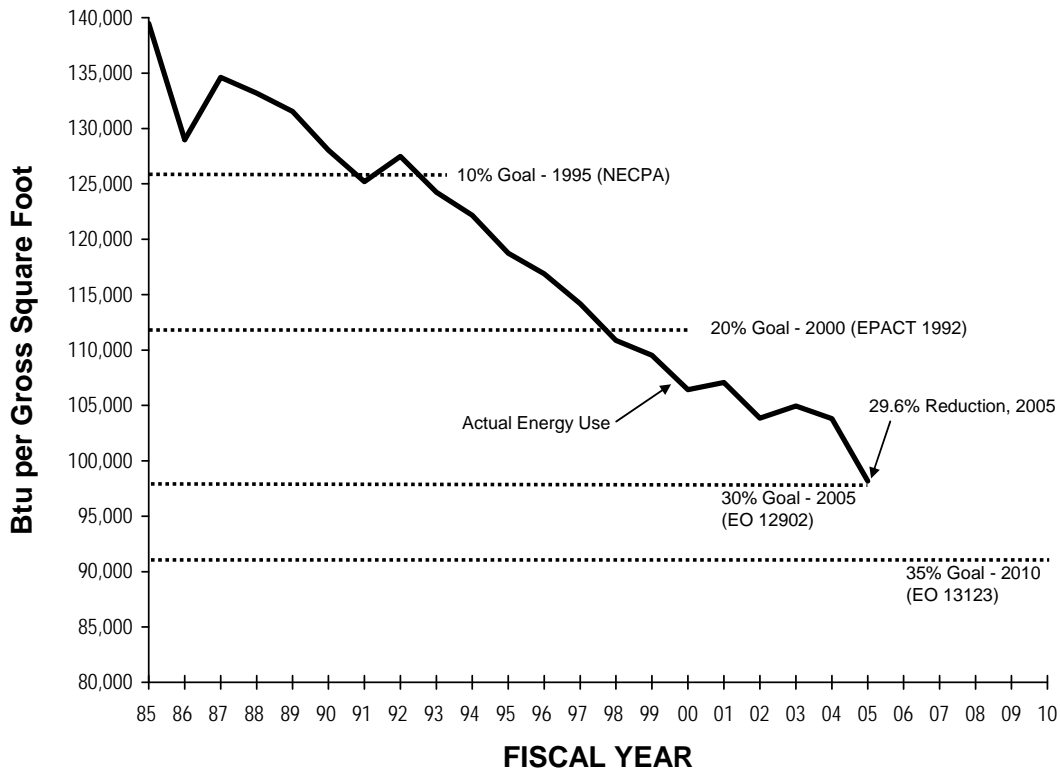
Statute/Directive	Requirement	FY 2005 Findings	Annual Report Discussion
Executive Order 13123	30 percent reduction in greenhouse gas emissions attributed to Federal facilities by 2010 from 1990.	Carbon emissions from energy used in non-exempt Federal facilities declined 22.1 percent in FY 2005 compared to FY 1990.	Section II (D), page 16
Executive Order 13123	Expand use of renewable energy by implementing renewable energy projects and by purchasing electricity from renewable sources.	Agencies reported renewable energy use in 2005 equivalent to 6.9 percent of Government facility electricity use.	Section II (E), page 18 Section IV, Agency Reports, page 37
Executive Order 13123	Minimize petroleum use within Federal facilities through use of non-petroleum energy sources and eliminating unnecessary fuel use.	The consumption of petroleum-based fuels in standard buildings and energy intensive facilities during FY 2005 decreased 70.0 percent compared to FY 1985 and 7.1 percent from FY 2004.	Section II(F), page 20
Executive Order 13123	Reduce total energy use and greenhouse gas emissions, as measured at the source. Agencies shall undertake projects to reduce source energy, even if site energy use increases.	Primary energy consumed in standard buildings and energy intensive facilities in FY 2005 decreased 12.9 percent from FY 1985 and 4.3 percent from FY 2004. Measured in terms of primary energy, Federal standard buildings show a reduction of 16.3 percent in Btu/GSF during FY 2005 compared to FY 1985.	Section II (G), page 23
Executive Order 13123	Reduce water consumption and associated energy use.	During FY 2005, all reporting agencies combined consumed almost 174.7 billion gallons of water at a cost of \$420.0 million. This was a decrease of 19.6 percent compared to the FY 2000 water consumption and an increase of 11.0 percent from the previous year.	Section II (H), page 26

B. Energy Efficiency Improvement Goals for Standard Buildings

Section 202 of Executive Order 13123 requires each agency to reduce energy consumption per gross square foot of its standard buildings by 30 percent by 2005 and 35 percent by 2010 relative to 1985. Standard buildings do not include agency-designated industrial, laboratory and other energy intensive facilities which are subject to a separate goal under Section 203 of the Order. Agencies provided data to DOE for FY 2005 indicating a decrease in energy consumption per gross square foot of 29.6 percent relative to FY 1985. Although the 30 percent reduction goal was narrowly missed for 2005, the Government is well on track to meet the 35 percent goal for 2010.

The Government's performance for each year since FY 1985 is illustrated in Figure 3. This reduction was the result of significant decreases in the consumption of fuel oil, natural gas, LPG/propane, and coal. The use of non-electric fuels in Federal buildings has declined 43.8 percent since 1985, while the consumption of electricity has increased by 8.4 percent. The installation and increased use of electricity-driven electronic equipment contributed to increases in electricity through the years. Electricity now represents about 67.8 percent of the total energy costs of Federal buildings and accounts for 46.1 percent of total site-delivered energy consumption in standard buildings. This is compared to 30.7 percent of the total site-delivered energy consumption in standard buildings in FY 1985.

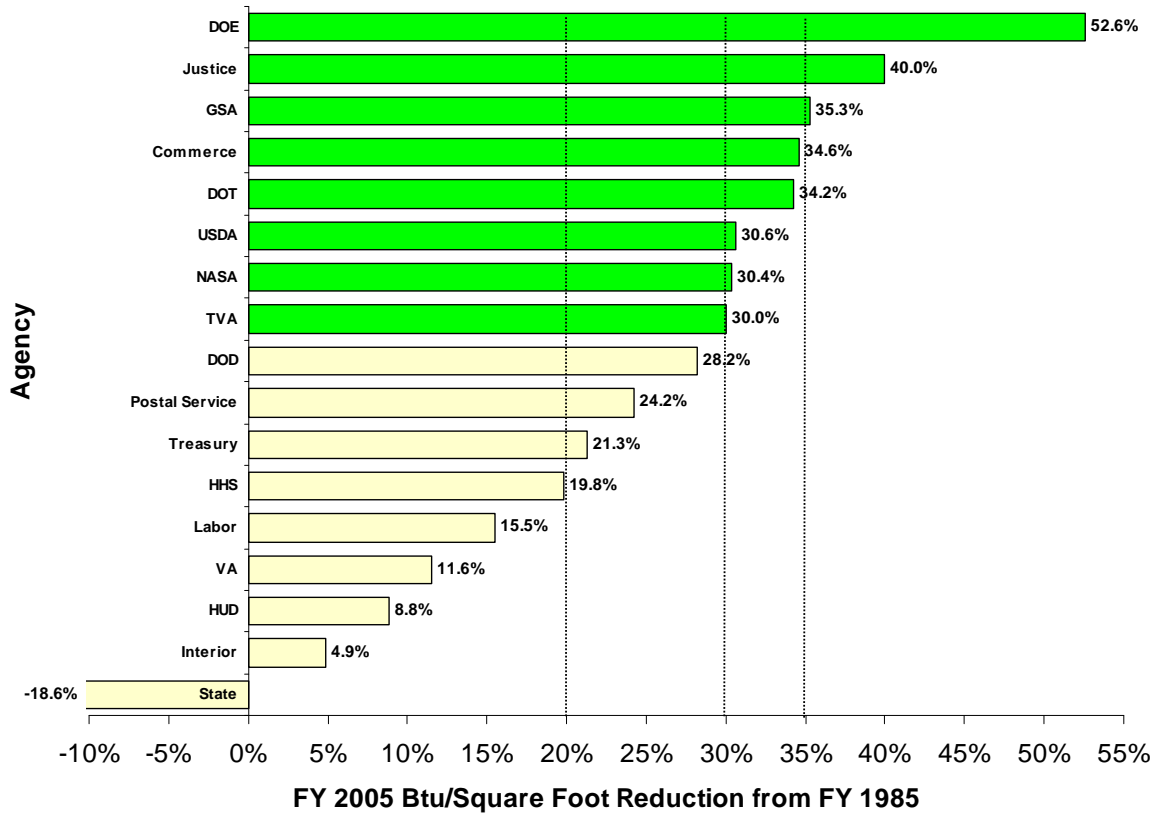
Figure 3
Overall Government Progress Toward the Energy Efficiency Goals for Standard Buildings,
FY 1985 through FY 2005



Executive Order 13123 allows agencies to credit renewable energy purchases toward their performance under the reduction goal for standard buildings. In FY 2005, these credits amounted to almost 7.8 trillion Btu that were subtracted from agencies' consumption before Btu/GSF was calculated. Similarly, Section 502(e) of the Executive Order provides credit to agencies that implement cost-effective projects that save primary energy, but not necessarily site-delivered energy. In FY 2005, these credits amounted to 1.8 trillion Btu. Without these credits, the Government's reduction in FY 2005 would have been 27.3 percent compared to FY 1985. The credits as applied to each agency are documented in Table 2.

Agency performance in FY 2005 compared to FY 1985 is illustrated below in Figure 4 and documented in Table 2. Eight agencies, the Departments of Agriculture, Commerce, Energy, Justice, Transportation, GSA, NASA, and the Tennessee Valley Authority have reduced energy use per gross square foot in standard buildings by more than 30 percent from 1985. One additional agency, the Department of Defense is on track to meet the 35 percent reduction goal for 2010 with a decline of greater than 28 percent.

Figure 4
Individual Agency Reductions in Btu per Square Foot of Standard Building Space
in FY 2005 Compared to FY 1985



Note: Dark shaded bars indicate that agencies have met the reduction goal for FY 2005.

**TABLE 2
FEDERAL STANDARD BUILDINGS SITE-DELIVERED ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 2005**

	FISCAL YEAR 1985			FISCAL YEAR 2005			% CHANGE 1985-2005
	GSF (Thou.)	Billion Btu	BTU/GSF	GSF (Thou.)	Billion Btu	BTU/GSF	
VA†	123,650.0	24,552.0	198,560	160,747.0	<i>28,228.5</i>	<i>175,609</i>	-11.6
USPS	189,400.0	16,238.3	85,736	360,484.7	23,423.7	64,978	-24.2
DOE†	60,457.1	28,603.8	473,126	67,240.4	<i>15,064.7</i>	<i>224,043</i>	-52.6
GSA†	190,966.7	15,865.6	83,080	174,762.7	<i>9,389.2</i>	<i>53,725</i>	-35.3
DOI†	54,154.4	4,762.4	87,940	62,500.4	<i>5,229.1</i>	<i>83,664</i>	-4.9
NASA†	14,623.4	3,760.1	257,130	22,351.0	<i>3,997.7</i>	<i>178,860</i>	-30.4
DHS†	0.0	0.0	NA	39,927.5	<i>3,789.5</i>	94,910	NA
USDA	24,061.0	1,953.6	81,195	45,278.8	2,551.8	56,358	-30.6
DOL	18,268.3	2,153.0	117,852	22,705.5	2,261.3	99,593	-15.5
DOJ	20,768.8	6,112.0	294,289	6,244.0	1,102.3	176,537	-40.0
DOT	32,291.1	4,614.5	142,904	7,202.2	676.8	93,971	-34.2
TVA†	4,886.6	402.4	82,357	9,333.0	<i>537.7</i>	<i>57,618</i>	-30.0
DOC†	4,522.6	540.3	119,476	4,836.2	<i>377.7</i>	<i>78,103</i>	-34.6
ST	2,597.0	232.2	89,392	3,183.2	337.5	106,020	18.6
TRSY†	4,225.0	426.0	100,830	3,590.3	<i>284.8</i>	<i>79,328</i>	-21.3
HHS	2,649.8	253.0	95,491	2,696.0	206.5	76,596	-19.8
HUD	1,432.0	116.9	81,668	1,432.0	106.6	74,441	-8.8
OTHER*†	3,172.0	406.8	128,249	9,900.5	<i>980.7</i>	<i>99,060</i>	-22.8
CIVILIAN AGENCIES							
SUBTOTAL†	752,125.8	110,993.1	147,573	1,004,415.4	<i>98,546.2</i>	<i>98,113</i>	-33.5
DOD†	2,224,527.3	304,190.0	136,744	1,953,859.2	<i>191,870.9</i>	<i>98,201</i>	-28.2
TOTAL†	2,976,653.1	415,183.1	139,480	2,958,274.6	<i>290,417.1</i>	<i>98,171</i>	-29.6

Data as of 7 June 2006

*Other includes the FCC, FEMA, NRC, OPM, PCC, RRB, SSA, and BBG/IBB. RRB and SSA are included under the Other category because they lack FY 1985 baseline data.

†Indicates that reductions were made to FY 2005 energy use and Btu/GSF (shown in italics) to reflect purchases of renewable energy. When calculating Btu/GSF, the following amounts were subtracted from agency energy use for FY 2005: VA, 304.4 BBtu (1.1% of energy use); DOE, 301.3 BBtu (2.0%); GSA, 2,147.6 BBtu (18.6%); DOI, 5.6 BBtu (0.1%); NASA, 272.5 BBtu (6.4%); DHS, 68.4 BBtu (1.8%); TVA, 4.0 BBtu (0.7%); DOC, 106.2 BBtu (21.9%); TRSY, 18.1 BBtu (6.0%); SSA, 5.5 BBtu (0.6%); civilian agencies subtotal, 3,233.7 BBtu (3.2%); DOD, 4,550.3 BBtu (2.3%); and all agencies total, 7,783.9 BBtu (2.6%). The following agencies also received Section 502(c) credits: VA, 159.7 BBtu; GSA, 2.3 BBtu; DOD, and 1,657.0 BBtu

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

C. Goals for Industrial, Laboratory, and Other Energy Intensive Facilities

Section 203 of Executive Order 13123 requires each agency to reduce energy consumption per square foot, per unit of production, or per other unit as applicable, by 20 percent by 2005 and 25 percent by 2010 relative to 1990 in industrial, laboratory, and other energy intensive facilities. The designation of these facilities is at the discretion of each agency. Table 3 documents agency progress made toward the goals for industrial, laboratory, and other energy intensive facilities. Currently, 15 agencies are reporting energy intensive facilities under the provisions of Executive Order 13123: the Departments of Agriculture (USDA), Commerce (DOC), Defense (DOD), Energy (DOE), Health and Human Services (HHS), Homeland Security (DHS), Justice (DOJ), and the Treasury, EPA, Federal Communications Commission, GSA, NASA, the Social Security Administration (SSA), TVA, and the International Broadcasting Bureau (IBB). A list of energy intensive facilities reported by each of these agencies can be found at www.eere.energy.gov/femp/pdfs/eifacilities05.pdf.

During FY 2005 eight agencies, DOC, DOD, DOE, EPA, GSA, IBB, USDA, and TVA, had already achieved reductions greater than 20 percent compared to FY 1990. Three agencies, HHS, the Treasury, and SSA, achieved reductions between 10 and 20 percent. Two agencies, the Departments of Justice and Homeland Security, were unable to provide base year data for FY 1990. As a whole, the Government achieved a reduction of 17.6 percent in Btu per gross square foot in its industrial, laboratory, and other energy intensive facilities compared to FY 1990.

DOD reports facilities that perform production or industrial functions under the energy intensive facilities category. Because the relationship between energy consumption and production varies widely between processes, DOD has decided to use energy usage per gross square foot as the performance measure for the industrial and laboratory facility category. DOD considers an entire military base an industrial facility if 60 percent or more of the base-wide energy use is for industrial purposes. DOD reported a reduction of 21.6 percent in its laboratory and industrial facilities compared to FY 1990.

In FY 2005, DOE reported a reduction in its laboratory and industrial facilities Btu per gross square foot of 26.8 percent compared to FY 1990.

The Department of Health and Human Service's energy intensive facilities include laboratories, hospitals, animal centers, health clinics, and other related support space. In FY 2005, the energy consumption of HHS energy intensive facilities declined 18.4 percent compared to FY 1990.

USDA measures the energy performance of its Agricultural Research Service based on Air-Quality-Adjusted Btu/GSF, which removes the impact of present day requirements for increased laboratory ventilation air for safety and health reasons. These requirements have become more stringent and require greater energy use than the standards that were in place in the FY 1990 base year. USDA reported a decrease of 47.5 percent from FY 1990 based on Air-Quality Adjusted Btu/GSF. Without the adjustment, the decrease would have been 16.8 percent.

In FY 2005, the Department of Justice began reporting its Bureau of Prisons (BOP) facilities (formerly categorized as standard buildings) as energy intensive facilities. Since BOP did not begin reporting its facilities until FY 1986, no revisions were made to FY 1985 data. (No

**TABLE 3
FEDERAL ENERGY INTENSIVE FACILITIES ENERGY USE
PER GROSS SQUARE FOOT, FY 1990 AND FY 2005**

	FISCAL YEAR 1990			FISCAL YEAR 2005			% CHANGE 1990-2005
	GSF (Thou.)	Billion Btu	BTU/GSF	GSF (Thou.)	Billion Btu	BTU/GSF	
DOJ	0.0	0.0	NA	57,325.3	12,916.5	225,319	NA
HHS ¹ †	18,294.7	7,738.3	422,981	24,567.2	8,482.0	345,258	-18.4
DOE†	18,852.8	7,507.9	398,237	24,291.2	7,083.7	291,615	-26.8
GSA†	10,071.3	4,354.0	432,313	20,288.5	5,893.5	290,487	-32.8
NASA†	12,787.9	4,142.9	323,972	12,159.8	3,303.9	271,710	-16.1
TRSY†	7,018.5	1,773.8	252,734	9,005.7	1,865.1	207,103	-18.1
USDA ² †	13,403.8	2,416.2	180,262	14,533.3	1,375.0	94,612	-47.5
DOC†	3,090.6	976.6	315,975	5,717.2	1,358.9	237,678	-24.8
IBB	1,012.5	1,406.9	1,389,496	962.6	910.8	946,187	-31.9
EPA†	2,090.0	747.0	357,414	3,706.7	793.5	214,065	-40.1
DHS	0.0	0.0	NA	2,437.3	549.2	225,326	NA
SSA ³	611.3	215.5	352,599	611.0	183.5	300,362	-14.8
TVA	404.9	112.2	277,180	404.9	75.2	185,799	-33.0
FCC	0.0	0.0	NA	20.1	1.1	54,726	NA
PCC ⁴	2,219.8	190.8	85,934	0.0	0.0	NA	NA
CIVILIAN AGENCIES							
SUBTOTAL†	89,858.1	31,582.1	351,467	176,030.9	44,792.0	254,455	-27.6
DOD†	183,779.2	39,209.1	213,349	158,230.2	26,459.4	167,221	-21.6
TOTAL†	273,637.3	70,791.2	258,705	334,261.1	71,251.4	213,161	-17.6

Data as of 7 June 2006

¹HHS/NIH adjusted its baseline to account for mandated air quality improvements in later years.

²USDA Agricultural Research Service laboratory facilities consumption is measured in Air-Quality Adjusted Btu/Square Foot.

³Indicates estimated baseline

⁴PCC ceased to exist in 2000.

†Indicates that reductions were made to FY 2005 energy use and Btu/GSF (shown in italics) to reflect purchases of renewable energy. When calculating Btu/GSF, the following amounts were subtracted from agency energy use for FY 2005: HHS, 12.5 BBtu (0.1% of energy use); DOE, 185.9 BBtu (2.6%); GSA, 66.2 BBtu (1.1%); NASA, 165.4 BBtu (4.8%); USDA, 0.9 BBtu (0.1%); TRSY, 26.6 BBtu (1.4%); DOC, 193.1 BBtu (12.4%); EPA, 516.8 BBtu (39.4%); civilian agencies subtotal, 1,167.4 BBtu (2.5%); DOD, 780.3 BBtu (2.9%); and all agency total 1,947.6 BBtu (2.7%). The following agencies also received Section 502(c) credits: HHS, 367.2 BBtu and DOD, 314.90 BBtu.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

revisions were provided to any year's data prior to FY 2005.) BOP facilities operate 24 hours per day, 365 days per year with energy consuming functions that include daily food preparation, dishwashing, inmate showers, laundry, and industrial activities. The performance measure DOJ uses for BOP facilities is Btu/GSF per inmate. By this measure, BOP has reduced its energy intensity by 63 percent from FY 1986. DOJ also changed the reporting of the FBI headquarters facility from the energy intensive facilities to the standard buildings category in FY 2005. DOJ has not provided FY 1990 baseline data for its energy intensive facilities.

The Treasury reports energy consumption for 9.0 million square feet of industrial space for Internal Revenue Service, Bureau of Engraving and Printing, and U.S. Mint facilities. As of FY 2005, the Treasury's industrial facilities have achieved a 18.1 percent reduction in consumption over their FY 1990 baseline on a Btu/GSF basis.

Energy use at EPA laboratories decreased by 40.1 percent from 357,414 Btu per gross square foot per year in 1990 to 214,065 Btu per gross square foot per year in FY 2005. EPA's energy intensity for FY 2005 was adjusted to reflect purchases of 516.8 billion Btu of renewable energy.

GSA's Btu/GSF in its energy intensive facilities decreased 32.8 percent compared with the 1990 base year. FY 2005 data reflects purchases of 66.2 billion Btu of renewable electricity.

NASA has elected to use Btu/GSF as the agency-wide aggregate performance measure for energy intensive facilities. Other performance measures are utilized for individual industrial facilities, space flight tracking stations, and clean rooms. The average energy intensity for NASA's energy intensive buildings was 277,138 Btu/GSF by the end of FY 2005, as compared to the FY 1990 baseline value of 323,972 Btu/GSF. This represents a decrease of 14.5 percent.

DOC's energy intensive facilities are operated by two of its bureaus: the National Institute of Standards and Technology (NIST) and the National Oceanic and Atmospheric Administration (NOAA). NIST installations are comprised of laboratories that require constant environmental space control and base electrical loads for scientific equipment and computers. NOAA Weather Service facilities operate 24 hours a day and consist of radar towers and other equipment. Marine Fisheries and Laboratories utilize refrigerators, freezers, incubators, coolers, pumps, and compressors that operate 24 hours a day. In FY 2005, DOC energy intensive facilities decreased consumption per square foot by 24.8 percent from FY 1990, from 315,975 Btu/GSF to 237,678 Btu/GSF. DOC's energy intensity for FY 2005 was adjusted to reflect purchases of 193.1 billion Btu of renewable electricity.

The International Broadcasting Bureau designates domestic and overseas Voice of America Relay Stations as energy-intensive facilities and measures using the rate-based unit of billion Btu per thousand transmitter hours (BBtu/Khrs) and a base year of 1997 due to the availability of historical metrics. In FY 2005, IBB reduced its energy intensity from 2.449 BBtu/Khrs to 1.907 BBtu/Khrs, a 22.2 percent reduction from the base year.

The Social Security Administration, which began reporting energy consumption in 1996 as an independent agency, has designated its National Computer Center as an energy intensive facility. Using FY 1996 as its base year, SSA saw a reduction of 14.8 percent in Btu/GSF in FY 2005.

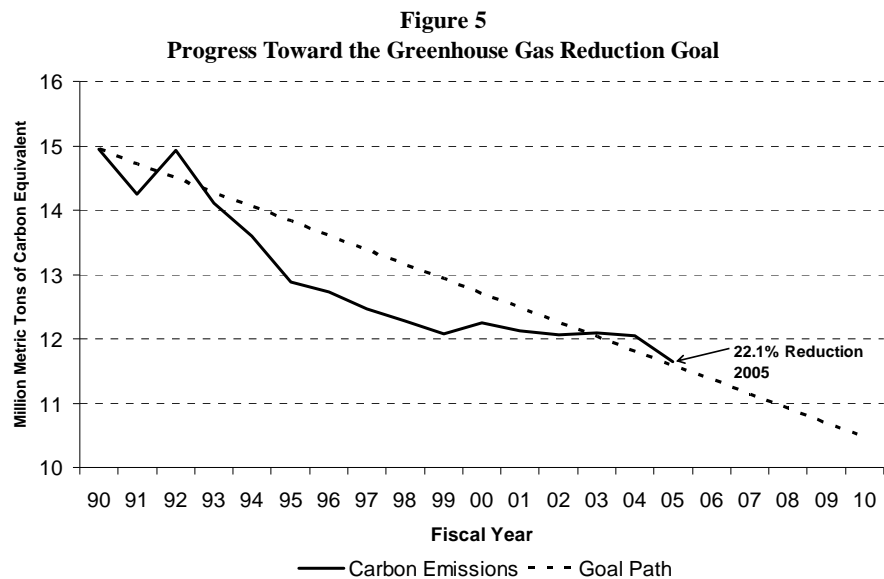
D. Greenhouse Gas Reduction Goals

Section 201 of Executive Order 13123 establishes a greenhouse gas reduction goal for Federal Government facilities. This goal applies to standard buildings subject to the energy efficiency goals of Section 202 and industrial, laboratory, and other energy-intensive facilities subject to the goals of Section 203. The requirement states:

“Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990. In order to encourage optimal investment in energy improvements, agencies can count greenhouse gas reductions from improvements in nonfacility energy use toward this goal to the extent that these reductions are approved by the Office of Management and Budget (OMB).”

DOE estimates carbon emissions from agency-reported energy use using national fuel-specific emission factors, except for emissions from electricity use which are calculated using regional coefficients derived from Energy Information Administration (EIA) data. (See Appendix B for more information on the methodology.) As shown in Table 4, when the carbon emissions from standard buildings and industrial, laboratory, and other energy-intensive facilities are combined,

the Government shows a reduction of 22.1 percent from 14.9 million metric tons of carbon equivalent (MTCE) in FY 1990 to 11.6 million MTCE in FY 2005. Much of this decline is attributable to the 35.1 percent reduction of DOD during this period. Carbon emissions decreased by 411,221 MTCE or 3.4 percent from FY 2004. Figure 5 illustrates the trend from FY 1990 through FY 2005.



The creation of the Department of Homeland Security had a significant impact on the calculation of carbon emissions of two other agencies during FY 2005. The entire building inventory of FEMA is now reported under DHS, resulting in the 100 percent decrease from previous years on Table 4. The transfer of the U.S. Coast Guard and the Transportation Security Administration from the Department of Transportation to DHS (beginning in FY 2003) resulted in DOT’s 74.0 percent decrease in carbon emissions from the base year.

Aside from FEMA and DOT, five agencies, EPA, DOD, DOE, HUD, and IBB, have reduced carbon emissions by more than 20 percent from FY 1990. Four other agencies, RRB, NASA, GSA, and the State Department, have also had declines in carbon emissions since FY 1990.

TABLE 4
ESTIMATED CARBON EMISSIONS FROM FEDERAL AGENCY FACILITY ENERGY USE
(In Metric Tons of Carbon Equivalent (MTCE))

CIVILIAN AGENCY	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 90-05
USPS	722,711	725,690	754,657	810,286	823,895	827,214	855,771	784,543	830,133	831,527	963,258	911,358	913,891	900,843	957,379	971,693	34.5
VA	687,514	689,299	691,790	704,279	708,115	704,737	730,492	741,031	748,661	747,630	754,508	802,866	792,661	824,811	841,769	827,356	20.3
DOE	904,689	862,869	887,049	884,790	871,935	856,948	832,095	793,466	748,870	732,857	710,856	735,107	723,204	743,732	712,403	663,118	-26.7
GSA	604,248	562,655	557,841	566,280	553,366	534,068	558,009	565,674	563,041	572,475	622,160	633,053	609,235	628,154	608,978	512,365	-15.2
DOJ	157,889	199,009	156,968	198,055	213,756	221,666	272,141	272,379	280,253	290,088	334,196	333,828	328,009	351,505	371,888	405,197	156.6
NASA	292,829	291,807	296,069	293,049	288,546	281,861	274,103	283,850	284,004	276,222	274,144	269,084	259,847	246,625	232,483	251,151	-14.2
HHS	224,596	196,188	217,755	226,951	229,302	194,634	208,053	231,698	228,683	219,180	238,356	244,630	251,778	253,833	272,361	287,692	28.1
DHS	0	0	0	0	0	0	0	0	0	0	0	0	0	155,550	151,068	140,755	NA
USDA	145,906	140,804	138,144	143,864	143,310	136,636	139,976	134,500	144,142	136,027	139,436	145,852	136,348	167,726	148,448	164,135	12.5
DOT	111,387	100,457	125,039	125,028	121,113	119,087	133,075	141,605	129,161	126,785	122,342	125,872	135,130	29,546	29,216	28,968	-74.0
DOI	128,167	128,690	117,470	141,425	141,276	125,679	100,587	114,268	119,429	118,863	133,143	160,813	158,565	149,275	172,048	165,132	28.8
TRSY	81,682	92,270	100,781	92,051	90,875	85,947	85,479	111,771	97,978	99,663	106,313	102,202	110,513	90,883	68,502	86,041	5.3
DOC	49,109	47,510	51,459	54,717	66,726	71,616	72,477	63,570	62,802	63,320	59,138	72,264	64,335	67,460	73,838	54,651	11.3
DOL	68,641	66,055	66,797	69,054	69,250	66,308	68,164	69,483	70,171	54,382	74,037	78,063	76,610	79,801	96,530	76,949	12.1
EPA	26,700	28,796	29,429	30,780	31,714	33,973	33,874	33,722	34,224	36,969	31,491	35,743	26,351	24,493	18,176	4,930	-81.5
TVA	20,014	19,426	19,752	21,572	30,915	34,842	34,506	33,248	31,923	31,542	30,603	31,132	30,818	30,604	30,822	29,452	47.2
IBB	33,614	22,529	22,506	22,314	20,608	21,253	23,012	27,423	25,282	22,735	23,133	9,430	34,426	35,505	31,857	9,965	-70.4
FEMA	7,862	7,321	7,461	6,834	6,488	6,465	6,509	6,559	6,573	6,706	6,885	6,608	7,161	0	0	0	-100.0
ST	15,589	15,850	15,758	2,388	4,221	4,476	14,001	5,202	5,255	5,304	6,782	5,676	11,060	12,191	14,601	15,589	0.0
HUD	6,641	6,164	5,742	5,366	5,012	4,736	5,137	4,944	4,725	4,753	4,923	4,932	4,727	4,781	3,702	4,456	-32.9
NRC	1,961	2,940	2,614	2,686	2,803	3,707	4,009	4,210	4,120	4,082	4,036	3,652	3,663	3,877	4,592	3,689	88.1
RRB	1,405	1,457	1,563	1,604	1,406	1,359	1,417	1,511	1,309	1,232	1,211	1,128	1,138	1,097	1,132	1,150	-18.2
Other	25,902	16,255	15,866	16,554	16,293	43,757	82,739	87,203	71,286	72,183	74,087	68,944	66,719	90,394	28,062	37,439	44.5
CIVILIAN AGENCIES																	
SUBTOTAL	4,319,055	4,224,041	4,282,509	4,419,925	4,440,925	4,380,968	4,535,625	4,511,859	4,492,025	4,454,530	4,715,039	4,782,238	4,746,189	4,892,686	4,869,858	4,741,872	9.8
DOD	10,624,130	10,029,510	10,650,088	9,692,082	9,150,419	8,501,381	8,193,372	7,958,137	7,785,738	7,628,420	7,535,656	7,346,187	7,311,470	7,205,783	7,180,717	6,897,481	-35.1
TOTAL	14,943,185	14,253,550	14,932,596	14,112,007	13,591,344	12,882,348	12,728,997	12,469,996	12,277,763	12,082,950	12,250,695	12,128,424	12,057,659	12,098,469	12,050,575	11,639,354	-22.1

Data as of 7 June 2006

*Other includes, for certain years, CFTC, CIA, FCC, FTC, NSF, OPM, PCC, and SSA.

Note: Carbon emission calculations were adjusted in FY 2005 for 14 agencies to reflect purchases of renewable energy. These agencies, and their corresponding credit for renewable energy purchases are: VA, 16,043 MTCE; DOE, 18,855 MTCE; GSA, 112,733 MTCE; NASA, 10,560 MTCE; HHS, 194 MTCE; DHS, 3,071 MTCE; USDA, 47 MTCE; DOI, 317 MTCE; TRSY, 2,230 MTCE; DOC, 14,932 MTCE; EPA, 27,477 MTCE; TVA, 193 MTCE; SSA, 244 MTCE; and DOD, 246,896 MTCE. Similar adjustments were made for renewable energy purchases in previous years. Sum of components may not equal total due to independent rounding.

Source: Calculated from energy consumption data from Federal Agency Annual Energy Management Data Reports, see Appendix B.

Eleven agencies have seen increases in carbon emissions from facility energy use since FY 1990, mainly due to larger building inventories and heightened industrial, laboratory, and research operations resulting in increased energy consumption.

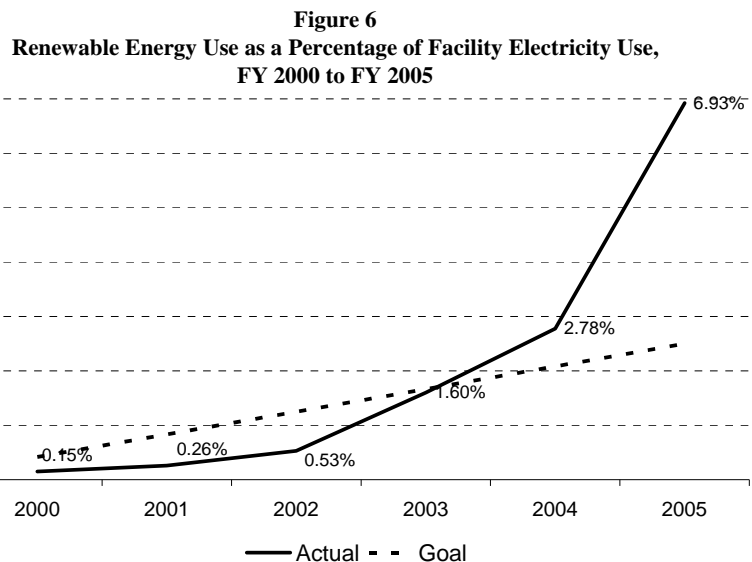
E. Renewable Energy Goal

Section 503 of Executive Order 13123 directed the Secretary of Energy in collaboration with the heads of other agencies to develop a goal for increased renewable energy use in the Federal Government. The Renewable Energy Working Group of the Interagency Energy Management Task Force worked with agency and industry representatives to develop an appropriate renewable energy goal and guidance on how to measure progress toward the goal. In July 2000, the Secretary of Energy approved a goal that the equivalent of 2.5 percent of electricity consumption from Federal facilities should come from *new* renewable energy sources by 2005. New renewable energy only includes energy from projects or purchases of renewable energy contracted or built after 1990.

Although the goal is based on Federal electricity consumption, non-electric renewable energy use is also eligible to be counted toward progress in meeting the goal.

Based on FY 2005 Federal electricity consumption of 55,035 gigawatthours (GWh), the goal for new renewable energy use in the Federal Government is 1,376 GWh. In terms of site-delivered Btu, 2.5 percent of Federal electricity consumption is equal to 4,695 billion Btu.

As shown in Table 5, Federal agencies reported purchasing or producing 13,003.8 billion Btu (3,811.2 GWh) of new renewable energy in FY 2005, equivalent to 6.9 percent of the Federal Government’s electricity use, and greatly surpassing the goal of 2.5 percent. Figure 6 illustrates that the consumption of new renewable energy in FY 2005 nearly doubled the amount reported by the agencies in FY 2004. The main contributors to this increase were DOD and GSA. DOD reported more than two-and-a-half times the amount of self-generated and purchased renewable energy than the previous year’s accounting. Much of this increase is a result of DOD reporting large-scale geothermal projects and waste-to-energy systems in FY 2005 that were not accounted for in previous years. In FY 2005, GSA quadrupled its purchases of renewable energy over FY 2004.



Purchases of renewable energy, including green power, renewable electricity credits, and landfill gas comprised 75.7 percent of Government renewable energy use in FY 2005. Self-generated energy, including electricity, solar thermal applications, and geothermal heat pump installations, comprised 24.3 percent of renewable energy use. Electricity generation from photovoltaics, wind, and other renewable sources constitutes 10.5 percent the Government's renewable energy total.

Ten agencies have surpassed the goal of obtaining the equivalent of more than 2.5 percent of total electricity consumption from renewable sources. These agencies are EPA (112.6 percent), DOC (27.4 percent), GSA (22.8 percent), NASA (8.4 percent), DOD (8.3 percent), DOE (3.3 percent), the Treasury (3.1 percent), DHS (3.0 percent), VA (2.9 percent), and TVA (2.8 percent). The Interior Department used renewable energy equivalent to 1.4 percent of its electricity use and the Railroad Retirement Board (RRB) used 1.0 percent. Six agencies reported using renewable energy, but in amounts of less than 1 percent of their electricity use.

**TABLE 5
FEDERAL AGENCY PROGRESS TOWARD THE RENEWABLE ENERGY GOAL
FY 2005**

Agency	Self-Generated Renewable Energy					Purchased Renewable Energy	Total Renewable Energy	Total Facility Electricity Use	Renewable Energy vs. Electricity Use
	Electricity	Biomass Natural Gas	Thermal Energy	Other	Total Self-Generated Renewable Energy				
	MWH	Million Btu	Million Btu	Million Btu	Billion Btu				
DOD	387,452.0	695.8	1,600,489.1	99,859.9	3,023.0	5,330.5	8,353.6	100,977.1	8.3%
GSA	60.5	0.0	2,030.0	0.0	2.2	2,252.7	2,254.9	9,893.2	22.8%
DOE	132.4	0.0	130.2	14,671.6	15.3	530.0	545.3	16,701.7	3.3%
EPA ¹	107.4	0.0	7,800.0	0.0	8.2	516.8	525.0	466.1	112.6%
NASA	295.6	0.0	0.0	0.0	1.0	462.5	463.5	5,529.7	8.4%
VA	33.5	0.0	2,920.0	0.0	3.0	304.4	307.4	10,606.4	2.9%
DOC	91.1	0.0	0.0	0.0	0.3	299.3	299.6	1,093.7	27.4%
DHS	251.8	0.0	1,666.8	0.0	2.5	68.4	71.0	2,397.5	3.0%
TVA	3,630.0	0.0	0.0	37,030.4	49.4	4.0	53.4	1,876.4	2.8%
TRSY	0.0	0.0	0.0	0.0	0.0	44.7	44.7	1,424.3	3.1%
DOI	4,410.0	0.0	5,500.0	4,100.0	24.6	5.7	30.3	2,187.9	1.4%
DOT	378.9	0.0	15,750.0	0.0	17.0	10.0	27.0	2,928.8	0.9%
HHS	0.5	0.0	0.0	0.0	0.0	12.5	12.5	3,538.2	0.4%
USDA	1,350.9	0.0	200.0	0.0	4.8	0.9	5.7	2,138.1	0.3%
SSA	28.9	0.0	0.1	0.0	0.1	5.3	5.4	747.8	0.7%
DOJ	1,099.0	0.0	4.0	0.0	3.8	0.0	3.8	4,987.3	<0.1%
USPS	150.0	0.0	0.0	0.0	0.5	0.0	0.5	18,162.2	<0.1%
RRB	0.0	0.0	0.0	0.0	0.0	0.2	0.2	15.7	1.0%
ST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	505.1	0.0%
DOL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,042.4	0.0%
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	560.2	0.0%
TOTAL	399,472.5	695.8	1,636,490.2	155,661.9	3,155.8	9,847.9	13,003.8	187,779.8	6.9%

¹EPA's renewable energy use is 112.6% of its electricity use due to its purchases and generation of non-electric renewable energy.

F. Petroleum Reduction

In FY 2005, petroleum-based fuels accounted for 788,317.3 billion Btu (0.79 quads) of the total 1.1 quads consumed by the Federal Government (Table 6). Of that, approximately 726,569.8 billion Btu (0.73 quads) were used by DOD primarily for jet fuel, navy special fuel oil, and distillate/diesel for vehicles and equipment energy. Only 0.03 quads (35,662.7 billion Btu) of petroleum-based fuels were used for Federal non-exempt facility energy.

Section 205 of Executive Order 13123 directs agencies to minimize the use of petroleum-based fuels in buildings and facilities. Federal agencies have made significant progress in reducing their dependence on fuel oil and LPG/propane in their standard buildings and energy intensive facilities. Table 7 shows that when these end-use sectors are combined, Federal agencies reduced petroleum-based fuels by 70.0 percent in FY 2005 compared to FY 1985, from 118.8 trillion Btu to 35.7 trillion Btu. Compared to the previous year, use of these fuels fell by 6.2 percent. Figure 7 illustrates this consumption for the previous 10 years and for FY 1985 and FY 1990.

Figure 7
Petroleum-Based Fuel Consumption in Federal Standard Buildings and Energy Intensive Facilities; 1985, 1990, and 1995 through 2005

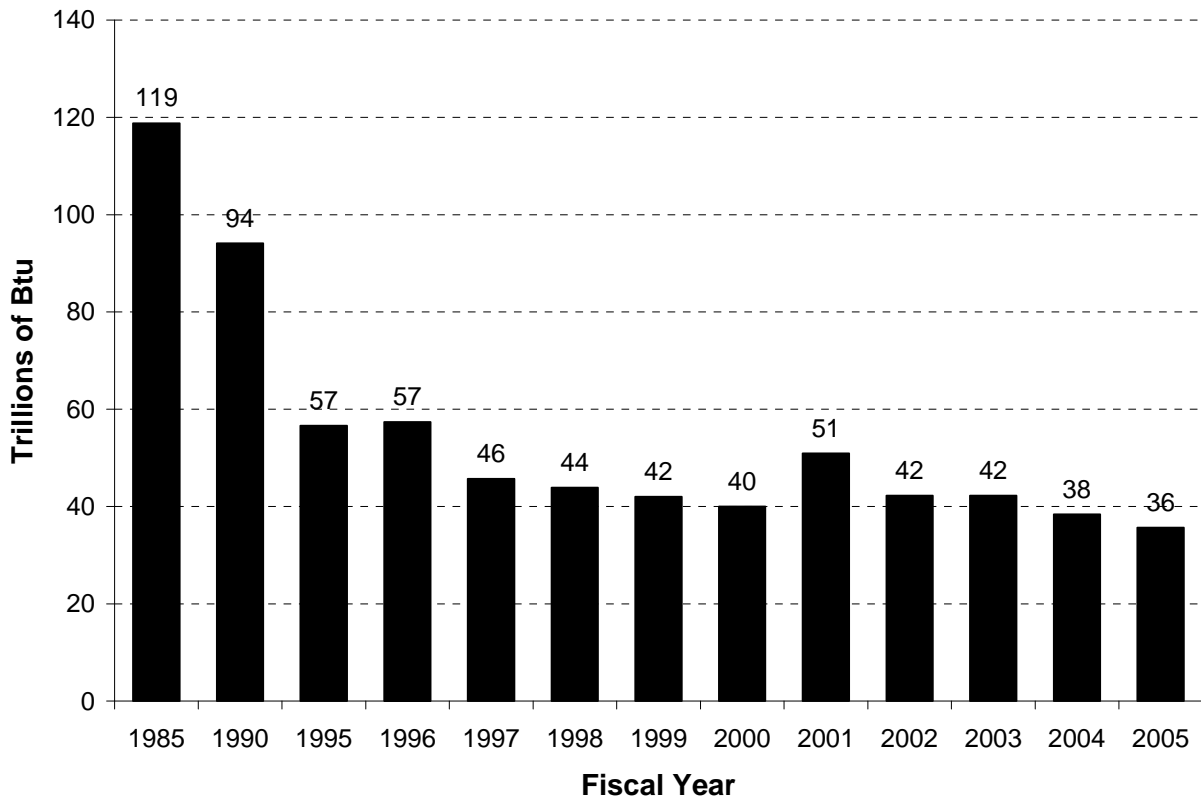


TABLE 6
FEDERAL PETROLEUM USAGE IN FY 2005
(in Thousands of Gallons, Billions of Btu, and Petajoules [Joule x 10¹⁵])

	Unit Total (K Gal)	BBTU* DOD	BBTU* Civilian	BBTU* Total	Petajoules* Total
Standard Buildings					
Fuel Oil	203,615.7	23,545.1	4,696.4	28,241.5	29.8
LPG/Propane	31,877.1	1,799.0	1,245.3	3,044.3	3.2
Energy Intensive Facilities					
Fuel Oil	29,743.3	2,009.4	2,116.0	4,125.4	4.4
LPG/Propane	2,633.7	40.0	211.5	251.5	0.3
Exempt Facilities					
Fuel Oil	14,946.1	1,689.3	383.7	2,073.0	2.2
LPG/Propane	267.9	4.0	21.6	25.6	0.0
Vehicles & Equipment					
Motor Gas	377,543.0	16,564.1	30,628.8	47,192.9	49.8
Dist-Diesel & Petrol.	243,282.7	23,522.2	10,221.1	33,743.3	35.6
Aviation Gas	3,085.5	75.6	310.1	385.7	0.4
Jet Fuel	3,786,306.4	484,607.0	7,612.9	492,219.8	519.3
Navy Special Fuel Oil	1,238,063.4	170,543.5	1,175.9	171,719.4	181.2
LPG/Propane	549.7	6.5	46.0	52.5	0.1
Other	5,242.4	2,164.1	3,078.3	5,242.4	5.5
Total		726,569.8	61,747.5	788,317.3	831.6

*Uses a conversion factor of:

95,500 BTUs/gallon for lpg/propane

138,700 BTUs/gallon for fuel oil, distillate-diesel & petroleum, and navy special fuel oil

125,000 BTUs/gallon for motor gasoline and aviation gasoline

130,000 BTUs/gallon for jet fuel

947.9 Billion BTUs/Petajoule

1,055 Petajoule/quad

Data as of 7 June 2006

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 7
PETROLEUM-BASED FUEL* CONSUMPTION IN STANDARD BUILDING & ENERGY INTENSIVE FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985. . .	FY 1990. . .	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
DOD	101,385.4	77,517.0	46,340.5	46,463.0	38,082.0	36,940.5	35,632.5	32,748.8	39,297.4	33,794.7	32,410.3	29,756.0	27,393.5	-73.0	-7.9
DOE	1,773.3	1,965.8	2,093.2	1,630.9	1,518.8	859.9	944.9	1,063.9	1,706.0	1,207.3	1,501.4	1,409.4	1,322.0	-25.4	-6.2
DOI	1,591.6	1,273.9	1,574.3	1,177.7	799.6	964.7	835.1	996.7	1,324.0	1,382.5	1,238.6	1,574.8	1,292.9	-18.8	-17.9
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,400.3	1,223.1	1,279.3	NA	4.6
USDA	900.6	732.7	426.7	367.0	377.4	387.3	170.7	226.0	327.6	422.4	460.5	586.2	911.5	-58.1	-18.2
VA	2,176.7	2,219.3	1,292.9	2,098.2	1,186.3	954.6	954.8	1,045.4	3,040.5	1,206.2	1,644.3	1,114.7	809.6	-10.1	38.1
USPS	1,673.2	1,502.2	813.9	595.2	819.0	1,139.4	821.7	857.9	1,425.5	719.9	948.5	673.7	738.4	-55.9	9.6
HHS	2,096.5	2,282.0	1,152.5	1,718.8	760.7	498.6	492.3	751.4	897.0	636.6	887.3	477.4	612.9	-70.8	28.4
IBB	0.0	1,055.2	375.6	386.0	415.0	395.0	472.7	472.7	472.7	660.1	447.2	416.3	380.9	NA	-8.5
DOJ	381.7	371.6	286.2	354.9	247.2	212.7	219.1	240.5	261.5	289.0	188.8	161.1	284.3	-25.5	76.4
NASA	652.6	896.4	360.9	446.5	253.4	239.6	212.7	206.1	265.2	229.0	312.3	308.6	219.6	-66.4	-28.9
DOL	437.8	331.2	210.8	220.6	254.2	226.1	188.9	193.2	210.0	405.0	362.4	337.4	181.8	-58.5	-46.1
DOC	157.2	77.6	354.8	695.7	55.2	44.3	48.2	77.7	56.6	33.7	122.5	42.8	69.2	-56.0	61.7
TRSY	22.5	291.4	117.1	116.5	57.4	45.2	65.7	120.7	102.1	80.1	61.5	60.4	55.0	144.9	-8.9
GSA	3,120.0	2,040.4	250.3	310.7	183.1	125.0	111.3	121.1	466.7	99.7	108.4	103.0	50.1	-98.4	-51.4
SSA	0.0	0.0	0.0	27.7	29.2	28.5	3.5	40.2	37.7	50.9	44.0	40.6	31.5	NA	-22.5
EPA	16.7	5.9	43.4	51.8	26.2	9.6	19.9	33.7	113.3	17.7	73.8	95.4	26.2	56.8	-72.6
DOT	2,380.4	1,524.1	912.2	709.9	670.9	817.2	824.3	815.0	928.2	1,014.2	3.8	3.4	2.3	-99.9	-33.1
TVA	4.2	3.2	3.9	4.1	0.0	3.0	2.9	1.9	1.5	1.5	1.5	1.9	1.5	-65.1	-23.6
FCC	1.7	1.9	1.3	1.7	1.7	1.7	1.7	0.6	0.6	0.6	0.6	0.0	0.3	-83.2	NA
HUD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	NA	NA
ST	0.0	0.0	0.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA
TOTAL	118,772.1	94,091.9	56,610.3	57,398.8	45,737.4	43,892.8	42,023.0	40,013.5	50,934.1	42,251.0	42,217.7	38,386.3	35,662.7	-70.0	-7.1
MBOE	20.4	16.1	9.7	9.9	7.9	7.5	7.2	6.9	8.7	7.3	7.2	6.6	6.1		
PETAJoule	125.3	99.3	59.7	60.6	48.3	46.3	44.3	42.2	53.7	44.6	44.5	40.5	37.6		

Data as of 7 June 2006

*Petroleum-based fuels comprise fuel oil and LPG/propane.

Note: Ellipses after fiscal year (1985. . .) indicate where intervening years' data are left off the table, but available upon request from FEMP.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

G. Source Energy

Section 206 of Executive Order 13123 directs the Federal Government to strive to reduce primary energy use as measured at the source of generation. Primary energy consumption considers all resources used to generate and transport electricity and steam. The source conversion factors of 11,850 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to estimate primary energy consumption. See Appendix B for conversion factors used to calculate site-delivered energy consumption.

Table 8 shows that when Federal standard buildings and energy intensive facilities are combined, primary energy use for these sectors declined 12.6 percent in FY 2005 compared to FY 1985, from 882.9 trillion Btu to 771.4 trillion Btu. Compared to FY 1990 consumption of 953.3 trillion Btu, FY 2005 primary energy use declined 19.1 percent. Primary energy used in Federal facilities during FY 2005 decreased 4.5 percent from the previous year.

Table 9 shows Federal agency progress toward the Executive Order 13123 goals for standard buildings in terms of primary energy use per gross square feet. Measured in terms of primary energy, the Federal Government shows a reduction of 16.3 percent in FY 2005 compared to FY 1985. The large difference from the site-delivered Btu/GSF reduction of 29.6 percent (as shown previously in Table 2) reflects the significant declines in direct use of fossil fuels and the offsetting increases in the share of the fuel mix contributed by electricity. Similarly, appendix Table A-3 shows primary energy use for standard buildings in absolute terms.

TABLE 8
PRIMARY ENERGY USE IN STANDARD BUILDINGS AND ENERGY INTENSIVE FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985...	FY 1990...	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
DOD	611,431.9	663,669.2	556,998.3	535,338.8	517,439.5	507,265.7	499,669.2	492,646.7	482,168.3	480,472.1	474,371.8	471,709.5	448,121.1	-26.7	-5.0
USPS	40,143.9	47,824.8	57,606.8	59,866.0	54,696.6	57,068.7	58,333.5	66,217.4	62,202.1	62,145.5	60,810.9	63,678.4	64,656.4	61.1	1.5
VA	42,864.1	44,400.3	47,474.3	48,716.5	49,087.3	49,577.6	49,880.1	49,633.7	52,031.5	52,217.8	53,840.6	54,694.9	54,263.0	26.6	-0.8
DOE	66,407.8	67,974.2	62,984.0	63,641.4	61,787.1	58,157.8	43,158.0	56,356.8	52,584.0	56,996.4	58,101.2	56,585.1	52,884.6	-20.4	-6.5
GSA	45,589.4	39,162.3	36,535.0	37,391.2	37,560.1	37,315.3	38,308.1	40,614.0	41,558.5	40,737.5	41,920.6	41,404.9	33,612.9	-26.3	-18.8
DOJ	9,048.5	9,512.4	14,011.9	17,152.6	17,158.5	17,788.9	18,504.8	20,975.6	21,300.1	21,209.2	23,402.7	24,556.5	26,693.2	195.0	8.7
HHS	10,128.1	13,188.4	12,084.2	12,806.8	14,530.7	14,178.7	13,700.9	14,633.6	15,334.3	15,696.3	16,111.2	16,672.1	18,125.7	79.0	8.7
NASA	17,379.0	20,954.2	21,138.1	20,450.0	21,083.5	21,075.6	20,458.0	19,625.0	19,363.4	19,018.2	18,433.6	17,741.3	18,067.2	4.0	1.8
DOI	8,542.8	7,616.8	7,770.1	6,274.6	7,311.3	7,533.8	7,631.3	8,202.1	9,685.2	9,690.9	9,071.2	11,428.7	10,655.6	24.7	-6.8
USDA	7,947.0	9,668.0	9,502.6	9,594.9	9,266.1	9,735.0	9,252.2	9,339.8	9,620.5	9,078.5	10,703.0	9,548.5	10,096.3	27.0	5.7
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10,750.2	10,479.6	10,089.8	NA	-3.7
TRSY	1,723.3	5,542.2	6,009.7	5,888.1	7,603.2	6,873.1	7,025.6	7,148.0	6,972.5	7,032.5	6,021.9	5,882.8	5,671.3	229.1	-3.6
DOL	3,734.1	3,916.2	3,979.2	4,100.5	4,137.2	4,167.4	3,264.6	4,392.2	4,666.0	4,813.7	5,068.9	4,997.8	4,855.8	30.0	-2.8
DOC	3,075.3	3,283.4	4,906.7	4,800.0	4,399.8	4,300.2	4,392.8	3,963.2	4,893.3	4,400.0	4,558.2	4,804.5	3,720.2	21.0	-22.6
TVA	1,779.5	1,830.1	2,797.8	2,716.4	2,598.7	2,557.5	2,587.7	2,426.7	2,427.1	2,210.2	2,220.6	2,188.2	2,113.8	18.8	-3.4
DOT	8,746.5	7,217.0	8,472.5	9,647.7	10,021.9	9,062.4	8,996.8	8,810.5	8,849.0	9,326.2	1,979.3	1,969.9	1,881.9	-78.5	-4.5
ST	702.6	833.6	260.3	795.4	299.9	301.7	306.3	389.6	324.4	738.6	840.9	975.1	1,040.4	48.1	6.7
EPA	1,644.1	1,643.0	2,165.1	2,128.9	2,107.9	2,114.9	2,334.5	1,959.9	2,297.0	2,089.6	2,322.2	2,467.7	690.5	-58.0	-72.0
HUD	356.2	435.0	322.3	339.2	326.7	316.5	324.2	324.2	336.7	327.8	324.8	312.8	305.9	-14.1	-2.2
OTHER*	1,668.4	4,642.8	6,110.0	9,022.8	9,746.0	8,425.2	8,203.4	8,115.1	7,980.9	10,080.9	9,442.4	5,394.6	3,839.4	130.1	-28.8
TOTAL	882,912.5	953,313.9	861,128.9	850,671.8	831,162.0	817,816.0	796,332.0	815,774.1	804,594.8	808,281.9	810,296.2	807,492.9	771,385.0	-12.6	-4.5
MBOE	151.5	163.6	147.8	146.0	142.7	140.4	136.7	140.0	138.1	138.7	139.1	138.6	132.4		
PETAJOULE	931.4	1,005.7	908.5	897.4	876.8	862.8	840.1	860.6	848.8	852.7	854.8	851.9	813.8		

Data as of 7 June 2006

*Other includes, for certain years, CIA, FCC, FEMA, FTC, NARA, NRC, OPM, RRB, SSA, and IBB.

Notes: Renewable energy purchases have been accounted for, having the effect of reducing primary energy consumption in FY 2005 for the following agencies by the noted amounts: DOD, 17,000.0 BBtu; VA, 1,057.2 BBtu; DOE, 1,692.0 BBtu; GSA, 7,688.7 BBtu; HHS, 13.3 BBtu; NASA, 773.4 BBtu; DOI, 19.6 BBtu; USDA, 3.0 BBtu; DHS, 237.7 BBtu; TRSY, 155.3 BBtu; DOC, 1,039.6 BBtu; TVA, 13.9 BBtu; and EPA, 1,785.3 BBtu.

Ellipses after fiscal year (1985. . .) indicate where intervening years' data are left off the table, but available upon request from FEMP.

Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 9
FEDERAL STANDARD BUILDINGS PRIMARY ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 2005

	FISCAL YEAR 1985			FISCAL YEAR 2005			% CHANGE 1985-2005
	GSF (Thou.)	Billion Btu	BTU/GSF	GSF (Thou.)	Billion Btu	BTU/GSF	
USPS	189,400.0	40,143.9	211,953	360,484.7	64,656.4	179,360	-15.4
VA†	123,650.0	42,864.1	346,657	160,747.0	<i>54,263.0</i>	<i>337,568</i>	-2.6
DOE†	60,457.1	48,300.5	798,922	67,240.4	<i>32,957.5</i>	<i>490,144</i>	-38.6
GSA†	190,966.7	40,134.3	210,164	174,762.7	<i>23,475.5</i>	<i>134,328</i>	-36.1
DOI†	54,154.4	8,542.8	157,748	62,500.4	<i>10,655.6</i>	<i>170,489</i>	8.1
NASA†	14,623.4	8,899.9	608,608	22,351.0	<i>10,441.7</i>	<i>467,169</i>	-23.2
DHS†	0.0	0.0	NA	39,927.5	<i>9,069.7</i>	<i>227,154</i>	NA
USDA	24,061.0	4,156.4	172,746	49,831.2	6,161.9	123,655	-28.4
DOL	18,268.3	3,734.1	204,404	22,705.5	4,855.8	213,860	4.6
DOJ	20,768.8	9,048.5	435,679	6,244.0	2,777.0	444,747	2.1
DOT	32,291.1	8,746.5	270,863	7,202.2	1,881.9	261,295	-3.5
TVA†	4,886.6	1,349.0	276,067	9,333.0	<i>1,852.5</i>	<i>198,493</i>	-28.1
ST	2,597.0	702.6	270,529	3,183.2	1,040.4	326,841	20.8
DOC†	4,522.6	1,208.3	267,167	4,836.2	<i>1,035.9</i>	<i>214,201</i>	-19.8
TRSY†	4,225.0	1,094.9	259,142	3,590.3	<i>804.4</i>	<i>224,049</i>	-13.5
HHS	2,649.8	677.7	255,759	2,696.0	546.0	202,522	-20.8
HUD	1,432.0	356.2	248,708	1,432.0	305.9	213,617	-14.1
OTHER*†	3,172.0	1,087.7	342,897	9,900.5	<i>2,764.7</i>	<i>279,244</i>	-18.6
CIVILIAN AGENCIES							
SUBTOTAL†	752,125.8	221,047.4	293,897	1,061,363.8	<i>229,545.7</i>	<i>216,274</i>	-26.4
DOD†	2,224,527.3	512,581.0	230,422	1,953,859.2	<i>392,228.1</i>	<i>200,745</i>	-12.9
TOTAL†	2,976,653.1	733,628.3	246,461	3,015,223.0	<i>621,773.8</i>	<i>206,212</i>	-16.3

Data as of 7 June 2006

*Other includes the FCC, FEMA, NRC, OPM, PCC, RRB, SSA, and BGG/IBB. RRB and SSA are included under the Other category because they lack FY 1985 baseline data.

†Indicates that reductions were made to FY 2005 energy use and Btu/GSF (shown in italics) to reflect purchases of renewable energy. When calculating Btu/GSF, the following amounts were subtracted from agency energy use for FY 2005: VA, 1,057.2 BBtu; DOE, 1,046.3 BBtu; GSA, 7,458.7 BBtu; NASA, 352.1 BBtu; DOI, 19.6 BBtu; DHS, 237.7 BBtu; TVA, 13.9 BBtu; DOC, 368.9 BBtu; TRSY, 63.0 BBtu; SSA, 18.9 BBtu; and DOD, 15,030.0 BBtu.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

H. Water Conservation

Under Section 207 of Executive Order 13123, agencies are required to reduce water consumption and associated energy use in their facilities to reach the goals set under Section 503(f) of the Executive Order.

The water conservation goals require agencies to implement life-cycle cost-effective water efficiency programs that include developing a comprehensive water management plan and at least four separate Water Efficiency Improvement Best Management Practices (BMPs), as defined in DOE guidance documents. The goals include the following schedule for program implementation in agencies' facilities:

- 5 percent of facilities by 2002,
- 15 percent of facilities by 2004,
- 30 percent of facilities by 2006,
- 50 percent of facilities by 2008, and
- 80 percent of facilities by 2010.

Eleven agencies reported that at least 20 percent of their facilities have implemented comprehensive water management plans. These agencies are DOC, DOD, DOI, the Nuclear Regulatory Commission, RRB, SSA, NASA, HHS, the Treasury, GSA, and EPA. Eleven agencies also reported having implemented at least four BMPs in at least 20 percent of their facilities. These agencies are DOC, DOD, the Nuclear Regulatory Commission, RRB, SSA, NASA, NARA, HHS, the Treasury, GSA, and EPA. Of the remaining agencies, seven reported implementing water management plans and BMPs in at least some of their facilities, and five reported no facilities with plans or BMPs.

FY 2000 water consumption data are used by agencies as baseline usage to measure progress in water conservation efforts. Agencies use actual data where available or develop estimates where actual data are not available. During FY 2005, all reporting agencies combined consumed almost 174.7 billion gallons of water at a cost of \$420.0 million. This was a decrease of 19.6 percent compared to the FY 2000 water consumption level of 217.4 billion gallons, and a decrease of 11.0 percent from the previous year.

I. Investments in Energy Efficiency

During FY 2005, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities: direct appropriated funding, energy savings performance contracts (ESPCs), and utility energy service contracts (UESCs). Known funding from the three sources totaled approximately \$463.0 million in FY 2005. Direct appropriations accounted for approximately \$290.6 million. ESPC contract modifications and awards by agencies with limited authority resulted in approximately \$96.8 million in estimated contractor investment in FY 2005 (\$72.2 million from DOE Super ESPC delivery orders and \$24.6 million from other agency ESPCs), and approximately \$75.6 million in private sector investment came from utility energy service contracts.

Since 1985, the Government has invested approximately \$7.3 billion in energy efficiency, almost \$4.2 billion of which was direct appropriations and \$3.1 billion from ESPCs and UESCs (\$2.0 billion from ESPCs and \$1.1 billion from UESCs).

1. Direct Appropriations

Section 545 of NECPA requires each agency, in support of the President's annual budget request to Congress, to specifically set forth and identify funds requested for energy conservation measures (42 U.S.C. § 8255). Table 10-A presents agency funding (in nominal dollars) reported from FY 1985 through FY 2005 for energy conservation retrofits and capital equipment. Table 10-B presents the same information in constant 2005 dollars. Reports from Federal agencies indicated that \$290.6 million was spent on energy efficiency projects in FY 2005, compared with \$173.8 million in FY 2004, a 67.2 percent increase. In some cases, the data provided by the agencies include funding from operation and maintenance accounts that was specifically identified as contributing to energy efficiency.

DOD funded \$189.0 million for energy efficiency projects in FY 2005, an increase of 55.7 percent from the previous year. GSA spent \$35.2 million compared to \$5.0 million in FY 2004. Similarly, VA reported funding \$18.7 million for energy efficiency compared to \$2 million in FY 2004.

2. Energy Savings Performance Contracting

At the end of FY 2003, the authority granted by Congress to Federal agencies to enter into ESPCs expired. Authority was retroactively reinstated at the start of FY 2005 ((Sec. 1090(a), Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005; P.L. 108-375).

During FY 2005, 20 ESPC contracts or delivery orders were awarded at five agencies. These include delivery orders awarded through the DOE/FEMP Super ESPC programs as well as projects awarded by the DOD. Project investment from these projects totaled approximately \$96.8 million, providing the Government with an opportunity to save more than 726.4 billion Btu each year. Details of these contract awards are provided by agency in Table 11.

TABLE 10-A
AGENCY DIRECT APPROPRIATIONS FOR ENERGY EFFICENCY PROJECTS, FY 1985 THROUGH FY 2005
(Thousands of Nominal (As-Spent) Dollars)

AGENCY	FY 1985..	FY 1990..	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 0405
DOD	\$136,100	\$1,020	\$189,600	\$112,487	\$118,970	\$191,446	\$91,243	\$44,442	\$57,113	\$60,600	\$103,490	\$121,400	\$188,961	55.7
GSA	\$6,700	\$11,125	\$7,242	\$7,400	\$20,000	\$0	\$25,000	\$17,000	\$5,000	\$4,500	\$4,800	\$5,000	\$35,213	604.3
VA	\$13,000	\$11,200	\$11,960	\$3,700	\$7,400	\$13,000	\$10,500	\$0	\$15,000	\$898	\$686	\$2,000	\$18,700	835.0
NASA	\$11,800	\$2,943	\$20,666	\$30,266	\$15,919	\$13,813	\$18,509	\$11,731	\$6,045	\$9,389	\$8,501	\$11,118	\$10,950	-1.5
DOI	\$3,198	\$0	\$779	\$891	\$0	\$160	\$1,730	\$23,999	\$3,220	\$22,800	\$26,134	\$5,740	\$7,592	32.3
HHS	\$0	\$427	\$1,271	\$2,676	\$2,879	\$2,200	\$4,793	\$8,440	\$8,640	\$1,771	\$3,700	\$2,984	\$7,363	151.0
EPA	\$0	\$0	\$1,720	\$1,600	\$1,600	\$0	\$0	\$0	\$1,963	\$1,684	\$2,439	\$3,458	\$3,790	9.6
DOC	\$0	\$0	\$0	\$0	\$0	\$330	\$0	\$257	\$257	\$1,883	\$621	\$3,537	\$3,405	-3.7
DHS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,700	\$1,740	\$2,714	56.0
USDA	\$2,500	\$1,547	\$2,894	\$5,983	\$3,891	\$1,765	\$994	\$1,954	\$2,100	\$3,818	\$2,000	\$2,958	\$2,655	-10.2
TRSY	\$0	\$1,134	\$2,810	\$170	\$2,990	\$1,400	\$1,495	\$2,152	\$4,670	\$8,678	\$7,854	\$8,662	\$2,379	-72.5
DOT	\$13,660	\$0	\$3,793	\$2,585	\$3,176	\$3,000	\$9,005	\$2,664	\$4,321	\$2,085	\$1,243	\$978	\$2,318	137.0
DOE	\$14,800	\$19,500	\$30,200	\$0	\$0	\$0	\$0	\$0	\$2,000	\$1,400	\$1,500	\$1,963	\$1,951	-0.6
SSA	\$0	\$0	\$0	\$0	\$0	\$2,776	\$1,000	\$1,000	\$1,000	\$500	\$175	\$500	\$885	77.0
DOJ	\$0	\$6,100	\$994	\$1,559	\$2,091	\$1,500	\$1,615	\$1,170	\$489	\$968	\$223	\$1,300	\$651	-49.9
DOL	\$238	\$17	\$0	\$366	\$0	\$0	\$40	\$0	\$0	\$0	\$0	\$0	\$448	NA
NARA	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9	\$68	\$140	\$100	\$295	195.0
TVA	\$0	\$0	\$4,277	\$522	\$1,158	\$1,466	\$1,022	\$284	\$300	\$365	\$400	\$336	\$278	-17.1
RRB	\$0	\$0	\$33	\$0	\$38	\$23	\$0	\$0	\$35	\$10	\$15	\$15	\$15	0.0
STATE	\$0	\$0	\$0	\$0	\$1,902	\$51	\$1,238	\$0	\$260	\$4	\$847	\$70	\$0	-100.0
HUD	\$0	\$0	\$43	\$0	\$2,418	\$0	\$0	\$0	\$55	\$22	\$68	\$8	\$0	-100.0
CIA	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$18,600	\$0	\$2,770	\$0	\$0	NA
NRC	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$226	\$0	\$0	\$0	\$0	NA
PC C	\$1,274	\$361	\$14	\$23	\$3	\$104	\$0	\$0	\$0	\$0	\$0	\$0	\$0	NA
USPS	\$55,300	\$4,000	\$10,050	\$9,000	\$16,000	\$31,000	\$38,000	\$6,000	\$0	\$0	\$0	\$0	\$0	NA
Total	\$258,560	\$59,374	\$288,346	\$179,228	\$200,435	\$264,034	\$206,184	\$121,093	\$131,302	\$121,442	\$169,306	\$173,815	\$290,563	67.2

Data as of 7 June 2006

Notes: Does not include energy savings performance contracts, utility energy service contracts, and utility demand side management incentives. Ellipses after fiscal year (1985..) indicate where intervening years' data are left off the table, but available upon request from FEMP. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 10-B
AGENCY DIRECT APPROPRIATIONS FOR ENERGY EFFICENCY PROJECTS, FY 1985 THROUGH FY 2005
(Thousands of Constant 2005 Dollars)

AGENCY	FY 1985..	FY 1990..	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 04/05
DOD	\$250,184	\$1,596	\$262,968	\$150,384	\$152,136	\$234,903	\$107,219	\$50,388	\$64,244	\$67,110	\$111,640	\$125,673	\$188,961	50.4
GSA	\$12,316	\$17,410	\$10,044	\$9,893	\$25,575	\$0	\$29,377	\$19,274	\$5,624	\$4,983	\$5,178	\$5,176	\$35,213	580.3
VA	\$23,897	\$17,527	\$16,588	\$4,947	\$9,463	\$15,951	\$12,338	\$0	\$16,873	\$994	\$740	\$2,070	\$18,700	803.2
NASA	\$21,691	\$4,606	\$28,663	\$40,463	\$20,357	\$16,948	\$21,750	\$13,300	\$6,800	\$10,398	\$9,171	\$11,509	\$10,950	-4.9
DOI	\$5,879	\$0	\$1,080	\$1,191	\$0	\$196	\$2,033	\$27,210	\$3,622	\$25,249	\$28,192	\$5,942	\$7,592	27.8
HHS	\$0	\$668	\$1,763	\$3,578	\$3,682	\$2,699	\$5,632	\$9,569	\$9,719	\$1,961	\$3,991	\$3,037	\$7,363	142.4
EPA	\$0	\$0	\$2,386	\$2,139	\$2,046	\$0	\$0	\$0	\$2,208	\$1,865	\$2,631	\$3,579	\$3,790	5.9
DOC	\$0	\$0	\$0	\$0	\$0	\$405	\$0	\$291	\$289	\$2,085	\$670	\$3,661	\$3,405	-7.0
DHS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,834	\$1,801	\$2,714	50.7
USDA	\$4,596	\$2,421	\$4,014	\$7,999	\$4,976	\$2,166	\$1,168	\$2,215	\$2,362	\$4,228	\$2,157	\$3,062	\$2,665	-13.3
TRSY	\$0	\$1,775	\$3,897	\$227	\$3,824	\$1,718	\$1,757	\$2,440	\$5,253	\$9,610	\$8,472	\$8,967	\$2,379	-73.5
DOT	\$25,092	\$0	\$5,261	\$3,456	\$4,061	\$3,681	\$10,582	\$3,020	\$4,861	\$2,309	\$1,340	\$1,013	\$2,318	128.9
DOE	\$27,206	\$30,516	\$41,886	\$0	\$0	\$0	\$0	\$0	\$2,250	\$1,550	\$1,618	\$2,032	\$1,951	-4.0
SSA	\$0	\$0	\$0	\$0	\$0	\$3,406	\$1,175	\$1,134	\$1,125	\$554	\$189	\$518	\$885	71.0
DOJ	\$0	\$9,546	\$1,379	\$2,084	\$2,674	\$1,840	\$1,898	\$1,327	\$550	\$1,071	\$241	\$1,346	\$651	-51.6
DOL	\$438	\$27	\$0	\$489	\$0	\$0	\$47	\$0	\$0	\$0	\$0	\$0	\$448	NA
NARA	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10	\$75	\$151	\$104	\$295	185.0
TVA	\$0	\$0	\$5,932	\$698	\$1,481	\$1,799	\$1,201	\$322	\$337	\$404	\$431	\$347	\$278	-20.0
RRB	\$0	\$0	\$46	\$0	\$48	\$28	\$0	\$0	\$39	\$11	\$16	\$16	\$15	-3.4
STATE	\$0	\$0	\$0	\$0	\$2,432	\$63	\$1,455	\$0	\$292	\$4	\$914	\$72	\$0	-100.0
HUD	\$0	\$0	\$60	\$0	\$3,092	\$0	\$0	\$0	\$62	\$25	\$73	\$8	\$0	-100.0
CIA	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,922	\$0	\$2,988	\$0	\$0	NA
NRC	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$254	\$0	\$0	\$0	\$0	NA
PC C	\$2,342	\$565	\$19	\$31	\$4	\$128	\$0	\$0	\$0	\$0	\$0	\$0	\$0	NA
USPS	\$101,654	\$6,260	\$13,939	\$12,032	\$20,460	\$38,037	\$44,653	\$6,803	\$0	\$0	\$0	\$0	\$0	NA
Total	\$475,294	\$92,917	\$399,925	\$239,610	\$256,310	\$323,968	\$242,284	\$137,294	\$147,696	\$134,487	\$182,639	\$179,933	\$290,563	61.5

Data as of 7 June 2006

Notes: Does not include energy savings performance contracts, utility energy service contracts, and utility demand side management incentives. Ellipses after fiscal year (1985..) indicate where intervening years' data are left off the table, but available upon request from FEMP. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports.

TABLE 11
ENERGY SAVINGS PERFORMANCE CONTRACTS, DELIVERY ORDERS, AND
CONTRACT MODIFICATIONS AWARDED BY FEDERAL AGENCIES IN FY 2005

Agency	Number of Delivery Orders/ Modifications/ Contracts	Project Investment (Thou. \$)	Allocation of Project Cost Savings (Thousand \$)			Annual Energy Savings (MMBtu)
			Total Guaranteed Cost Savings	Payment to Contractor	Net Savings to Government	
Defense	15	\$71,192	\$141,686	\$140,955	\$731	456,537
Social Security Admin.	1	\$2,388	\$4,740	\$4,740	\$0	5,171
GSA	1	\$17,797	\$73,584	\$73,584	\$0	227,530
DHS/U.S. Coast Guard	1	\$1,108	\$2,142	\$1,789	\$353	6,667
National Archives	2	\$4,275	\$8,909	\$8,891	\$18	30,497
Total	20	\$96,761	\$231,061	\$229,959	\$1,101	726,402

Through a decentralized approach, DOD awarded the largest number of contracts/delivery orders with 15 ESPC projects in FY 2005. These contracts include many infrastructure upgrades and new equipment to help DOD installations reduce energy and water consumption. Examples include new thermal storage systems, chillers, boilers, lights, motors, energy management control systems (EMCS), and water reducing devices. Normally, cost savings are used to first pay the contractor, and then are used to offset other base operating support expenses. In some cases, however, installations decided to seek a shorter contract term and defer all Government cost savings until contract completion. In these cases, the savings generated by ESPCs help to reduce the energy consumption, but do not reduce the total cost of operation until the contracts expire. After contract expiration and the retrofits are paid in full, DOD will retain any future cost savings.

Nine DOE/FEMP Super ESPC delivery orders were awarded during FY 2005. Super ESPCs are broad area indefinite delivery, indefinite quantity (IDIQ) contracts that allow agencies to negotiate site-specific performance-based delivery orders with an energy service company (ESCO) under the umbrella contracts. Project investment totaled \$72.2 million, providing annual savings of more than 559.0 billion Btu to the Government. These delivery orders include four by DOD, one by SSA, one by GSA, one by the DHS/Coast Guard, and two by the National Archives and Records Administration.

3. Utility Energy Service Contracts

In FY 2005, Federal agencies awarded 40 UESCs as shown in Table 12. Financed investment in the projects totaled approximately \$75.6 million. The estimated annual energy savings from the 40 projects is 795.1 billion Btu.

Projects were undertaken by agencies to accomplish a wide variety of energy efficiency improvements. Of the 40 UESCs awarded in FY 2005, 32 were implemented by the DOD. Contracts were put in place to perform infrastructure upgrades and purchase new equipment to help installations reduce energy and water consumption. Examples of equipment purchased with

TABLE 12
UTILITY ENERGY SERVICE CONTRACTS AND DELIVERY ORDERS AWARDED
BY FEDERAL AGENCIES IN FY 2005

Agency	Number of Delivery Orders/ Contracts	Total Capital Cost (Thou. \$)	Financed Investment (Thou. \$)	Appropriations (Thou. \$)	Annual Cost Savings (Thou. \$)	Annual Energy Savings (MMBtu)
Commerce	1	\$804.5	\$804.5	\$0.0	\$80.4	10,022
Defense	32	\$73,167.8	\$68,457.2	\$4,710.7	\$8,701.6	708,316
Energy	3	\$242.0	\$95.2	\$146.8	\$72.2	3,517
GSA	1	\$1,700.0	\$1,700.0	\$0.0	\$147.4	19,456
HHS	1	\$587.2	\$293.6	\$293.6	\$58.7	8,250
NASA	2	\$4,206.0	\$4,206.0	\$0.0	\$1,100.1	45,506
Total	40	\$80,707.5	\$75,556.4	\$5,151.1	\$10,160.5	795,067

UESCs include: HVAC and steam system upgrades, chillers, boilers, lights, motors, EMCS systems and water reducing devices.

4. Life-Cycle Costing (LCC)

The Federal Energy Management Program (FEMP) publishes updated fuel energy price indices and discount factors for life-cycle cost analyses. The most recent *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis, Annual Supplement to Handbook 135* was published and distributed to Federal energy managers in April 2005.

A set of Building Life-Cycle Cost (BLCC) computer programs have been developed and supported by the National Institute of Standards and Technology (NIST) under FEMP sponsorship. The latest update of the BLCC5 version of the software, which incorporates the 2005 DOE/FEMP discount rate and the latest energy price projections from the Energy Information Administration, was released April 1, 2005. Version BLCC 5.1-02 includes two new modules for evaluating Military Construction (MILCON) projects. BLCC 5.1-02 now contains the following four modules for analyzing energy and water conservation and renewable energy projects:

- Analyses for Federal agency-funded projects;
- Analyses for Federal agency projects financed through energy savings performance contracts or utility energy savings contracts;
- MILCON analyses for DOD-funded projects; and
- MILCON analyses for projects under DOD's Energy Conservation Investment Program.

III. INTERAGENCY EXCHANGE OF INFORMATION

A. Federal Coordination

Federal Interagency Energy Policy Committee

The members of the Federal Interagency Energy Policy Committee met on February 25, 2005 during a meeting of Federal Senior Energy and Environmental Officials to review Federal agency progress in implementing Executive Orders 13101, 13123, 13148, and 13149. Executive Order progress reports on government-wide implementation were presented for energy, transportation, and environmental requirements. Representatives from DOD, Interior, and NASA also gave presentations highlighting their accomplishments toward the requirements, and recent progress within agencies was also discussed. For most agencies, the Senior Energy Official is also their Federal Interagency Energy Policy Committee member.

Federal Interagency Energy Management Task Force

In FY 2005, meetings of the Federal Interagency Energy Management Task Force were held on October 19, 2004; January 26, 2005; April 12, 2005; and August 4, 2005. The memoranda of record from these meetings are posted at www.eere.energy.gov/femp/about/fiemtf.cfm. Issues highlighted in these meetings included the following:

- Agency energy management programs, budgets, challenges, opportunities, and activities to meet Executive Order energy reduction and renewable energy goals for FY 2005.
- Guidance for completing annual reports and scorecards.
- The General Accountability Office (GAO) audits of the energy savings performance contracting program and other alternative financing approaches, and its recommendations in two reports to the Office of Management and Budget.
- A strategic energy management planning exercise developed by FEMP and completed by agencies to provide a strategic view of their performance toward the Executive Order 2005 goals and the strategies they will use to meet reductions required for 2010.
- Information and updates on the “180-Day Report”, a mandated review of the ESPC program that included the barriers that prevent agencies from fully utilizing the program and how the program could be more flexible and effective.
- EPACT 2005 and its provisions affecting federal energy management, including new energy management goals and a 10-year reauthorization of energy savings performance contracting.
- Federal Energy and Water Management Awards and the Presidential Awards for Leadership in Federal Energy Management event status and successes.
- FEMP’s technical assistance programs, workshops, and conferences related to Federal energy management.

B. Training

Many agencies have their own internal training and recognition programs. Overall, Federal agencies reported spending \$2.6 million to train 4,744 Federal personnel in energy efficiency, renewable energy, and water conservation subjects. During FY 2005, FEMP conducted 71 training workshops and symposia for more than 3,200 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities. FEMP workshops conducted during FY 2005 included the following:

- Advanced ESPC/Financing,
- Advanced Facility Energy Decision System (FEDS),
- Building Commissioning to Optimize Efficiency and Operations at Federal Facilities,
- Commissioning: The Best Bang for Your Building Buck,
- Creating Sustainable Federal Buildings,
- Design Strategies for Low-Energy, Sustainable, Secure Buildings,
- Energy 2005,
- Energy Management Telecourse/Live Streaming: Part 1a: Utility Energy Services Contracting,
- Energy Management Telecourse/Live Streaming: Part 1b: ESPC Contracting,
- Energy Management Telecourse/Live Streaming: Part 2a: Buying Energy Efficient Products,
- Energy Management Telecourse/Live Streaming: Part 2b: Life-Cycle Costing – Basic,
- Energy Management Telecourse/Live Streaming: Part 3a: Water Resource Management,
- Energy Management Telecourse/Live Streaming: Part 3b: Operations and Maintenance Management,
- Evolving Energy Markets,
- FEMP Lights Lighting and Health Workshop,
- FEMP Lights Online Course,
- Hands-On Distributed Energy Resources (DER) Training,
- Implementing Renewable Energy Projects,
- Introduction to Distributed Energy,
- Introduction to ESPC,
- Introduction to Facility Energy Decision System (FEDS),
- Labs21 High Performance, Low Energy Laboratory Design Course,
- Meeting Federal Renewable Energy Goals,
- Operations and Maintenance Management,
- Optimizing Steam System Performance,
- Utility Energy Service Contracting, and
- Water Resource Management.

“Energy 2005,” the energy efficiency workshop and exposition sponsored by FEMP, and co-sponsored by DOD and GSA, was held Aug. 14-17, 2005 in Long Beach, California. The conference provided participants with opportunities to explore such topics as strategies for energy projects, selling energy projects, and alternative financing. The conference had panel discussions and an exhibit hall showcasing energy technologies. More than 1,362 were in attendance and more than 117 companies exhibited at the event.

C. Awards and Recognition

Outstanding accomplishments in energy efficiency and water conservation in the Federal sector were recognized with the presentation of the 2005 Federal Energy and Water Management Awards on October 27, 2005, at the U.S. Department of State Headquarters in Washington, D.C. Awards were selected from outstanding Federal energy managers and contributors who:

- Implemented proven energy efficiency, energy, and water conservation techniques;
- Developed and implemented energy-related training programs and employee energy awareness programs;
- Applied advanced strategies and load reduction techniques to decrease or eliminate grid-dependence and increase the assurance of critical functions;
- Made successful efforts to fulfill compliance with energy and water reduction mandates; or
- Provided leadership in purchasing or supplying energy-efficient, renewable energy, or water-conserving products to one or more Federal agencies.

Recipients of the 2005 awards were selected from 101 nominees submitted by 17 Federal agencies. There were 16 awardees representing 9 different Federal agencies. Distribution of awards among the Federal agencies for accomplishments in the previous fiscal year is indicated in Table 13.

**TABLE 13.
2005 FEDERAL ENERGY AND WATER MANAGEMENT AWARDS
BY GROUP AND TYPE**

Agency	Individual	Small Group	Organization	Total	Energy Efficiency	Renewable Energy	Water Management	Energy Security	Exceptional Service
Army			1	1	1				
DOI		1	1	2	1	1			
GSA		2		2	1	1			
NASA		1		1		1			
Navy	1	2	1	4	2		1		1
Smithsonian		2		2		1	1		
USAF	1			1					1
USMC		1	1	3			1	1	
VA			1	1	1				
TOTAL	2	9	5	16	6	4	3	1	2

The Presidential Awards for Leadership in Federal Energy Management recognize highly successful efforts, leadership, and support in promoting and improving Federal energy management. In 2005, these awards were presented in a combined ceremony with the Federal

energy awards program. Five organizations, four from DOD and one from GSA, received this prestigious award.

D. Public Education Programs

The DOE's Office of Energy Efficiency and Renewable Energy (EERE) Information Center provides basic, technical, and financial information on various energy efficiency and renewable energy technologies and programs. The EERE Information Center telephone number is 877-337-3463. The EERE Information Center has two operations—the Message Center and the Mail Center. The Message Center is the location where the calls are answered, and emails and letters are received. The Mail Center ships the products requested from the orders received from the Message Center.

The EERE Information Center processed 17,997 inquiries during FY 2005. These inquiries were received via telephone, email, fax, and U.S. mail. Customers included consumers, utilities, businesses, technology companies, individual manufacturing plants, federal facilities, building energy code officials, and the hydrogen energy community. The Mail Center processed 12,929 orders and shipped 287,465 products during FY 2005. EERE also hosts a Web site at www.eere.energy.gov and offers free subscriptions to the EERE Network News e-mail newsletter.

The Energy Information Administration's National Energy Information Center (NEIC) responds to public and private sector questions on energy production, consumption, prices, resource availability, and projections of supply and demand. NEIC provides information to Federal employees and the public at www.eia.doe.gov. Electronic inquiries may be sent to infoctr@eia.doe.gov. During FY 2005, NEIC staff responded to 31,974 inquiries. The EIA web site recorded 22.2 million user sessions during FY 2005.

The Office of Scientific and Technical Information (OSTI), as part of the Office of Science, provides leadership and coordination for the DOE-wide Scientific and Technical Information Program (STIP). In this capacity, OSTI assures access by DOE, the scientific research community, academia, U.S. industry, and the public to DOE research results in support of the DOE mission. Key collections developed and maintained by OSTI on behalf of DOE include Energy Citations Database (ECD), the DOE Information Bridge, the E-print Network, Research and Development (R&D) Project Summaries, and EnergyFiles. In FY 2005, more than 38 million user transactions were accommodated via systems residing on OSTI servers.

The DOE public information mechanisms include several direct service programs designed to provide technical assistance to specific target groups. Two of these programs are the State Energy Program (SEP) and the Industrial Assessment Center Program.

SEP provides funding to states to carry out their own energy efficiency and renewable energy programs. SEP funding enables state energy offices to design and implement programs according to the needs of their economies, the potential of their natural resources, and the participation of local industries. States use grants to address their energy priorities and program funding to adopt emerging renewable energy and energy efficiency technologies. Funding from SEP goes to state

energy offices in all states and U.S. territories. SEP projects are managed by state energy offices, not by DOE directly. There are three sources of funding for DOE's SEP: DOE grants, SEP Special Projects, and Petroleum Violation Escrow (PVE) Funds.

The SEP provides grants based on a yearly appropriation by Congress and a formula that takes into account population and energy consumption in each state. The second source of funding is from technology programs in DOE's Office of Energy Efficiency and Renewable Energy for deployment projects in the states. EERE awards this funding annually to state energy offices through a competitive solicitation for SEP Special Projects. Since the competition for these funds is keen, many states join forces with private sector partners and contribute their own funds toward these projects. State energy offices can use PVE funds for SEP projects if they appear in the SEP plan that the states file yearly with DOE. These funds proceed from court settlements for overcharges by oil companies in the 1970s and 1980s. The last distribution of PVE funds was in the late 1980s, and a final distribution of funding from these escrow accounts was scheduled for 2005.

The SEP plays a role when the state energy office is involved in the project, the State Energy Program provides funding, or the state uses petroleum violation escrow funds for part of the project and it is in the state's SEP plan. The results from the State Energy Program reflect the work of state energy offices. The outcome is an innovative deployment of new energy efficiency and renewable energy technologies across the geographic panorama of the United States and its territories. Additional information is provided on the program website at http://www.eere.energy.gov/state_energy_program.

The Industrial Assessment Centers (IACs), sponsored by EERE's Industrial Technologies Program, provide no-cost energy, waste, and productivity assessments to help eligible small and mid-sized manufacturers identify measures to maximize energy-efficiency, reduce waste, and improve productivity. Additionally, the IACs serve as a training ground for the next-generation of energy savvy engineers. The assessments are conducted by local teams of engineering faculty and students from 26 participating universities across the country. Additional information is provided on the program website at www.eere.energy.gov/industry/bestpractices/iacs.html.

IV. FEDERAL ENERGY MANAGEMENT ACTIVITIES

A. DEPARTMENT OF AGRICULTURE (USDA)

Management and Administration

During FY 2005, the Senior Energy Official for the Department of Agriculture (USDA) was the Acting Assistant Secretary for Administration (ASA). The Acting ASA has the authority to implement federal energy management policy related to the internal operations of USDA, and to exercise full Department-wide contracting and procurement authority. Two of USDA's largest agencies, the Agricultural Research Service (ARS) and the Forest Service (FS), also have agency Senior Energy Officials. Within the ASA, the Office of Procurement and Property Management (OPPM) has Departmental responsibility for policy, planning, and reporting, and serves as the primary inter- and intra-Departmental liaison on energy matters related to the facilities and internal operations of the Department. The USDA agencies, in concert with OPPM, are responsible for the identification of appropriate energy conservation actions and programming, budgeting, and implementing the Executive Order 13123 requirements and the USDA Annual Energy Implementation Plan within their own organizations.

USDA has an Energy Support Team comprised of management, procurement, legal, real property, budget, and technical personnel. The team has representatives from various USDA agencies, including ARS, FS and the Office of Operations (OO). The overwhelming majority of facilities ownership and related direct facilities energy consumption is attributable primarily to ARS, FS and OO. ARS and FS also have established internal energy teams.

Management Tools

In FY 2005, USDA continued the implementation of the Corporate Property Asset Information System (CPAIS). CPAIS is a web-based system designed to meet USDA's real property management, inventory and reporting needs. Several data fields for reporting facilities energy information have been incorporated into CPAIS. These fields include information on types and quantity of fuel used at the facility, energy audit history, and whether or not a facility has an energy and water conservation plan, uses energy savings performance contracts (ESPCs), and sustainable design principles.

Awards

USDA participated in the Department of Energy's (DOE's) Annual Federal Energy and Water Management Awards program and the "You Have the Power"

recognition program. Agency personnel were encouraged to submit nominations for these programs to recognize outstanding contributions by employees to the energy and water conservation effort.

Individual USDA agencies conducted their own employee award and recognition programs as well. The ARS incentive and awards program recognized and rewarded employees for their energy saving contributions, and was implemented in varying ways by the geographic areas within the agency. At the ARS Mid-South Area, employees received monetary awards for the implementation of measures/projects that resulted in improved service, savings or other benefits including reduced energy consumption. Also, in the South Atlantic and Pacific West Areas, employees who provided feasible suggestions on how to significantly reduce energy and water consumption while remaining compatible with the agency's mission received spot awards proportional to the savings.

Within FS, the Region 2 forester designated a new category named "Sustainable Operations" under the honor awards program. The intent is to recognize an individual or group that makes a contribution to reducing the region's energy and environmental footprint.

Training and Education

USDA personnel participated in training opportunities throughout FY 2005 from a variety of sources, including energy management-related sessions offered by the Federal Energy Management Program (FEMP) and other educational organizations. Additionally, USDA's Energy and Environment Division disseminated hundreds of copies of various energy awareness and educational materials to agency facility and energy managers, and directed them to the Division's Facilities Energy web site. Furthermore, staff from OPPM participated in the Energy 2005 Workshop and Exhibition in Long Beach, California.

Within ARS, relevant energy management training and materials was provided to the workforce. Employees were encouraged to attend energy management training offered by FEMP, private or public educational institutions, Federal agencies, or professional associations. Managers were encouraged to establish and involve energy committees in energy management decision making. At some ARS locations, the facility engineers received training by local power and water utilities on

general conservation, best practices and rate structures available to minimize operating costs. Other locations discussed water conservation during staff meetings, educated building occupants about various energy conservation measures, and encouraged all personnel to play a proactive role in water conservation. Also, numerous individuals were trained on LEED, bio-based building materials, distributed energy, and the LABS 21 program.

In FY 2005, FS conducted and participated in various training and education programs. Specific FS activity involved training provided through the Bonneville Power Administration that discussed energy tracking and use analysis, energy efficient products, and project financing. Other FS training events included a sustainability summit, LEED accreditation and energy management systems.

Showcase Facilities

Several facilities in the design or construction phase within FS have been designated as Showcase facilities; specifically:

- Mystic District Office, Black Hills National Forest (NF): A biomass boiler that is integrated with natural gas boilers will provide heat for the facility. The biomass boiler will utilize logs to meet 80 to 90 percent of the heating requirements. The design of the project is 90 percent completed and will be implemented once funding is available. This project will demonstrate using wood waste as a building heat source.
- Big Goose Ranger Station, Big Horn NF: Two 5 kilowatt fuel cells have been installed to provide power to two bunkhouses, a shop, trailer pedestals, and the water and waste water systems. Additionally, waste heat from the fuel cell is utilized to heat domestic water and provide heat to the building through a baseboard system. A photovoltaic system provides power to a sump pump and a satellite uplink. The uplink allows engineers to operate and monitor fuel cell operation and determine fuel cell efficiency. Power and heating was previously provided by a propane generator. This is the first fuel cell project in FS. It is installed at a high altitude (7,800 feet above sea level), not tied to the electrical grid, and will be shut down during the winter.
- Bessey Nursery/District Office, Nebraska NF: This is the region's first LEED designed facility. It is anticipated the facility will achieve LEED Silver rating. Heating and cooling and domestic hot water preheat is provided by a ground-coupled heat pump system. Waterless urinals, dual-flush toilets, and low flow faucets reduce the water consumption by 50 percent. The building construction will

demonstrate the utilization of materials obtained within a 500-mile radius. Seventy five percent of construction waste will be diverted from landfills by recycling or reuse. This is especially difficult in remote/rural areas. High efficient lighting, controls, and daylighting will reduce energy consumption. Overall the building will utilize 45 percent less energy than a standard designed facility.

- Shell Falls Visitor Contact Station, Big Horn NF: A micro-hydro plant is under design to replace the three plus miles of buried power line. This plant will produce power for the contact station with excess power provided to the utility grid. Other conservation measures at the visitor contact station include waterless urinals, low voltage lighting, and vending misers. Shell Falls provides an excellent opportunity to educate the public on sustainability and water and energy conservation since it has 750,000 visitors per year.
- The Shoal Creek Ranger District (RD) Office will be designated a Showcase facility, as it is expected to be the first FS LEED certified building. Construction of this office was completed in October, with certification expected near the end of calendar year 2006.

Energy Efficiency Performance

Standard Buildings

In FY 2005, USDA reported a 30.6 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. USDA used an estimated 56,358 Btu per square foot in its standard buildings during the year.

USDA's OO reported a considerable increase in energy consumption between FY 1985 and FY 2005; and a nominal increase was also reported from FY 2004 to FY 2005. However, there are several extenuating factors that may be skewing the accuracy of this performance measure. In 1985 the Sidney R. Yates Building (150,000 square feet) was partially occupied and under-utilized. By 1991 the building was fully renovated and was being fully utilized. In FY 1991 electricity usage increased over 300 percent after the building was fully occupied.

Furthermore, OO notes that energy consumption is affected by USDA mandates to increase its space utilization rate and dramatic increases in the number of personal computers and other office equipment in the facility. As a result, the concentration of employees and office equipment (and the associated energy use) per gross square foot has been steadily increasing as leased facilities are shut down and employees are moved to the USDA Headquarters Complex, and as

USDA automates its office space. These changes have resulted in skewed results that understate the actual energy reductions being accomplished by OO.

Industrial and Laboratory Facilities

All ARS facilities and Animal and Plant Health Inspection Service (APHIS)-owned facilities are considered industrial and laboratory facilities. For the FY 2005 Energy Scorecard, USDA reported energy consumption of 94,612 Btu per square foot. USDA received credit for purchases of 0.9 billion Btu of renewable energy for its industrial and laboratory facilities. This lowered the energy intensity of these facilities from 94,540 to 94,480 Btu per square foot.

Compared to 180,262 Btu per unit in the 1990 baseline year, USDA reported a 47.5 percent reduction, more than double the 20 percent reduction target for FY 2005. This Btu per unit calculation is based on a combination of unadjusted energy use for APHIS and adjusted energy use for ARS as explained below.

As noted above, the entire ARS building inventory is categorized as Industrial, Laboratory, Research, and Other Energy Intensive Facilities. Performance in these facilities is measured based on Air-Quality-Adjusted (AQA) Btu per gross square foot, which removes the impact of present day requirements for increased laboratory ventilation air for safety and health reasons. These requirements have become more stringent and require greater energy use than the standards that were in place in 1990, the base year of the Executive Order 13123 goal.

Based on ARS's best engineering judgment, the laboratory and research space accounts for more than 90 percent of ARS building energy consumption, and the impact of modifying existing space-conditioning systems to improve indoor air quality more than doubles the energy intensity of the buildings affected by the modernization program. To eliminate the distorting impact of air-quality improvements, and to allow a more accurate apples-to-apples comparison of current energy use with the baseline year, annual consumption data is adjusted accordingly to reflect actual progress of the modernization program. This AQA measurement method has been used for this reporting since FY 2000.

In FY 1990, ARS consumed a total of 2.3 trillion Btu in 12.7 million gross square feet of facilities (or 178,014 Btu per gross square foot). In FY 2005, ARS consumption was 2.038 trillion Btu in 13.4 million gross square feet of facilities (or 152,354 BTU per gross square foot). Since a total of approximately 1.95 million gross square feet of the laboratory facilities have been modernized from FY 1990 through FY

2005, the ARS Air-Quality Adjusted consumption for FY 2005 should be 91,952 Btu per gross square foot. This represents a reduction of about 46.9 percent from the baseline consumption in FY 1990.

Non-Fleet Vehicle and Equipment Fuel Use

In FY 2005, USDA reported using 825,300 gallons of aviation gasoline, which is a significant increase from FY 2004. USDA's fuel use related to aircraft is reported in the Federal Aviation Interactive Reporting System.

Renewable Energy

During FY 2005, USDA used 5.7 billion Btu of renewable energy through a combination of purchases and on-site generation. This 5.7 billion Btu is equivalent to 0.3 percent of USDA's total electricity use.

Also, as part of the Renewable Energy Systems and Energy Efficiency Improvements program, USDA approved nearly \$21 million in grant funds to rural utilities and electric cooperatives to assist with the development that derive energy from wind, solar, biomass or geothermal source; or hydrogen derived from biomass or water using wind, solar, or geothermal energy sources. Grant funds can be used to pay a portion of eligible project costs.

Self-Generated Renewable Energy

Within USDA, FS continued to install photovoltaic systems at remote sites, and used passive solar design strategies, to the greatest extent possible, in new facility design and construction. Since 1990, FS has installed over 500 photovoltaic units mainly at remote sites formerly served by fossil-fueled generators. FS projects reported in FY 2005 include:

- Region 1: Flathead NF generated electricity using a water turbine, Nez Perce NF installed a potable water system and well powered by a photovoltaic solar panel, and Lewis & Clark NF installed solar panels on lookouts.
- Region 2: The Comanche National Grasslands utilized solar thermal application for space heating. The Grand Mesa, Uncompahgre, and Gunnison NF constructed two toilet facilities that utilize solar power to operate the fans. At the Cottonwood Creek Campground, a photovoltaic system provided power to pump and distribute water to the campground. Big Horn NF used a photovoltaic system to power a sump pump to keep water out of the building during the winter when the buildings are unoccupied. The photovoltaic system also provides power to the fuel cell's satellite uplink.
- Region 4: Solar panels were installed to power pumps at various water systems within the region; also, various buildings were converted from grid

supplied electricity to hybrid propane generator/photovoltaic systems.

- Region 5: With technical assistance from Bonneville Power Administration and grant funds from DOE, a 1,500-watt photovoltaic array was installed at the Mt. Whitney Ranger Station.

The Beltsville Agricultural Research Center (BARC), which is part of ARS, has installed approximately 68 generators operated by B-20 (biodiesel fuel) in its facilities. Though the use of these generators is infrequent, each recycled at least once a month during FY 2005. BARC utilizes a turbine at the dairy fueled by methane abstracted from animal waste. BARC continues assessing other renewable sources that are locally available. Also, the ARS Pacific West Area partnered with the State of Idaho to monitor wind velocity for potential wind-generated electricity.

The OO had one solar thermal system that generated approximately 0.2 billion Btu in FY 2005.

Purchased Renewable Energy

The FS Region 2 purchased 255 megawatthours of Renewable Energy Certificates (RECs) as part of an effort to support co-firing coal and small-diameter tree (woody biomass) development. The Colorado Governor's Office of Energy Management and Conservation developed the RECs through a DOE program. The Region's purchase equals the amount of energy needed to power seven FS district offices for one year.

Petroleum

Data from the agency's National Finance Center and purchase card records showed that USDA used 2.7 million gallons of fuel oil in its standard facilities during FY 2005 compared to 886,500 gallons in FY 1985. In USDA laboratory facilities, fuel oil consumption decreased, from 3.5 million gallons in FY 1985 to 1.4 million gallons in FY 2005.

Water Conservation

USDA agencies made progress in implementing the water conservation goals of Executive Order 13123. Overall, 27 USDA facilities implemented or continued to implement Water Management Plans (WMPs); while 19 facilities implemented WMPs and had at least four water conservation Best Management Practices during FY 2005. In FY 2005, USDA used an estimated 4.2 billion gallons of water in its standard buildings and energy intensive buildings combined.

The baseline water consumption of 718.3 million gallons of water is considered to be low due to lack of data collection systems in 2000. USDA continues to lack a departmental system for tracking water use, and

has to rely on cost-based estimates for reporting. However, improved data collection continues to capture more consumption and costs each year.

Implementation Strategies

Life-Cycle Cost Analysis

ARS used life-cycle cost (LCC) methodologies and value engineering to identify energy conservation opportunities. Agency policies and procedures are in place requiring use of LCC analysis for evaluating energy conservation opportunities and decision making.

FS policy requires the use of LCC analysis and value engineering for new buildings, as directed in the Forest Service Manual. In FY 2005, the Bessey District/Nursery Office utilized LCC analyses to select the Geothermal Heat Pump System. Additionally, the Southern Research Station employed LCC analyses for new construction and major renovation: At the North Central Research Station, it is mandatory to conduct a LCC analysis in order to obtain the necessary funding to construct new facilities.

For major facilities renovations and equipment replacement, LCC analysis is integral to the decisions about products, services, construction, and other projects at the Forest Product Labs (FPL). Benefit-cost and cost-effectiveness analyses are conducted in accordance with Office of Management and Budget (OMB) Circular No. A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs". FPL also makes decisions related to construction projects and energy reduction practices using the "Choosing by Advantages" process. All of the major Capital Improvement projects that were implemented in FY 2005 were selected, in part, for benefits determined by life-cycle cost.

Facility Energy Audits

ARS reported that five locations in the North Atlantic Area have undergone energy audits during FY 2005, for a total of 157,480 square feet. ARS also indicated that in the Pacific West Area and South Atlantic Area, four percent and 10 percent, respectively, of the buildings were audited in FY 2005.

In FY 2005, FS reported that two energy audits were performed to examine the feasibility of a geothermal project and a biomass project. Neither audit resulted in favorable conditions to allow the projects to proceed.

Financing Mechanisms

In FY 2005, USDA agencies received benefits in reduced energy usage from ESPCs awarded in previous fiscal years. The National Animal Disease Center, in

Ames, Iowa, continued its ESPC which was awarded in 1999 under the DOE Mid-West Area Super ESPC. Payments totaling \$600,872 were made to Johnson Controls, Inc. in FY 2005. Also, the National Agricultural Library, in Beltsville, Maryland, continued its ESPC to cover lighting retrofits, burner replacement, chiller plant automation, and building automation system. The ESPC, awarded in FY 2001, yields an estimated energy savings of 11.5 billion Btu per year. FY 2005 payments totaling \$125,602 were made to ERI Services, Inc.

The implementation of a biomass heating plant for the Black Hills Forest Mystic Ranger District Office in Region 2 of the Forest Service is nearing completion. The Region is working with DOE and an Energy Service Provider to look at other energy conserving opportunities in the region that could be financed through ESPC or utility energy services contract (UESC). Also, Region 2 worked with DOE and an Energy Services Company to study the use of biomass for power generation and building heating several facilities. These funding methods were not utilized due to the long finance period required.

ENERGY STAR and Other Energy-Efficient Products

In FY 2005, USDA continued its policy of buying computer equipment and other high volume products that meet the ENERGY STAR requirements. USDA agencies have been proactive in requiring the purchase of these products. For example, ARS acquired microcomputers that meet the ENERGY STAR requirements; and all new and replacement information technology equipment purchased by GIPSA were required to have an ENERGY STAR label. Also, purchases of equipment made directly and indirectly were monitored to ensure that they meet ENERGY STAR requirements.

Also in FY 2005, USDA joined the White House Office of the Federal Environmental Executive's Federal Electronic Challenge (FEC). FEC is a voluntary government-wide program that encourages agencies to manage their electronics equipment in an environmentally responsible and energy-efficient manner. USDA's OPPM solicited participation in the FEC program from USDA agencies, offices, and facilities.

ENERGY STAR Buildings

In FY 2005, new leased offices within the Forest Service's Greys River RD were designed to ENERGY STAR Building Standards. Also, in the Inyo National Forest, the Leased Supervisors Office and Interagency Visitors Center are both ENERGY STAR buildings; as is the Leased Supervisors Office in the Shasta Trinity Na-

tional Forest. All three of these buildings, located in Region 5 of FS, were completed in FY 2003.

Sustainable Building Design

During FY 2005, USDA agencies had a total of six buildings that were either in the design or construction phase that will be LEED-certified.

At ARS, appropriate sustainable design considerations were given in the siting, design, and construction of new facilities. These principles have been incorporated in the facilities design standards. Within FS, sustainable building design is inherent in the LEED certification process. Sustainable building principles are incorporated into all aspects of design and construction of new facilities and, where feasible, into existing facility reconstruction/renovation.

Energy Efficiency in Lease Provisions

In FY 2005, USDA directed its agencies to incorporate the model lease provisions contained in the USDA Real Property Leasing Handbook and the General Services Administration Energy and Environmental Business Practices in Lease Acquisition Guide. Eight USDA agencies have leasing authority and continued to address energy issues in their lease solicitations.

Industrial Facility Efficiency Improvements

For the Ames, Iowa modernization project, USDA signed a pilot partnership agreement in the Labs21 program that is jointly sponsored by the Environmental Protection Agency (EPA) and DOE. The program focuses on laboratory facilities and is intended to improve energy and water efficiency and to encourage the use of renewable energy sources. The project involves two of USDA's largest agencies: ARS and APHIS. The partnership agreement was signed in FY 2003, and work continued on this project in FY 2005.

As part of their ongoing facilities repair and maintenance program, USDA agencies spent more than \$2.65 million for related building energy efficiency and conservation improvements during FY 2005. Specific facility energy efficiency activities included the "Chemical Wing" modernization at the ARS Eastern Regional Research Center in Pennsylvania, which entailed replacing electrical lighting systems, insulation systems and building automation control systems with the most up-to-date efficient equipment.

Within FS, the FPL began construction to correct lab hood exhaust deficiencies. Two buildings have laboratories, each with approximately 30 exhaust hoods. The buildings were originally designed for one-pass air, where nearly 100 percent of the supply air is exhausted up the hoods. All hoods are currently designed to stay on at all times. At the completion of the project, each

building will have the 30 fans removed combining them in a common plenum with three exhaust fans on the roof. By adjusting hood airflow using information on required air supply under various laboratory operating conditions and schedules, energy will be saved by reducing the volume of air that is conditioned shortly before being exhausted. The new high-velocity fans are capable of maintaining a set negative pressure regardless of the flow. Also installed will be “smart” control dampers to reduce the flow rate through the hood as the door is closed, resulting in a continuous savings of 30,000 cubic feet per minute of conditioned air.

Highly Efficient Systems

The FS Southern Research Station reported several activities during FY 2005, including:

- A contract awarded for installation of a geothermal HVAC system in the new Southern Research Station laboratory facility in New Ellenton, South Carolina. The geothermal system is expected to reduce energy consumption by 35 percent over conventional systems, and ensures the new facility will attain LEED certification.
- A new 70-ton air cooled, helical rotary chiller was installed in a 27,500 square foot laboratory facility in Athens, Georgia, in May 2005. A 20 percent monthly energy reduction has been realized since installation.
- A new 150-ton water-cooled, screw type chiller was installed at the Alexandria Forestry Center, Pineville, Louisiana, in September 2005. Initial utility billings indicate the new chiller has reduced energy costs by 21percent at this 30,600 square foot facility.

Distributed Generation

USDA’s ARS continues to consider off-grid electricity opportunities that provide energy and environmental benefits when life-cycle cost-effective. The cogeneration and standby generation systems completed in FY 2001 allow the National Animal Disease Center to generate electrical power off-grid as needed. Off-grid generation is also provided to the National Soil Tilth Laboratory by Iowa State University, where small solar cell systems are used on several field instrumentation operations. Also, in the ARS Southern Plains Area, a micro-turbine has been purchased and will be used to provide power to the wind-diesel research efforts and mini-grid in Bushland, Texas.

Electrical Load Reduction Measures

USDA and its agencies continued to pursue and implement necessary electrical load reduction measures by relying upon established procedures during FY 2005. USDA sites have enhanced communications with the local utility company to better understand their needs for load reductions during peak times. Appropriate facility load reduction measures have also been identified. Systems have been established to alert employees of expected high demand days via email, voice mail, and public bulletin boards. Also during FY 2005, employees were encouraged to take steps to reduce lighting, personal computer and electrical appliance usage.

The ARS’s BARC joined with PEPCO in an Energy Reduction Plan designed to limit electricity use during non-occupied periods; and installed 68 generators operated by B-20 that operate on automatic switch gear control mode to support emergencies. The ARS Location in Fort Collins, Colorado, has installed tariff ceilings that work with the city’s “hot shot” signals to reduce power usage at critical times on the grid. Also, when needed, the National Agricultural Library reduced some of the power requirements during power emergencies by using a 500-KVA emergency generator to power elevators, data centers, life safety equipment, and mechanical equipment.

In other parts of ARS, the new facility in Ft. Lauderdale, Florida, was built with an HVAC system that is integrated into a computerized, zone-controlled management system which will reduce electrical usage during unoccupied hours. Also, at the Florence, South Carolina location, a large portion of HVAC units are controlled by a computer-operated energy management system, which sheds load for management of peak electrical load demand.

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B. DEPARTMENT OF COMMERCE

Management and Administration

The Senior Energy Official for Commerce (Commerce) is the Chief Financial Officer and Assistant Secretary for Administration. The Senior Energy Official participates at the Interagency Energy Policy Committee meetings and ensures actions under the Commerce Strategic Implementation Plan for Energy Management are accomplished to meet the Federal goals.

Departmental organizations and bureaus with responsibility for energy and water management in Commerce facilities include the following:

- Office of the Secretary (OSEC),
- National Oceanic and Atmospheric Administration (NOAA),
- National Institute of Standards and Technology (NIST),
- National Technical Information Service (NTIS); and
- Bureau of Census (Census.)

Management Tools

Awards

Each Commerce Bureau takes advantage of its own incentive programs to reward its exceptional employees. In addition, the Department of Commerce actively participates in the Department of Energy's, Federal Energy Management Program (FEMP) "You Have the Power" awareness campaign and Federal Energy and Water Management Awards programs.

Training and Education

Commerce recognizes that access to job-related training is important for every employee to do his/her job well. The energy team promotes appropriate training opportunities for facility energy management personnel.

Commerce personnel are regularly advised of upcoming energy-related training as information becomes available. Thirteen employees attended the Energy 2005 Workshop. Two employees also attended a U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Training Workshop.

Commerce Bureaus make energy awareness a key part of their energy programs, using materials provided through the "You Have the Power" program, as well as with additional materials procured on their own.

Commerce also implemented energy conservation awareness campaigns in conjunction with Energy Awareness month in October 2004, and Earth Day in April 2005. The campaigns included displays, informational materials and posters in the lobby of the Herbert C. Hoover Building (HCHB).

Energy Reduction Performance

Standard Buildings

In FY 2005, Commerce reported a 34.6 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. Commerce used 78,103 Btu per gross square foot in its standard buildings during the year. Commerce received credit for purchases of 106.2 billion Btu of renewable energy for its standard buildings, lowering the energy intensity of these facilities from 100,066 Btu per square foot to 78,103 Btu per square foot.

While Commerce has been very aggressive in making progress toward its energy goals, traditional energy reduction measures were supplemented this year with purchases of renewable energy to further reduce the amount of traditional (non-renewable) energy consumed.

Industrial and Laboratory Facilities

In FY 2005, Commerce reported a 24.8 percent decrease in energy consumption from FY 1990 for its energy intensive buildings when measured in Btu per gross square foot. Commerce used 237,678 Btu per gross square foot in its energy intensive buildings during the year. Commerce received credit for purchases of 193.1 billion Btu of renewable energy for these facilities, lowering the energy intensity from 271,454 Btu per square foot to 237,678 Btu per square foot.

Energy use for energy intensive buildings was 315,975 Btu per square foot for FY 1990 and 237,678 Btu per square foot for FY 2005. This is a 25 percent decrease, as compared to FY 1990, and a 26 percent decrease, as compared to FY 2004. The DOC has exceeded the 2005 energy reduction goals for energy intensive buildings, and has met the 2010 energy reduction goals for energy intensive buildings.

Non-Fleet Vehicle and Equipment Fuel Use

NOAA uses diesel fuel, aviation gasoline and jet fuel for its marine and aviation vehicles. NOAA operates a wide assortment of marine survey and research vessels.

Airplanes and helicopters are flown in support of NOAA's environmental research missions.

NOAA schedules its marine operations in advance in order to operate these vehicles as efficiently as possible. Fuel usage for these vehicles has remained relatively consistent in recent years. Flights of NOAA aircraft, however, are more dependent on weather events. The FY 2005 hurricane season kept the NOAA hurricane aircraft extremely busy. NOAA's aircraft flew the most hours in its history this past fiscal year, flying approximately 5,000 hours.

NOAA has been experimenting with the use of biodiesel products in some of its ships. The Great Lakes Environmental Research Laboratory has begun converting ship systems to use biodiesel products (not blends) to replace all petroleum products in use onboard. The results of a 5-year test program have shown improved crew working conditions, increased equipment life, and reduced environmental risks, in addition to reducing the amount of petroleum products in use. Further implementation of the biodiesel products program will depend on development of reliable supply systems in the areas where the ships operate.

Renewable Energy

Self-Generated Renewable Energy

Small-scale photovoltaic projects that self-generate energy using renewable sources continue to be operated by NOAA in American Samoa and San Diego, California, and by NIST in Gaithersburg, Maryland. NOAA's systems produce a combined total of 31.5 megawatthours of electricity. NIST's system produced a total of 36.6 megawatthours of electricity in 2005.

NIST's Boulder campus completed the installation of solar powered lighting in the Building 2 Parking lot. In addition, they also installed solar powered security lighting in conjunction with some new construction. Together these two projects will save an estimated 23 megawatthours of electricity each year.

Purchased Renewable Energy

NIST and NOAA continue to purchase wind-generated renewable power to supply a portion of the electrical needs of their facilities in Boulder, Colorado. In FY 2005, NIST consumed 882 megawatthours of purchased renewable energy, and NOAA consumed 1,129 megawatthours of purchased renewable energy.

Petroleum

Consumption of petroleum-based fuels in buildings in FY 1985 was 130.3 billion Btu. In FY 2005, this was reduced to 68.3 billion Btu, a 48 percent reduction since FY 1985. Most Commerce facilities only use

petroleum-based fuels, such as diesel, for their emergency generators. NIST uses fuel oil as a back-up fuel for natural gas fired boilers in the central plant in Gaithersburg, Maryland.

Water Conservation

Commerce's FY 2005 water consumption is estimated to be 351.2 million gallons, at a cost of \$1.9 million. NOAA estimated water consumption for its facilities, based on a unit consumption factor of 30 gallons per day per person; NOAA's total water usage for FY 2005 is 56.8 million gallons. In addition, the Census facility at Jeffersonville, Indiana, uses only well water and estimates its water consumption to be 4.2 million gallons per year.

Commerce Bureaus are incorporating and implementing Best Management Practices (BMPs) for efficient use of water. These practices include water conservation awareness, installing low-flow devices and sensors, planting indigenous plants and landscaping, and water recycling.

Water Management Plans are a fairly recent (1999) requirement for the agencies. Beginning in September 2003, Commerce funded contract assistance from the National Renewable Energy Laboratory to help the Bureaus develop these plans. The efforts to date have generated two Water Management Plans. In September 2005, Commerce awarded a follow-on contract to continue the work begun in 2003.

Implementation Strategies

Life-Cycle Cost Analysis

Commerce Bureaus employ life-cycle cost analysis as an integral part of making investment decisions in products, services, construction, and other projects to lower the Federal Government's costs and to reduce energy and water consumption.

Facility Energy Audits

NIST audited approximately 10 percent of its Gaithersburg, Maryland, and most of its NIST Boulder campus facility this year.

Financing Mechanisms

In FY 2005, Commerce requested \$4.6 million for the performance of energy audits and implementation of energy conservation measures. Congress appropriated \$3.3 million in the FY 2005 Appropriations Bill. Commerce Bureaus were able to make use of some additional funds that became available during the year, bringing the total energy program expenditures to \$3.5 million.

NOAA has been investigating various options for using energy savings performance contracting at its facilities, including bundling small regional facilities, and partnering with other agencies. NOAA is also investigating the use of utility energy savings contracts where available.

ENERGY STAR and Other Energy-Efficient Products

Commerce supports the use of ENERGY STAR and other energy-efficient products. Information on the availability and benefits of purchasing ENERGY STAR products has been distributed to the appropriate functional managers and their contracting officers. Commerce includes purchase of energy-efficient products in its Green Purchasing program, spearheaded by the Environmental Manager.

ENERGY STAR Buildings

Since there are no ENERGY STAR Building types that match the most common building types that Commerce constructs, Commerce has elected to focus on the use of the U.S. Green Building Council's LEED criteria instead of the ENERGY STAR Building criteria. Most new buildings and major renovations target a LEED silver rating.

Sustainable Building Design

Most of Commerce's new buildings and major renovations target a LEED silver rating. Commerce is working with GSA as it strives to achieve a LEED silver rating for the planned renovation of its headquarters facility, the HCHB, in Washington, D.C.

NOAA has adopted sustainable building design principles developed under the LEED certification program, and are incorporating them into the siting, design, and construction of new facilities. NOAA is currently pursuing LEED certification for the following construction projects:

- Weather Forecasting Office, Key West, Florida;
- Dr. Nancy Foster Environmental Center, Key West, Florida;
- Pacific Regional Center, Honolulu Project - Honolulu, Hawaii; and
- NOAA Satellite Operations Center - Suitland, Maryland.

Two NOAA facilities have already received LEED certification - the West Coast Alaska Tsunami Warning Center, Palmer, Alaska; and Weather Forecasting Office, Caribou, Maine. Both projects have been "firsts" in their states, making NOAA a leader in sustainable building.

Energy Efficiency in Lease Provisions

Energy and water efficiency are considered along with other factors when entering into new leases and renegotiating or extending existing leases. GSA leasing guidance is followed for buildings leased by and for Commerce.

Highly Efficient Systems

A recent study of the NIST facilities in Boulder, Colorado, indicated that NIST could benefit from a consolidation of its heating and cooling systems in a central plant. NIST has begun implementing that project which is expected to be completed in 2009.

Off-Grid Generation

Small-scale projects that self-generate energy using renewable sources (such as photovoltaics or wind turbines) or renewable energy thermal projects (such as solar thermal, biomass, or geothermal) are used to supplement commercial power. NOAA continues to operate a 10-kilowatt photovoltaic unit in American Samoa and a 10-kilowatt photovoltaic system in San Diego, California. NIST continues to operate its 28-kilowatt photovoltaic array on the roof of the Administration Building at its Gaithersburg, Maryland, facility. NOAA is also investigating use of photovoltaics at its facilities in Hawaii.

Electrical Load Reduction Measures

Major lighting retrofit projects have been initiated at the HCHB and at two NOAA Marine Operations Center sites. Projects will be completed in FY 2006. The HCHB project had not been cost effective in the past due to a planned major renovation of the building. Due to the rising cost of electricity and the development of phases for the planned renovation project, management reevaluated the situation and determined that it was cost-effective to upgrade the lighting in portions of the building that the planned renovation will not be affecting for several years. The lighting project includes a variety of lighting initiatives including LEED exit signs, high pressure sodium lighting in warehouse areas, and compact fluorescent lamps, as well as energy efficient fluorescent lamps.

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C. DEPARTMENT OF DEFENSE (DOD)

Management and Administration

The facilities energy program at the Department of Defense (DOD) is decentralized, with Defense Component Headquarters providing guidance and funding, and installations managing site-specific energy and water conservation programs. Energy project funding comes from a combination of government and alternative financing initiatives. Military installations are responsible for maintaining awareness, developing and implementing projects, and ensuring that new construction meets sustainable design criteria.

The Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics) is the DOD Senior Agency Official responsible for meeting the goals of Executive Order 13123.

The DOD Installations Capabilities Council (ICC), chaired by the Deputy Under Secretary of Defense (Installations & Environment) and chartered to address a broad spectrum of installation issues, is designated as the DOD Agency Energy Team. The membership of the ICC contains the cross-section of DOD senior leadership necessary to make decisions needed to remove obstacles hindering compliance with Executive Order 13123.

Management Tools

Awards

To increase energy conservation awareness and to recognize energy-saving efforts, DOD rewards individuals and organizations that demonstrate excellence in the field. These rewards serve to highlight and share the best practices among DOD agencies and to motivate employees.

The Air Force participated in the 2005 Federal Energy and Water Management Awards; 17 award candidates were submitted, with one individual award and one Presidential award received. The Air Force also received the 2005 Green Power Purchase Award as the largest federal purchaser of green power with over 41 percent of the Federal Government's purchase.

Headquarters (HQ) Air Force Civil Engineer Support Agency (AFCEA) has developed a rewards program called "Reduced Energy Appreciation Program (REAP)" which rewards the top three installations for the best overall reduction in energy use based on their previous year. The winners were Little Rock Air Force Base (AFB), Arizona, Nellis AFB, Nevada, and LaJes AFB, Azores.

Several commands have developed energy award programs that distribute funds to their base winners each year. They include:

- Pacific Air Forces (PACAF) has a \$225,000 annual award program recognizing long- and short-energy reduction projects at their installations.
- Air Force Combat Command (ACC) has a base energy award program that awards up to a total of \$1.0 million to ACC bases that exceeded the FY 2005 30 percent milestone goal and/or improved over last year's performance.

The Department of the Navy (Navy) annually presents Secretary of the Navy energy awards to recognize achievement in the efficient use of energy. Five awards were provided to Navy and Marine Corps winners in the categories of facilities and industrial installations. In addition to these awards, installations with an aggressive and successful program were recognized as achieving Platinum (highest) or Gold (second highest) level rankings for their energy programs.

The Navy Region Southwest energy team received a Presidential Energy award for reducing energy costs by ten percent, saving over \$4 million in FY 2004 and another \$1 million in FY 2005. The Marine Corps Base Camp Pendleton California energy team also received a Presidential Energy award for replacing inefficient HVAC and lighting systems, saving \$1.9 million. Navy installations and individuals received six awards for Federal Energy and Water Management.

In the Army, energy conservation awards are presented to individuals, organizations, and installations in recognition of their energy/water-saving efforts. The installations and regions participated in three energy awards programs—the Secretary of the Army Energy and Water Management Awards, the Presidential Energy Awards, and the Department of Energy Federal Energy and Water Management Awards. Each program recognizes individuals and organizations for exceptional performance in implementing energy efficiency achievements as set forth under Executive Order 13123. The Secretary of the Army Energy and Water Management Awards were presented on August 28, 2005, for accomplishments during FY 2004. The U.S. Army Installation Management Agency Southeast Region (IMA-SER) won a Presidential Award for Leadership in Federal Energy Management. Fort Lewis, Washington, won a Federal Energy and Water Management award in the Energy Efficiency/Energy Program Management for organizations category.

Training and Education

In FY 2005, DOD provided energy management training for 3,481 personnel.

The Air Force Institute of Technology (AFIT) Civil Engineer and Services School at Wright-Patterson AFB, Ohio, conducts an Energy Management Training (EMT) course. AFIT has also included the energy course material in an on-line computer-training program. Additionally, a one-hour energy briefing is provided in the civil engineers programmer's course.

The AFCESA developed a web-based ESPC training program providing training for 35 personnel from nine locations.

The HQ AFCESA developed and fielded a web-based Facility Managers Energy awareness course to assist base energy managers in training new building managers.

The Army's IMA Regions also provide training to their respective installations. For example, in April 2005, the Southeast Region (SERO) held an Energy Manager's Forum in Atlanta, Georgia. SERO brought together installation staff, HQ Army staff, DOE Staff, and various other energy consultants and personnel to discuss strategies, approaches, programs, processes, and procedures to improve energy operations and assist in meeting the goals of Executive Order 13123. Other IMA regions participated in DOE/FEMP training via web cast and teleconferencing. Europe Region conducts annual energy manager training, with a curriculum consistent with the proficiency requirements of the Energy Policy Act.

The Army uses energy management training courses available from commercial sources, such as Association of Energy Engineers, to meet the requirements of Executive Order 13123. The DOD Energy Manager's Handbook is distributed on the Construction Criteria Base CD. The Army's Energy website has been revised and is accessible at <http://hqda-energypolicy.pnl.gov> and provides current information and reference materials applicable to the energy program.

Showcase Facilities

DOD continues to participate in DOE-designated Showcase facilities to demonstrate new and innovative energy saving technologies. Facilities that are designated Showcase facilities may incorporate energy and water saving designs, energy conservation improvements, and renewable energy use.

The Navy established two new Showcases in FY 2005. Naval Station Guantanamo Bay brought the world's

largest wind farm diesel hybrid system on line. The 3.8-megawatt plant is improving the installation's grid reliability, producing 25 percent of the station's power, and saving the Navy \$1.2 million annually.

Marine Corps Base Camp Pendleton, California awarded over \$6 million in utility energy service contracts, decentralizing a steam plant and installing high efficiency lighting systems, daylighting for warehouses, and solar-powered outdoor lighting systems.

Naval Base Ventura County, Port Hueneme, California, and the U.S. Naval Academy, Annapolis, Maryland, continue as on-going Navy Showcase installations due to the large numbers of Academy midshipmen, Civil Engineer Corps officers, and Navy facilities managers who receive operations and facilities training there. Other continuing Showcase projects are: The Naval Base San Diego Admiral Prout Field House and Pool, the direct digital controls system at Naval Surface Warfare Center (NSWC) Dahlgren, the seven-megawatt cogeneration system at Marine Corps Air Ground Combat Center (MCAGCC) Twenty-Nine Palms, the 750-kilowatt photovoltaic system at Naval Base Coronado, California, the ground source heat pumps and Energy Management and Control Systems (EMCS) at Marine Corps Air Station (MCAS) Beaufort, South Carolina, the Bachelor Officer Quarters at Naval Training Center (NTC) Great Lakes, and various projects at Naval Medical Center San Diego, California.

In DeCA, the designated Showcase facility for the FY 2006 construction program is the Barksdale AFB, Louisiana Commissary. Energy efficiency features include heat reclaim from the refrigeration systems for space and water heating and refrigeration compressor systems comprised of several compressor sizes to ensure the most efficient combination of compressors is running at any one time to meet the load. The Refrigeration Monitoring and Control System (RMCS) for control of the Refrigeration System and HVAC system ensure efficient equipment operation. DeCA maximized use of energy efficient glass door refrigerated display cases, installed automatic scheduling of sales area and display case lighting, anti-sweat heater controls, temperature-terminated defrost and energy efficient lighting systems. Additional energy efficiency features of this facility are occupancy sensors, automatic water control on restroom fixtures, dual path HVAC systems for the sales area, maximum use of wall and roof insulation, energy efficient doors and windows, and utility metering.

Standard Buildings

In FY 2005, DOD reported a 28.2 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. DOD used an estimated 98,201 Btu per gross square foot in its standard buildings during the year. DOD received credit for purchases of 6.2 trillion Btu of renewable energy, lowering the energy intensity of these facilities from 101,378 Btu per square foot to 98,201 Btu per square foot.

Industrial and Laboratory Facilities

In FY 2005, DOD reported a 21.6 percent decrease in energy consumption from FY 1990 for its energy intensive facilities when measured in Btu per gross square foot. DOD used an estimated 167,221 Btu per gross square foot in its energy intensive facilities during the year. DOD received credit for purchases of 1.1 trillion Btu of renewable energy for these facilities, lowering the energy intensity from 174,142 Btu per square foot to 167,221 Btu per square foot.

Exempt Facilities

The Navy exempts mission critical, concentrated energy use transmitters, simulators, cold iron support to ships, and some private party facilities. The Army and Air Force have no exempt facilities. The Air Force exempts the energy consumed by streetlights and airfield lighting, equivalent to 5.7 gigawatthours.

Non-Fleet Vehicle and Equipment Fuel Use

In FY 2005, DOD consumed approximately 5.17 billion gallons of mobility fuels, a decrease from 5.35 billion gallons in FY 2004. Spending on mobility fuels increased 47 percent from \$5.39 billion in FY 2004 to \$7.95 billion in FY 2005. This increase in cost is attributed to the rise in fuel prices. For example, the price of jet fuel increased from \$1.11 per gallon in FY 2004 to \$1.70 per gallon in FY 2005.

The Air Force made significant positive improvements in processes for the procurement/lease of alternative fueled vehicles and utilization of alternative fuels. For the third year in a row, the Air Force estimates it will surpass the Energy Policy Act (EPA) Alternative Fuel Vehicle (AFV) acquisition mandate of 75 percent by 23 percent. If current strategies and assumptions remain unchanged, the Air Force will continue to exceed the AFV acquisition mandate in FY 2006 and FY 2007 and increase the amount of alternative fuels consumed by Air Force vehicles. The Air Force's success is largely due to major commands and local commanders placing special emphasis on obtaining AFVs within their owned and GSA leased fleets. Additionally, the Air Force Petroleum Office (AFPET) has made great strides working with the Defense Energy Supply Cen-

ter (DESC) in obtaining more alternative fuel infrastructure and alternative fuels. One significant factor for the success towards the AFV acquisitions mandate is the increased use of Biodiesel or B-20; from 7,000 Gasoline Gallons Equivalents (GGE) in FY 2001 to approximately 3.8 million GGE in FY 2005.

Thirteen alternate fuel projects are underway which will continue to improve progress to satisfy the mandates and utilizations of alternative fuels. Six of the thirteen projects have an E-85 scope/goal, four have a Bio-diesel scope/goal, and the rest is overall maintenance (piping or tank maintenance) of facilities to provide alternative fuels. Additionally, approximately 45 additional alternative fuel infrastructure projects have been submitted to DESC.

Renewable Energy

DOD remains dedicated to fulfilling the goals of the Executive Order 13123 by purchasing and generating electricity from renewable sources. In FY 2005, DOD used 8.35 trillion Btu of renewable energy from self-generation and through purchases. This translates to over 8 percent of DOD's electricity consumption, well exceeding the Executive Order 13123 goal of 2.5 percent by 2005. DOD emphasizes the use of solar and other renewable energy sources where it is cost-effective and has just recently established a long range goal of 25 percent by 2025. Passive solar designs, such as building orientation and window placement and sizing, have been implemented in a variety of existing buildings and new facility construction.

Self-Generated Renewable Energy

DOD has integrated photovoltaic power systems, solar water heating systems, and transpired solar collectors (solar walls) into its facilities. Active solar heating applications have included maintenance facility solar walls, swimming pool heating, and hot water heating.

In the Air Force, Luke AFB Arizona awarded an ESPC to install a 122-kilowatt photovoltaic system that will be operational in FY 2006. F.E. Warren AFB, Wyoming, installed two on-grid wind generation units with a capacity of 1.2 megawatts. The USAF Academy generated and captured over 870,000 cubic feet of digester gas in lieu of natural gas for use in the process of hot water boiler at the wastewater treatment plant. In addition, Eielson AFB, Alaska, has a refuse derived fuel program and processed over 890 tons, generating 12.2 billion Btu and saving over 840 tons of coal.

The Navy is increasing generation of renewable energy, operating the largest wind/diesel hybrid plant in the world and the two largest federal photovoltaic sys-

tems in the United States. The Navy is generating “free” thermal energy from the waste heat of five cogeneration systems, and a sixth plant will add to this generation in early FY 2006. The eastern flank of a geothermal well at Naval Air Warfare Center (NAWC) China Lake, California, has been producing 345 gigawatthours of electricity per year since 1990. In 2005, the Navy generated a total of 353 gigawatthours of renewable electricity and over 1.2 trillion Btu of renewable thermal energy from all sources. The Navy is also negotiating award of a geothermal electrical generating plant at Naval Air Station (NAS) Fallon, Nevada. Once constructed, the plant will produce power for the electric grid.

Navy projects made operational in FY 2005 include a 3.8-megawatt wind/diesel hybrid system, at Naval Station Guantanamo Bay, Cuba, and a 10-megawatt cogeneration plant at Naval Training Center Great Lakes, Chicago, Illinois.

The Army was also successful in funding the installation of 10-kilowatt wind turbines at Fort Huachuca, Arizona, and at the Headquarters for the Arizona National Guard.

Purchased Renewable Energy

DOD continued to purchase energy from renewable sources. In FY 2005, total DOD renewable energy purchases amounted to 834.4 billion Btu.

In the Air Force, Dyess AFB and Fairchild AFB purchase 100 percent renewable power for their installations.

The Navy purchased 114.6 gigawatthours of renewable electricity and 601.3 billion Btu of renewable thermal energy. Norfolk Naval Shipyard, Portsmouth, Virginia (industrial consumption), purchases electricity and steam from a privatized waste to energy plant. NAS Keflavik, Iceland, purchases electricity and steam generated from geothermal energy.

In the Army, Redstone Arsenal purchases steam from the City of Huntsville that is produced from municipal solid waste. In FY 2005, Redstone purchased 609.8 billion Btu. This renewable energy source was developed prior to 1990 and is therefore not included in the Renewable Energy/Renewable Energy Credit Purchases on the DOD Scorecard. Fort Carson is purchasing 6.6 gigawatthours of electrical power generated from renewable sources from Colorado Springs Utility. The Army is making a special effort to purchase renewable energy generated from solar, wind, geothermal, and biomass.

The Presidio of Monterey purchased 14.5 gigawatthours of solar energy in FY 2005 and Fort Sill purchased 116.4 gigawatthours of solar energy in FY 2005. Fort Lewis purchased 12.0 gigawatthours of Solar and Wind energy and Aberdeen Proving Ground purchased 469.3 billion Btu of thermal energy in FY 2005.

DeCA purchased 8.7 billion Btu of thermal energy generated by geothermal energy and 1.8 billion Btu of electricity generated by hydroelectric sources for the Keflavik commissary in FY 2005.

Petroleum

DOD continues to make significant progress in reducing the consumption of petroleum-based fuels. In the Navy, fuel oil use in facilities decreased 1.8 million gallons, or 2.6 percent, from last year. Several installations optimized central steam plant start-up/shut-down based on weather forecasts. Some installations installed boiler control systems to monitor and adjust efficiency and optimizing performance. Others upgraded heating systems to more efficient units.

Since FY 1985, the Army has reduced petroleum-based fuel use at its facilities by 94.8 percent. Army installations have been encouraged to investigate alternative fuels such as natural gas and renewable energy that produce less carbon emissions. Installations have also been encouraged to use more natural gas with fuel oil as back up.

Water Conservation

DOD remains committed to reducing overall consumption of natural resources by recording annual water consumption data from the services. In FY 2005, 195 DOD facilities developed Water Management Plans and implemented Best Management Practices (BMPs). This year, DOD consumed 124.3 billion gallons of potable water, a 28.3 percent decrease in consumption when compared to a FY 2000 base year.

During the year, Navy Region Southwest installed water efficient washing machines and waterless urinals, and implemented a wastewater recycling system at Naval Auxiliary Landing Field San Clemente Island. Naval Base Ventura County implemented xeriscaping at Point Mugu, converting 1.5 acres from watered turf to drought-tolerant xeriscaping. Naval Air Weapons Station China Lake is using a SCADA system to measure and alert maintenance personnel when abnormal flow rates from reservoirs occur. Alarms were successfully used this year to alert personnel to a 14" water distribution line break. Quick repair reduced the amount of water lost. Naval Weapons Station Seal

Beach reduced irrigation water by 50 percent by not watering non-prestige areas.

Norfolk Naval Shipyard, Portsmouth, Virginia, was pumping water from utility tunnels approximately 18 hours per day. A water survey was performed in utility tunnels in industrial buildings to determine the source of water leaks. Repairs have reduced water use and pumping requirements to approximately six hours per week.

Naval Station Great Lakes, Chicago, Illinois, replaced more than 6,600 feet of condensate return piping, saving 33.6 million gallons of water per year.

Naval Base Coronado, California Naval Base San Diego, California, and Naval Base Point Loma, installed 529 water-efficient washers and 13 water free urinals. Naval Base Coronado developed an efficient leak reporting and response system. Excessive water use meter reads are automatically flagged; Resource Efficiency Managers (REMs) are promptly notified to investigate to determine root cause and resolve. REMs also began use of innovative leak detection equipment to aid the program.

At the Washington Headquarters Service, efforts were focused on identifying locations of main water supplies to the reservation as well as existing water meters. These efforts consisted of reviewing existing condition drawings, reviewing as-buils from recently completed (within last five years) projects and field surveys to verify meter existence and locations.

Implementation Strategies

Life-Cycle Cost Analysis

DOD's Facilities and Energy managers utilize life-cycle cost (LCC) analysis in making decisions about their investment in products, services, construction, and other projects to lower costs and to reduce energy and water consumption. DOD considers the life-cycle costs of combining projects, and encourages bundling of energy efficiency projects with renewable energy projects, where appropriate. Projects are prioritized for capital funding and execution is based upon the greatest life-cycle savings to investment ratio. The use of passive solar design and active solar technologies are recommended where cost-effective over the life of the project. Sustainable development projects use LCC methodology and follow the Whole Building Design Guide.

In the Air Force, LCC analysis was used on all new construction projects and retrofit projects, including

ESPC, UESC, and Energy Conservation Improvement Programs. Examples include:

- Dormitory construction at Barksdale AFB Louisiana;
- Dining hall/Airmen's Center at Cannon AFB New Mexico;
- Infrared heating systems replaced an old forced air heating system at Altus AFB Oklahoma; and
- Compact fluorescent lighting retrofit at Yokota AB Japan.

Facility Energy Audits

DOD demonstrates its commitment to energy conservation and the goals of Executive Order 13123 by conducting energy audits of facilities and installations. In FY 2005, DOD completed an audit of 225,129 thousand square feet, or 10.7 percent of total facility square footage in FY 2005.

DeCA is partnering with the DOE for a retro-commissioning plan to audit commissaries with the objective of providing a baseline for a detailed retro-commissioning plan that will be applied to all commissaries system-wide.

Financing Mechanisms

In FY 2005, DOD components, through a decentralized approach, awarded 22 UESC and 15 ESPC task orders/contracts producing an estimated annual energy savings of 1,058 trillion Btu and a total life-cycle savings of \$282 million.

The Air Force awarded eight new ESPC and three new UESC task orders during the year. These task orders include energy infrastructure upgrades and new equipment to help the installations reduce energy and water consumption. Examples include new thermal storage systems, chillers, boilers, lights, motors, EMCS systems, and water reducing devices.

In FY 2005, the Army awarded seven ESPC contracts with an annual savings of 34.3 billion Btu. The Army awarded seven UESCs, with utility company investment of approximately \$29 million. Most of the anticipated \$54.6 million in total LCC savings will be returned to the utility company to pay for improvement measures.

ENERGY STAR and Other Energy-Efficient Products

When life-cycle cost-effective, DOD organizations select ENERGY STAR and other energy-efficient products when acquiring energy-consuming products. Guidance generated by DOE, GSA, and DLA for energy-efficient products are incorporated into the sustainable design and development of new and renovated

facilities. The components are procuring energy-consuming products that are in the upper 25 percent of energy efficiency. Energy efficient technologies include high-efficiency lighting and ballasts, exit signs, energy efficient motors, low-voltage distribution transformers, and the use of packaged heating and cooling equipment with energy efficiency ratios that meet or exceed Federal criteria for retrofitting existing buildings. Information technology hardware, computers and copying equipment are acquired under the ENERGY STAR program using GSA Schedules and either government-wide or service contracts.

ENERGY STAR Buildings

Two Air Force hospital clinics at Eielson AFB Alaska and Nellis AFB Nevada have been designated ENERGY STAR Buildings. Facilities #35, 316, 351 and 1030 have all been designated ENERGY STAR at Buckley AFB Colorado. In addition, all new military family housing units must be designed to meet the ENERGY STAR criteria.

Sustainable Building Design

Sustainability initiatives require an integrated design approach to the life cycle of buildings and infrastructure. The concepts of sustainable development as applied to DOD installations have been incorporated into the master planning process of each of the services. Installations are encouraged to approach land use planning and urban design in a holistic manner and integrate it with energy planning. In FY 2005, DOD adopted and applied sustainable design principles in 867 new building projects. Of these, 254 projects can or will be certified under the U.S. Green Buildings Council Leadership in Energy and Environmental Design (LEED). The following provides examples of DOD sustainable building design and construction efforts.

The Air Force Civil Engineer established an Air Force Sustainable Development Policy in FY 2002. All facility and infrastructure military construction (MILCON) projects must apply sustainability development concepts in the planning, design, construction, environmental management, operation, maintenance and disposal process by FY 2009. The Air Force sustainable target for FY 2005 was 35 percent. The Air Force completed 44 out of 260 projects, or 17 percent (MILCON and major renovation). The following are examples of using sustainable design concepts:

- Four Air Combat Command facilities obtained LEED certification, including a library at Shaw AFB South Carolina and an ADAL Intelligence production complex at Wright-Patterson AFB Ohio.

- Laughlin AFB Texas is designing a hybrid water source ground source heat pump dormitory project.
- The NORTHCOM addition and Mission Support facility addition is in construction at Peterson AFB Colorado.
- Consolidated Support Facility at Edwards AFB was rated at a silver level under LEED and was awarded the Air Force design for sustainability in FY 2005.

All Army installations have been encouraged to designate their own Showcase Projects and strive for higher sustainable rating levels (Silver, Gold, and Platinum). In accordance with Army policy, in FY 2005, Rock Island Arsenal and Tooele Army Depot designated themselves as Army showcase facilities. In FY 2005, the Army design/constructed 612 new buildings. Of those 612 new buildings, 163 can or will be LEED-certified.

In the Washington Headquarters Service, the Pentagon Renovation Office (PENREN) incorporates sustainability requirements and goals in each of their design-build Requests for Proposal. In all PENREN design-build contracts, the LEED rating system is the primary green building metric used. Design-build projects awarded between 1999 and mid-2002 did not require that contractors use the LEED rating system, but they volunteered to use it as a metric. PENREN's newer contracts included a requirement for earning a LEED certification as a minimum. The Pentagon Library and Conference Center (PLC2) contract was awarded in July 2004. However, most of the design was accomplished in FY 2005. This design-build contract included a requirement that LEED certification for New Construction must be met. The contractor set the bar higher at "Silver" and is currently tracking well to earn this rating. Wedge 3 started in FY 2005 and is following the LEED for Existing Buildings rating system. Although this project is still in the early stages, it is on track to earn LEED certification.

Energy Efficiency in Lease Provisions

DOD emphasizes energy and water conservation in leased facilities and each of the services has issued guidance directing that all leased spaces comply with the energy and water efficiency requirements of the Energy Policy Act of 1992. It is DOD's intent to continue to have the landlord make appropriate investments in energy efficiency, which can be amortized in the lease, provided the new total cost (energy costs plus lease cost) does not exceed total costs without improvements. These leases should amortize the investments over the economic life of the improvements. Build-to-lease solicitations for DOD facilities will

contain criteria encouraging sustainable design and development, energy efficiency, and verification of building performance. DOD relies upon the General Services Administration (GSA) to ensure the above provisions are included in buildings that they lease for DOD.

Industrial Facility Efficiency Improvements

DOD continues to make progress toward energy reduction goals. The following highlights several industrial facility improvement projects.

Naval Air Depot North Island, Coronado, California, installed several industrial facility efficiency improvements including: retrofit of three existing chillers with a new Turbocor Compressor and connecting the chillers to a direct digital controls system, high bay lighting for the southwest hangar with programmable circuit breaker panel connected to the energy management system/direct digital controls, demonstration tank cover on clean processing tank to provide ventilation control, compressed air reduction devices and meters with scheduled operation valves (repair leaks, replace disconnects, filters, & hoses), and lighting, ballast and occupancy sensor upgrades in office spaces.

Projects undertaken by DeCA during the year include:

- DeCA installs dual-path air conditioning to control commissary store humidity as an alternative to natural gas or propane fired desiccant dehumidification systems.
- DeCA uses and plans to increase use of heat-pipe technology for dehumidification and heat reclaim. Domestic hot water and HVAC heat reclaim systems are standard in most large commissary store systems.
- A Quality Surveillance Representative at each commissary monitors refrigeration and HVAC maintenance contract performance.
- DeCA conducts remote diagnostic monitoring of Refrigeration Monitoring and Control Systems at approximately 191 individual commissaries to ensure that refrigeration and lighting systems are being operated and maintained at their design specification. Discrepancies are forwarded to maintenance contractors on a daily basis for correction. Lighting controls were monitored and adjusted by this same method in FY 2005. This surveillance resulted in improved contractor maintenance and improved equipment operation and less energy consumed. Web-based energy monitoring control systems are being evaluated for DeCA wide use.

The National Security Agency (NSA) maintenance work force uses strategies to ensure that the most en-

ergy efficient products and procedures are used at all times on mechanical and electrical systems throughout the NSA campus. These systems include but are not limited to the following: compressed air systems, lighting, chilled water systems, pumping systems, hot water heating systems, etc.

Most of the chiller plants at the NSA campus are fully automated. Chillers and associated equipment are programmed to operate automatically based on building load. A MILCON project is underway which will interconnect all of the main campus chilled water systems, thereby allowing the most efficient chillers to provide chilled water for the buildings cooling requirements. Variable speed drives on HVAC airside equipment are also being installed in three large facilities.

NSA is also continuing the replacement of its legacy EMCS with a new state-of-the-art system. This new system is more flexible, will be monitoring more points, and running more energy efficient temperature control algorithms. NSA is also integrating a software package that will analyze system operation and determine where energy is being wasted.

Highly Efficient Systems

DOD encourages the components to combine cooling, heating, and power systems in new construction and/or retrofit projects when cost effective. The following provides examples of efforts to reduce energy consumption through the implementation of efficiency technologies and projects.

The Navy worked with the Office of the Secretary of Defense and DOE to develop appropriate credit for cogeneration systems on the annual report. The Navy's cogeneration capacity is 44 megawatts. Plants at Portsmouth Naval Shipyard, Kittery, Maine; Marine Corps Air-Ground Combat Center, Twenty-Nine Palms, California; Marine Corps Recruit Depot, Parris Island, South Carolina; Naval Submarine Base, New London, Connecticut; Naval Medical Center San Diego, California; Naval Base, San Diego, California; and Naval Surface Warfare Center, Indian Head, Maryland, continue to operate and provided cogeneration credits contributing 2.8 percent of the Navy's energy reduction. The Naval Training Center Great Lakes, Chicago, Illinois, 10-megawatt cogeneration project was scheduled to be completed by December 2005. No local natural resources (biomass, geothermal, etc.) were available to utilize in these projects.

In the Army, in addition to the centrally funded program, the installations also used their O&M funds to implement energy saving projects such as - upgrade boilers and distribution systems, improved high effi-

ciency pumps and motors, and updated system controls. Army regions and installations, along with the Army Corps of Engineers, evaluate the deployment of highly efficient energy systems for all new construction and major retrofit projects and incorporate these systems where cost-effective.

Distributed Generation

DOD is pursuing distributed and off-grid generation where it is life cycle cost-effective to provide peak saving opportunities and energy security. Typical applications include micro-turbines, fuel cells, cogeneration plants, flywheels and back-up generators.

In the Air Force, March AFB California is installing a 300-kilowatt photovoltaic system above a carport structure. Eielson AFB will complete installation of small wind generators and improved solar controllers at 23 remote sites.

The Navy uses off-grid generation for island installations, and remote applications. Naval Base Guantanamo Bay, Cuba, installed four wind turbines totaling 3.8 megawatts, providing 25 percent of the power for this isolated facility. Diesel engine generators were overhauled and provide the remaining off-grid power. Naval Support Facility Diego Garcia, British Indian Ocean Territory, installed solar street lighting fixtures in various areas of the base.

Naval Base Coronado, California, installed Solar Powered light emitting diode (LED) lights at the Naval Air Station North Island Fishing Pier.

Marine Corps Air Station Yuma, Arizona, installed one mile of solar lighting along a perimeter fence and multi-use pathway.

Marine Corps Base Camp Pendleton, California, installed more than 200 solar-powered street lights and caution lights over the past several years, and expanded the technology to provide solar-powered lighting at bus stops, carport electric vehicle charging stations, wastewater overflow detection stations, and notification and communication systems. In FY 2006, the base will install 100 new streetlights at remote, off-grid locations.

Other installations installed renewable power systems that are grid connected but reduce outside grid demand. These include a 30-kilowatt photovoltaic system at Naval Base Point Loma, California, a 20-kilowatt photovoltaic system at Naval Air Facility El Centro, California, and a 300-kilowatt photovoltaic system at Navy Region Hawaii.

The Navy continues to validate the performance and cost of Proton Exchange Membrane (PEM) fuel cells power plants in combined heat and power applications. Although PEM technology has made progress toward viable commercial products, there are still substantial durability, reliability, and availability issues that remain (e.g., due to hydrogen processing techniques, the PEM fuel stack becomes contaminated and can fail with as little as 6 months of continuous operation). The following installations are hosting the fuel cell demonstrations:

- Naval Base Coronado, California (five power plants);
- Submarine Base Point Loma, San Diego, California (three power plants);
- Naval Base Ventura County, California (two power plants); and
- Naval Facilities Engineering Command Hawaii, Pearl Harbor, Hawaii (one power plant).

All the fuel cells extract hydrogen from natural gas except for the plant at Pearl Harbor, which processes propane. The intent of the demonstration is to assess the performance, operations, maintenance, and repair requirements of the PEM fuel cells. The fuel cell power plants will operate for one year under this program.

Electrical Load Reduction Measures

In the Air Force, Cheyenne Mountain AFS Colorado, uses generators to their advantage by being on the “super peak” kilowatt-hour tariff and runs the generators when the local utility calls for load shedding.

Beale AFB continues to operate a radio system to limit demand by controlling electric water heaters and air conditioning units. The system allows the base to curtail demand by over one megawatt (about 10 percent) when electricity shortages are probable.

FY 2005 marked the fourth year the USAF Academy participated in Demand Side Management efforts during “super peak” periods called by the local utility. The Academy’s automated DSM program duty-cycled non-critical fan and pump motor loads to achieve approximately 4 percent reduction in peak power demand during the scheduled periods.

The Navy is validating the performance of energy technologies such as cool roofs, heat pipes, air conditioning compressors with integrated variable speed drives, air conditioning duct sealants, high efficiency air conditioning systems, scotopic lighting and destratification fans. The results of the demonstrations will be used to guide installations on the life cycle cost benefits of using these technologies to reduce electrical loads.

Naval Air Facility Atsugi, Japan, de-lamped excessive lighting, shortened the A/C season by four weeks, encouraged people to turn off the air conditioning 30 minutes before the office closed, turned off lights during lunch, controlled lighting by using a card-key system in BEQ/BOQ, installed T-8 lamps, CFL, LED exit lights and photocells in all newly built or renovated spaces, and restricted room temperature controls.

Naval Air Facility El Centro, California, shut down unoccupied bachelor quarters and hangars by turning the HVAC system off and unplugging all appliances. HVAC systems throughout the base were adjusted and Direct Digital Controls were used to turn temperatures in occupied office buildings and hangars to 78 degrees during the cooling months and 65 degrees during the heating months. The two flight-line compressors were shut down on weekends and during holidays. HVAC systems were shut down in unoccupied buildings during government holidays. HVAC scheduling was applied to the Navy Exchange, various MWR buildings, and all office buildings using the direct digital control system.

Naval Base Ventura County, California, replaced photocells and/or time controls to eliminate outdoor lights remaining on during daylight hours and shutdown non-essential galley refrigeration units.

Naval Weapons Station Seal Beach, California, raised temperature set point and shortened hours of operation in air conditioned buildings, removed or disabled 15 window air conditioners, and removed 35 personal refrigerators.

Army installations use a variety of methods to reduce peak load and demand. In FY 2005, many Army installations in the Western part of the United States

continued to take advantage of projects developed and initiated in FY 2004 based on the findings from the Western Power Grid Peak Demand and Energy Reduction Program. These studies provided a site-wide assessment of the energy-saving potential at the installation.

Other installations use other energy consumption and cost savings measures. For example, Fort Gordon employs diesel generators to manage its peak load. Fort Gordon leases 13.5 megawatts of diesel generator assets from the 249th Prime Power Program. The generators allow Fort Gordon to peak shave the electrical load shape which amounts to at least \$300,000 in annual savings or credits. Fort Lewis has various energy projects in which they do load shedding. Other installations use energy management control systems and utility monitoring control systems (UMCS) for peak shaving.

In the DeCA, California, stores turn off 50 percent of sales area lighting during load reduction warning periods. All stores with electronic Refrigeration Monitoring and Control Systems turn off 50 percent of sales area and all display case lighting during non-business hours.

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D. DEPARTMENT OF ENERGY (DOE)

Management and Administration

Within the Department of Energy (DOE), the Acting Assistant Secretary for Energy Efficiency and Renewable Energy is the Senior Agency Official responsible for advocating policy, programs, and new initiatives to take appropriate actions to conserve energy at DOE facilities to the maximum extent consistent with the effective discharge of public responsibilities. The head of this organization is ideally suited to the role of the Senior Agency Official, since the organization is responsible for conducting research in energy conservation and renewable energy technologies and for accomplishing energy conservation actions at DOE facilities through the Federal Energy Management Program (FEMP). During FY 2005, The Acting Program Manager was the agency official responsible for implementing the policies, programs, and new initiatives of the Assistant Secretary at DOE facilities and for accomplishing the requirements of public law, Executive Order 13123, and the Presidential Directive of May 3, 2001, "Energy Conservation at Federal Facilities."

The agency energy team at headquarters is FEMP's Departmental Energy Management Program (DEMP) Team. In addition to the energy team at headquarters, DOE also has a team of energy management professionals from headquarters, DOE Field Offices, and sites called the Energy Efficiency Working Group (EEWG), which is sponsored by FEMP. This group has a goal of promoting excellence in energy management through the active exchange of timely management and technical information. Working meetings are conducted two to three times a year.

The DEMP staff is the expert staff within FEMP that advocates energy efficiency and the cost effective acquisition of energy supplies and services for DOE facilities. The team provides support to the EEWG, and Senior Agency Official by drafting plans and policy, budgets, and reports for DOE's energy and utility management efforts. They also assist the DOE Program Office's in drafting the Energy and Utilities Management Performance Agreements, which are negotiated with the DOE Field Offices and sites.

The DOE Energy Coordinators and Utility Coordinators are designated persons at DOE Operations Offices and Field Offices responsible for acquiring utility services and for coordinating energy conservation actions and other energy initiatives at the sites. Implementation is carried out primarily through Management and Operating Contractors since the majority of DOE sites are

managed and operated by the private sector or not-for-profit divisions of universities.

Site energy coordinators are individuals designated by their site management as responsible for advocating energy efficiency at the site. These individuals prepare plans and reports, often initiating projects and support activities and other DOE energy management projects at their sites.

Management Tools

Awards

The Departmental Energy Management Awards were established in FY 1979 by the In-House Energy Management Program of the Department, which is now part of the Federal Energy Management Program under the Assistant Secretary for Energy Efficiency and Renewable Energy. Each year, these awards are presented to DOE personnel in recognition of their outstanding contributions toward energy and dollar savings at DOE facilities and field organizations. Many DOE organizations have employee incentive programs to reward exceptional performance in implementing Executive Order 13123.

Training and Education

Technical training and energy awareness activities continue to be a large component of site programs. During FY 2005, DOE organizations reported training 137 employees in energy management.

Showcase Facilities

Many DOE facilities do not qualify as potential Federal Energy Saver Showcase Facilities because visitation is restricted because of national security or safety reasons.

Energy Efficiency Performance

Standard Buildings

In FY 2005, DOE reported a 52.6 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. DOE used 224,043 Btu per gross square foot in its standard buildings during the year. DOE received credit for purchases of 301.3 billion Btu of renewable energy, lowering the energy intensity of these facilities from 228,523 Btu per square foot to 224,043 Btu per square foot.

This reduction is partially due to reduced mission-related activities and overall downsizing of operations

and facilities. As manpower is reduced and facilities are closed, efforts are ongoing to consolidate operations and minimize energy use in vacated buildings. The reduced energy use in vacated buildings will be accomplished through shutting off or setback of HVAC systems, lighting, transformers, and other building equipment usage.

Industrial and Laboratory Facilities

In FY 2005, DOE's laboratory and industrial facilities saw a reduction in Btu per gross square feet of 26.8 percent since FY 1990. This reduction is mainly attributable to reduced mission-related activities and overall downsizing of operations and facilities.

DOE used 291,615 Btu per gross square foot in its energy intensive facilities during the year. DOE received credit for purchases of 185.9 billion Btu of renewable energy for these facilities, lowering the energy intensity from 299,269 Btu per square foot to 291,615 Btu per square foot.

Exempt Facilities

Most of DOE's facilities that are proposed for exemption are currently reported under the metered process category and have been scaled back operationally to prepare for decontamination and decommissioning. These facilities have traditionally been energy intensive operations that will in many cases dominate the energy consumption being reported at the site and the site consumption will vary in direct relationship to the energy consumption of these facilities. Traditional energy conservation measures will not significantly effect the energy consumption that will be reported for these facilities, and it would be impractical to meet the goals with these facilities included in other than the exempt category.

Non-Fleet Vehicle and Equipment Fuel Use

Bonneville Power Administration (BPA) uses incentives to encourage a rideshare program such as parking priority for the building garage. BPA encourages mass transit and has provided a new park and ride station. BPA also provides free transit tickets for employees traveling on short trips for business and training.

Savannah River Site (SRS) has purchased alternative fueled vehicles that use E85 fuel for over 75 percent of its light duty fleet vehicles. In FY 2005, SRS consumed over 300,000 gallons of clean burning E85 fuel, reducing petroleum use.

In FY 2005, Oak Ridge National Laboratory (ORNL) purchased 11 ethanol-burning vehicles, bringing the total to 91 since 1999.

In 2005, the Thomas Jefferson National Accelerator Facility (TJNAF) replaced two gasoline powered vehicles with E85 vehicles. The Stanford Linear Accelerator Center (SLAC) purchased three additional Neighborhood Electrical Vehicles (NEVs) in FY 2005, bringing the total to 24 NEVs at the site. The battery-operated NEVs allow SLAC to discontinue lease of some GSA gasoline-powered vehicles.

Renewable Energy

Self-Generated Renewable Energy

In FY 2005, DOE facilities reported using a total of 15.3 billion Btu of self-generated energy, comprised of 132.4 megawatthours of self-generated electricity, 130.2 million Btu of renewable thermal energy, and 4,300 megawatthours of "other" renewable energy.

The Idaho National Laboratory (INL) Records Storage Facility includes a solar wall that provides heat, resulting in approximately \$1,250 per year in avoided energy costs for space conditioning. INL used a total of 120 million Btu of self-generated renewable thermal energy during the year.

National Renewable Energy Laboratory (NREL) generates about 53.0 megawatthours of electricity from grid-connected PV panels each year. These panels are located at the Solar Energy Research Facility, the STM Site Entrance Building, the Outdoor Test Facility, the National Wind Technology Center (NWTC) Site Entrance Building, and the Distributed Energy Resources (DER) Test Facility, as well as remote applications including signs, walkway lights and parking lighting. The NWTC has approximately 1.6 megawatts of installed wind turbine capacity used for research purposes. The energy produced is used to offset simultaneous NWTC site energy use. The turbines produced over 60.0 megawatthours in FY 2005. Total self-generated electricity at NREL was 113.0 megawatthours. NREL also reported using 10.2 million Btu of self-generated renewable thermal energy during the year.

The Hanford Site utilizes two mobile and 41 fixed solar-powered emergency sirens. Each siren is powered by two 120-watt panels totaling 240 watts and producing 12 volts. This year the Hanford Site Emergency and Alerting System (HSEAS) included the installation of two new low-power AM broadcast stations and renovation of two existing radio station sites. The stations' antennas and broadcast equipment are powered by a solar-charged battery system.

The Hanford Site also completed a project to install remote operated isolation valves on its export water system. This project incorporated a series of solar

charging stations and new, remote-operated valves and pressure transmitters to provide monitoring and control capabilities from the water plant control room.

Under normal conditions, produced fluids at Naval Petroleum Reserve (NPR) #3 are heated by burning natural gas to augment separation of oil and water in its treatment facilities. NPR #3 has naturally occurring, flowing hot water supply and production wells. Field staff has routed some of the hot water to “pre-heat” produced fluids and buildings to reduce the consumption of natural gas.

DOE Headquarters (Headquarters) installed 7-kilowatt photovoltaic arrays and solar water collectors at the Germantown, Maryland, and Forrestal building child development centers. Headquarters also installed photovoltaic arrays on the south side of the South Building.

Purchased Renewable Energy

On April 20, 2000, the Secretary of Energy directed DOE to purchase three percent of its total electricity needs from non-hydro renewable energy sources by 2005, and 7.5 percent of its total electricity purchases from renewable sources by 2010. At 3.3 percent, DOE has met the requirement at the end of FY 2005 to purchase three percent of its total electricity needs from non-hydro renewable energy sources.

In certain cases, DOE officials may find that electricity produced from renewable power costs more than electricity produced using other energy sources, such as conventional fossil fuels. In those instances, DOE will cover the incremental costs with money saved from energy projects, savings obtained through lower energy costs as a result of retail electric competition, contract negotiations with utility companies, and utility rate reductions. By combining the lower cost of electricity with some portion of moderately more expensive renewable electricity, DOE will not increase its overall utility budget. During FY 2005, DOE purchased 54,727.7 megawatthours of green power at a cost of \$3.0 million.

The Richland Operation’s Office 10-year Power Sales Agreement (2002-2011) with BPA provides for the purchase of 1.5 megawatts of Environmentally Preferred Power (EPP) for the first five-year rate period. EPP is generated from endorsed hydroelectric generating facilities, wind projects, and other endorsed projects. Through this agreement, the Hanford Site received credit for purchasing 11,206.0 megawatthours during FY 2005, and Pacific Northwest National Laboratory (PNNL) received credit for purchasing 1,918 megawatthours of renewable electricity.

PNNL also acquired 9,250 megawatthours of local wind power from the Stateline Wind Farm. In total, PNNL is able to claim that in FY 2005, the lab was approximately 16.5 percent green-powered, its highest percentage ever.

Headquarters purchased 16,443 megawatthours of renewable electricity for the Germantown campus and Forrestal building. The FY 2005 amount accounts for 44 percent of Headquarters’ electric power consumption and 23.5 percent of the total energy consumption.

During FY 2005, NETL purchased 786 megawatthours of renewable energy from its electric power supplier. The Strategic Petroleum Reserve also purchased 1,720.0 megawatthours of renewable energy credits.

NREL purchased approximately 97 percent of its total electrical use of 16.2 gigawatthours of its DOE-owned buildings in renewable energy certificates (RECs), a purchase of 15.7 gigawatthours. When these RECs were purchased earlier in FY 2005, in order to achieve 100 percent coverage of electrical use, it was estimated the FY 2005 electrical energy use would be equal to that of FY 2004 or 15.6 gigawatthours. Since the actual electrical consumption was higher, to true up the purchase difference, additional energy will be purchased as a part of the FY 2006 REC purchase. Twenty-three percent of the FY 2005 purchase was made through Community Energy, Inc. These RECs were from a small, rural wind project owned by the City of Lamar and the Arkansas River Power Authority. Seventy-three percent of this purchase was made through the Western Area Power Administration Federal Agency Master Purchase Agreement. The RECs for this agreement are derived from biomass resources in California. The remaining RECs were purchased through the Xcel Energy Windsource program.

Petroleum

Since FY 1985, DOE has substantially reduced its use of petroleum-based fuels in its facilities. In FY 2005, DOE reduced consumption of fuel oil in all of its facilities by 47.8 percent from 19.0 million gallons in FY 1985 to 9.9 million gallons in FY 2005. The use of LPG/propane was reduced 58.8 percent during the period, a reduction of 843,000 gallons.

Hanford Site’s FY 2005 petroleum-based fuel consumption indicates a 75.6 percent decrease from the FY 1985 baseline. This achievement continues to be made possible by the ESPC contractor replacing old steam plant facilities in 1998 with new portable boilers running on high-quality diesel and natural gas. Both fuels burn cleaner than heavy oil.

Petroleum based fuels used in buildings at National Nuclear Security Administration/Nevada Site Office sites consist specifically of fuel oil used in buildings at the Nevada Test Site. Consumption for FY 1985 was 318,852 gallons while consumption for FY 2005 was 137,392 gallons, a reduction in consumption of 56.9 percent.

Water Conservation

DOE recognizes the potential to save money and natural resources through water conservation. To meet the goals of Executive Order 13123, facilities are using life-cycle cost-effective measures to reduce water consumption and associated energy use. DOE also encouraged its field offices and sites to include water management plans within their facility management plans. DOE sites reported using 5.6 billion gallons of water during FY 2005 costing \$13.6 million.

Hanford Site's total water produced/purchased for FY 2005 was 268.9 million gallons, a reduction of 17.28 percent from the FY 2000 baseline of 325.1 million gallons. The reduced water need for fire suppression activities, post-wildfire dust control, and tree planting, as well as construction dust suppression activities and facility stand downs, accounted for the majority of the decline. Water consumption declined 9.8 percent from FY 2004 to FY 2005 due to facility closures and employee reductions.

PPPL has successfully minimized the use of potable water through an agreement with the State of New Jersey to draw raw water from the Delaware and Raritan canal. Potable water consumption decreased by approximately 14 percent during FY 2005.

Approximately 58.8 million gallons of water was consumed this year at TJNAF. The bulk of the water used is directly related to process or facility heat rejection and is recycled. Sealing water, when used for its intended purpose, is collected and pumped to the cooling towers as feed water. This eliminates a waste stream and recycles 1.4 million gallons of water per year. Also, separate metering has been installed for lawn sprinklers. Lawn sprinkling is adjusted for rainfall and is kept to the minimum level. This provision is included in the grounds maintenance subcontract and performance is monitored regularly. Also, the laboratory implements seven of 10 BMPs for water on all building water systems on the campus.

In FY 2005, PNNL installed 14 Infra-Red (IR) hands-free faucets and 19 IR flushometers. PNNL continues to conserve water from the Columbia River using the advanced landscaping methods and strategies developed and implemented in FY 2002.

Implementation Strategies

Life-Cycle Cost Analysis

Fermilab conducted life cycle cost (LCC) analysis on each of its energy conservation projects developed during FY 2005 to ensure feasibility and help identify optimal solutions. These same principles are employed in the design of general construction. Two LCC cost-effective energy conservation projects were developed in FY 2005 that will pay back DOE investment costs within five years, and were funded by DEMP to help the lab follow through on EPACT requirements.

In FY 2005, SRS continued an aggressive deactivation and decommissioning (D&D) program in various site facilities. The intent of this program is to ensure accelerated environmental clean-up of the site. The scope of this effort includes the decommissioning of 225 facilities by the end of FY 2006. Many of these are energy-consuming facilities while a large number are not. The shutdown and physical removal of site facilities as part of the accelerated D&D program was certainly the best evidence of LCC analysis at work at SRS.

Facility Energy Audits

DOE sites are working to meet the Executive Order 13123 goal of conducting energy and water audits for approximately 10 percent of their facilities each year. Audits are conducted independently, through ESPCs or UESCs. From FY 1992 to FY 2005, more than 90 percent of DOE's total facility space received energy audits.

DEMP funding was utilized in FY 2005 to complete a Model Program entitled "Retro-Commissioning of B-Area Laboratory Facilities" in four SRS facilities. For this project, retro-commissioning procedures specifically targeted at energy efficiency improvements in the buildings were implemented. ORNL staff was selected to conduct the technical development and front-end implementation of the project due to the exploratory nature of procedure development and previous extensive involvement with development of energy assessment and re-commissioning procedures for energy efficiency projects. ORNL also has extensive energy management experience in laboratory environments. The primary objective of the project was to conduct re-commissioning assessment and testing of important energy systems in the facilities. This led to development of recommendations for energy system modifications, which in turn resulted in facility improvements and energy cost savings. This project confirmed experience from previous projects that adaptation of energy systems sometimes allows significant savings potential to be achieved, but special interventions from facility staff are often required.

During FY 2005, NETL successfully passed both ISO14001 Semi-annual Surveillance Audits and will maintain its ISO14001 Certification. NETL has identified 10 significant Environmental Aspects which can be controlled or influenced by planned or new developments, or new or modified activities, product and services. One of the Significant Environmental Aspects identified is Energy and Fuel Usage. This Aspect was comprised of six targets: improving the energy management program, reducing energy use per square foot, increasing purchase of electricity from clean sources, reducing petroleum consumption, acquiring more alternative fuel vehicles, increasing the usage rate of alternative fuel in vehicles, and attaining LEED certification for NETL's new building design and construction

At PNNL, two buildings, the Environmental Technology Building (ETB) and the National Security Building (NSB), were re-audited in FY 2005 after analyzing the metered end use data for FY 2004 to provide improved energy use baselines. These baselines are now used to determine when energy use is considered excessive and re-commissioning is required. In the process of performing these energy audits, PNNL identified many operational no-cost or low-cost ECMs that could be done in its facilities. Many of these ECMs involved developing better control strategies using its METASYS building control system to shut off, reduce runtime, or eliminate wasteful heating and cooling practices. This was developed into a continuous re-commissioning process that continues in all PNNL and Battelle facilities. This strategy was implemented in the leased ETB and NSB buildings in FY 2005. This is more challenging in leased facilities as there is no direct access to the operational parameters and control strategies and partnerships must be developed with the building owner/operators.

Financing Mechanisms

DEMP received \$1.95 million in appropriations for FY 2005. Funds received in FY 2005 were distributed between activities to introduce new energy management practices into DOE sites through Model Program Development, and funding support for energy projects through Energy Retrofit Project Support, that provide known energy savings and reductions in energy use. In this way, DOE sustains an effective program balance between implementing new initiatives for energy management emphasizing best practices and achieving known quantifiable energy savings through retrofit projects.

Through an agency-wide competition, nine sites received Energy Retrofit Project Support funds and eight sites received funds for Model Program

Development. The retrofit projects will save 25.7 billion Btu annually. The Government will save approximately \$303,000 per year in avoided utilities and maintenance costs when these projects are completed.

At the Hanford Site, two BPA projects totaling \$515,730 in FY 2003 alternative funding were continued during FY 2005. Completion of these projects will reduce electricity costs by approximately \$167,614 and provide an annualized energy savings of over 4.8 gigawatthours. One of the alternative financed projects completed during FY 2005 was Project L-327, 100 Area Export Water Pumps Replacement. Three energy-efficient 2400-volt motors/pumps were installed at the 50-year-old 182B export water pumping facility. Flows for the new system are expected to range from 500-9,300 gallons per minute. This project is based on energy savings and will utilize a variable-speed magnadrive coupler on the 250-hp pump, between the motor and pump to control water flow during times of low demand and during pump transition periods. An estimated savings of approximately 3.3 gigawatthours per year has been calculated with the implementation of this new pumping configuration.

PNNL had three BPA projects totaling \$95,200 in alternative funding undertaken or completed during FY 2005. The 326 Building Variable Frequency Drive (VFD) project added VFDs to a 100 HP exhaust fan and to a 15 HP supply fan. These 326 VFDs will save an estimated 187.9 megawatthours per year. The 331 Building VFD project added VFDs to two 100 HP supply fans and to two 50 HP exhaust fans for a measured savings of 549.4 megawatthours per year. The other project was the National Security Building (NSB)/Environmental Technology Building (ETB) re-commissioning project which used previously installed sub-metering in the building to determine why energy usage in ETB is climbing at a faster rate than its mirror image twin (NSB building). Analyses of the energy use data identified 714.4 megawatthours per year that could be saved with minimal changes in building operations. These changes will be implemented during FY 2006. Savings from these three projects will provide an annual energy savings of 1.5 gigawatthours and a reduction of utility costs of about \$82,175.

ENERGY STAR and Other Energy-Efficient Products

Fermilab promoted the purchase of ENERGY STAR and FEMP-recommended products, and continued to notify engineers, designers, and buyers in the procurement department of available rebates on such goods. Specific language to this effect was also incorporated in guide specifications for new construction and in product

specifications. Fermilab acquisition systems also incorporated recommendations for low standby power products from FEMP's "Standby Power Data Center" into purchasing decisions.

NETL purchases ENERGY STAR products and other energy-efficient products. This is accomplished through NETL's procurement group which has ENERGY STAR products incorporated into their procurement packages. The majority of the ENERGY STAR products are associated with computer equipment. NETL incorporates energy efficient products such as HVAC equipment into their designs using EPA's and DOE's FEMP guidelines.

Over the last year NREL has deployed Verdiem's (formerly EZConserv) Surveyor tool to some 1,143 PCs throughout the Laboratory. This is nearly 100 percent of the PCs at the Laboratory that can appropriately be managed. This tool tracks computer modes (on, off, standby) and power management settings. It also has the capability to centrally shut down computers at predetermined times and set power management settings. A pilot program to implement automatic shutdown and set aggressive power management setting was implemented during FY 2004 and continued into FY 2005. A web-interface of Surveyor data was developed so that staff can easily access personal use data on a real-time basis.

TJNAF uses energy efficient products where possible. One example of this is the use of low-mercury fluorescent lamps. Air conditioners and new computers are purchased with an ENERGY STAR rating.

ENERGY STAR Buildings

In FY 2005, BNL obtained the ENERGY STAR designation for the DOE Brookhaven Site Office.

Sustainable Building Design

Fermilab's LEED principles and standards have been increasingly integrated into the lab's design practices. In FY 2005, a second member of the Facilities Engineering Group became a LEED-Accredited Professional. All projects are analyzed at the conceptual design review stage for conformance to LEED standards. In FY 2005, this amounted to five projects. The lab routinely receives credit for water efficient landscaping, use of low-emitting materials, alternate transportation, and reduced site disturbance. The routine use of direct digital control (DDC) technology also positions the lab to often receive credit for measurement and verification and carbon dioxide monitoring.

INL Energy Management currently has seven LEED accredited professionals and is working to incorporate

sustainable design criteria into the INL Architectural Engineering standards and to champion sustainable principles for design and operations personnel. DEMP Model Program funding was provided in FY 2005 to provide LEED direction and technical support for the INL's new Radiological and Environmental Sciences Laboratory (RESL) facility. This Model Program championed sustainable design principles for the RESL during conceptual design by providing technical direction on LEED qualification points, design and drawing review, and the development of a display model of the new RESL facility. This model showcases the various sustainable concepts included in the design and has been displayed at numerous functions, including Earth Day and a site open house.

Energy Efficiency in Lease Provisions

Approximately one half of NREL employees currently occupy leased office space. These leases have been renewed through 2008. NREL's leases include clauses that open the door for NREL and the lessor to "enter into negotiations with the object of equitably sharing the capital costs and benefits of energy efficiency improvements." While small energy efficiency projects (lighting) have been completed with the current lessor, there has not been sufficient interest on the part of the lessor to promote additional, higher-cost energy efficiency projects in NREL's leased spaces. NREL does, however, encourage employees to save energy and water in their own workspaces and operations.

SLAC leased three modular office units in FY 2005 to provide temporary office space until a permanent office building is constructed. Energy conservation specifications for the units were met or exceeded when the units were assembled.

Industrial Facility Efficiency Improvements

At SRS, boiler controls for boiler #2 at the 784-A steam plant were upgraded in FY 2005 from old, inefficient pneumatic controls to new state-of-the-art multi-loop digital controllers. This followed a previous upgrade of the controls for the other boiler unit. The combustion controller controls air flow, furnace draft, and oxygen trim, as well as the induced-draft/forced-draft fan speed. The boiler master controller controls firing rate, drum level, and feedwater flow. The plant master controller provides control based on steam header pressure or boiler steam flow. The successful installation and startup of the new controls on these boilers to provide support for the Dynamic Underground Stripping (DUS) project will save SRS approximately \$200,000 each year that the DUS project requires steam.

During FY 2005, BNL, with regard to efficiency in energy intensive facilities has rescheduled 30 megawatts of demand to avoid coinciding with the utility summer peak; obtained DEMP funding for two projects: Free Cooling at the Central Chilled Water Facility and Steam Manhole Insulation; and construction of a 1,300-ton satellite chiller project that will displace older, less efficient chillers.

During FY 2005, NETL's B-94 Analytical Chemistry Building, Pittsburgh, Pennsylvania, installed three new satellite natural gas-fired high efficiency multi-stage low pressure hot water boilers. During the fourth quarter of FY 2005, NETL awarded a construction contract to install two new central steam plant natural gas-fired boilers at its Morgantown, West Virginia site. When installed, these new boilers will be more energy efficient and have automated controls for better operational efficiencies.

PPPL's Central Plant has four boilers with dual-fuel capability. Boiler fuel can be either natural gas or No. 2 fuel oil when cost effective and allowed by the supplier. The boilers operate primarily on natural gas. In addition to normal maintenance, a project was completed during FY 2005 to further improve efficiency by converting the four boilers in the Central Plant to use No. 2 fuel oil as well as natural gas to allow for efficient operations under different energy market conditions.

Highly Efficient Systems

The TJNAF Lab's new CEBAF Center addition is a heat pump system with ground-coupled heat "storage." A significant fraction of the heat removed from the building in the summer will be captured by the heat pumps in the winter to heat the building.

Distributed Generation

NNSA/NSO has distributed generation sites using solar panels for local power in remote areas and emergency backup generators for some facilities, but no generation-specific resources that supply a regular power source.

At NREL, a 900-watt wind turbine at NWTC Site Entrance Building was installed and placed in operation.

Electrical Load Reduction Measures

Fermilab extended its participation in voluntary power curtailment programs with the local electric utility in FY 2005. The contract curtailment load target remained at 25.0 megawatts and durations from the previous year were maintained. Due to mild weather and supply improvements, Fermilab was not called upon to curtail load this year.

As in previous years, BNL participated in LIPA's Peak Load Curtailment Program during the summer of FY 2005. Upon notification by the utility that a critical day was in progress, all employees as well as the operators of critical facilities were notified and asked to reduce power consumption. BNL contracted to reduce electric demand by 4 megawatts during critical periods. However, LIPA did not call any reduction periods in 2005 due to recent capacity additions, despite record temperatures and demand.

Many electrical load reduction measures described in the Hanford Site's Electrical Load Curtailment Plan have been implemented, reducing the load available for reduction in any subsequent emergency situation. Activities conducted during FY 2005 that contributed to this effort include reducing lighting, HVAC, office equipment, other electrical equipment, shutdown/ deactivating facilities, and downsizing/removing transformers.

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E. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

Management and Administration

The U.S. Department of Health and Human Services (HHS) has established a centralized energy program to coordinate the energy and water conservation efforts, facilitate alternative financing of energy and water projects, promote federal energy programs, manage an extensive energy awareness campaign, and provide information and assistance to meet the federal energy management goals.

The HHS Senior Energy Agency Official is the Assistant Secretary for Administration and Management. The six HHS Operating Divisions (OPDIVs) that manage real property have also submitted FY 2005 annual energy reports in compliance with the requirements of Executive Order 13123. These OPDIVs are the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Indian Health Service (IHS), the National Institutes of Health (NIH), the Office of the Secretary (OS), and the Program Support Center (PSC). Each OPDIV has identified their energy and water efficiency efforts, which are highlighted in the detailed sections of this report.

Management Tools

Awards

The annual HHS Energy and Water Management Awards Program recognizes the exceptional performance of HHS energy management personnel in implementing projects, programs, and alternative financing contracts to meet the requirements of the various Executive Orders and laws. In FY 2005, 23 award winners were honored as part of the HHS Energy and Water Management Awards. These individuals and organizations reduced energy and water use through a wide range of energy projects and programs. The use of alternative financing, Department of Energy (DOE) Industrial Assessment Centers for energy auditing, waterside economizer and heat recovery systems, boiler plant upgrades, lighting timers, direct digital controls, and strong management support of the implementation of energy projects by these award winners have led to significant annual energy and water savings.

The HHS Energy Program relies on such outreach tools as seminars, newsletters, awareness events, and after-hours energy audits to inform employees about their energy-saving performance. In addition, HHS Operating Divisions incorporate life-cycle cost analyses, sustainable design, ENERGY STAR equipment procurement, and renewable energy technology in design policy and

guidelines for new construction and renovation projects.

HHS uses the “You Have the Power” campaign Energy Champion posters to recognize individuals and small groups for their outstanding efforts in energy and water efficiency. In FY 2005, an Energy Champion poster and an Energy Project Poster were published for HHS.

In addition, CDC, IHS, and OS used internal awards programs in FY 2005 to recognize individuals for their work on improving central plant efficiency and increasing energy awareness. CDC currently uses the cash incentive award system to award exceptional overall and on-the-spot exceptional performances over and beyond the employee’s everyday responsibilities. The IHS Albuquerque and Bemidji Areas use Area Director’s Awards Programs to recognize energy saving projects and individual initiatives. The IHS Portland area uses an “on-the-spot” awards program to motivate efforts.

Training and Education

In FY 2005, 91 HHS energy personnel received training in energy and water efficiency topics. This training included OPDIV specific workshops, DOE Federal Energy Management Program (FEMP) classes, and utility or manufacturer-sponsored training. The subject content of the courses covered the broad spectrum of energy and water efficiency, varying from specific equipment instruction to alternative financing techniques and sustainable design.

In FY 2005, the HHS Energy Program sponsored a one-day energy workshop held in conjunction with the HHS Energy and Water Management Awards Ceremony. The workshop focused on green power procurement, water efficiency opportunities, and renewable energy project applications. In addition, the HHS Energy Officer and support contractor held three specific energy sessions for IHS covering topics such as energy funding, reduction requirements, sustainable design, and an energy and water efficiency overview for the highest level of IHS facility management. These OPDIV-specific training sessions offered an arena to meet the needs of IHS and generated new tasks to enhance the energy efficiency efforts of the Areas.

The IHS Alaska Area provided energy management and conservation training to staff engineers in FY 2005. IHS engineers participated in many energy conservation seminars and workshops that focused on relevant topics such as the energy conservation ele-

ments of HVAC and direct digital control (DDC) systems and energy awareness. The FEMP energy awareness publications and information have been channeled to the facility managers for implementation at their sites.

NIH sponsored the 4th Annual DHHS Environmental Networking Conference in May 2005, at the Lister Hill Auditorium of the Bethesda campus. More than 20 NIH personnel including environmental, planning, utilities, and engineering staff attended the conference. The conference included sessions on green procurement, sustainability, biodiesel as an alternate fuel, and an overview of the HHS Energy Program.

OS and PSC sponsored major Earth Day Expos in FY 2005, highlighting sustainability and choices that employees can make in their everyday lives to conserve energy, water, and natural resources. The expos were entitled "The Price is Green" and was based on the Price is Right game show. Vendors displayed products and provided information on alternative fueled vehicles, water conservation, solar energy, electricity deregulation, local environmental organizations, ENERGY STAR homes and appliances, air duct sealing, home energy audits, backyard habitats, green power procurement, and recycling.

Energy Efficiency Performance

Standard Buildings

In FY 2005, HHS reported a 19.8 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. HHS used an estimated 76,596 Btu per gross square foot in its standard buildings during the year. Only ten percent of the HHS square footage is considered standard space.

The FY 2005 energy consumption rate for standard facilities is 7.9 percent lower than the FY 2004 usage. The reduced consumption is primarily due to a major decrease of energy use at the PSC Parklawn Building. In the beginning of FY 2005, the PSC facility management installed separate electricity meters on a 10,328 square foot data center and found that it used 28.5 percent of the total electricity consumed by the building. This is a very large percentage of energy consumption for a space that is only 0.6 percent of the building's square footage and that cannot be subject to energy conservation measures. The electricity used by the data center for the year was then exempted from the overall consumption for the building. The square footage for the data center was also subtracted from the facility's total square footage. The result of this concise energy monitoring is a more accurate reflection of the

electricity consumption in the building with the computer data center excluded. The data center was exempted per the provisions of Executive Order 13123 for exempt facilities.

Industrial and Laboratory Facilities

Ninety percent of the HHS square footage is considered energy intensive including laboratories, hospitals, animal centers, health clinics, and other related support space. The performance measure used for the HHS energy intensive facilities is Btu per square foot.

In FY 2005, the energy consumption of HHS energy intensive facilities was 8.5 trillion Btu and 345,258 Btu per gross square foot. This consumption rate includes a credit for the NIH cogeneration project that increases site energy, but decreases source energy. HHS received credit for purchases of 379.7 billion Btu of renewable energy for these facilities, lowering the energy intensity from 360,715 Btu per square foot to 345,258 Btu per square foot. The revised FY 1990 baseline (including new NIH Code Compliant Baseline) for the HHS energy intensive facilities resulted in a total energy consumption of 7.7 trillion Btu, and a consumption rate of 422,981 Btu per gross square foot. This equates to an 18.4 percent decrease when comparing FY 2005 to the baseline year of FY 1990.

The FY 2005 energy consumption was 2.4 percent higher than the FY 2004 usage, due to the continued new construction at the NIH campus that has offset the energy efficiency reductions realized from implemented projects. Energy is used in the construction projects, but the square footage is not included in the OPDIV inventories, so the energy consumption on the campuses increases. In addition, much of the construction (or renovation) is focusing on bringing HHS laboratories and hospitals up-to-date with current ventilation standards for laboratory and animal care. Therefore, these projects result in greater energy consumption due to the increased ventilation required, even when energy efficiency technologies are introduced.

Exempt Facilities

Two HHS sites have exempted facilities. NIH has outdoor multilevel parking garages on the NIH Bethesda Campus that consume lighting energy only. These facilities are not metered separately. Therefore, the energy consumption of these structures has been estimated based on the number of lighting fixtures and the time of use. Total energy use is estimated at 7.7 billion Btu or 8,685 Btu per gross square foot.

The PSC Parklawn Building has a large computer data center that is metered separately and has been ex-

empted for the first time this year. The computer center consumes 5.6 gigawatthours or 28.5 percent of the building's entire electrical load while only occupying 0.6 percent of the space.

Non-Fleet Vehicle and Equipment Fuel Use

The energy consumption in this category is incurred by NIH only. Its use of 200.2 billion Btu is 3.3 percent of the total NIH consumption.

Renewable Energy

Self-Generated Renewable Energy

In FY 2005, the operation of the FDA White Oak Campus photovoltaic system was optimized. The system was installed under a photovoltaic energy savings performance contract (ESPC) and included a 10-kilowatt photovoltaic system to augment the electrical distribution system. The ESPC is between SEMBRA Energy Services and the General Services Administration (GSA).

A solar energy feasibility study was completed at the FDA Muirkirk Campus facility in Beltsville, Maryland. The study identified projects that are estimated to reduce energy costs by more than \$87,000 per year from solar air heating at the pasture buildings, MOD 1 & 2 buildings, and the BRF buildings. The energy savings would represent 4.4 percent of the current energy use at the Muirkirk Campus.

Specifically, the projects include the installation of 21 solar roofing panels and siding systems or ground mounted solar heating systems for 17 out buildings and four emergency generators. The solar systems, covering 70,000 square feet, would produce heated air and deliver the air to preheat outside air for the buildings or equipment. The estimated cost for the projects is about \$600,000, yielding a simple payback period of six years. This study was forwarded to GSA for review since the majority of the work involved the MOD II facility, which is a GSA-owned facility.

OS completed a feasibility study on the application of a solar thermal system on the roof of the Humphrey Building to heat domestic water supplies. The project was found to be feasible with a ten to eleven year payback period. However, due to a major building renovation planned to begin in FY 2006, the final application of the system has not been determined and is therefore on hold.

In FY 2005, PSC facility management completed a solar energy survey at the Parklawn Building. The study identified projects that would save over \$1,700 per year in energy costs from solar air heating, but at

this time the cost of the project was too high to receive a payback prior to lease termination. The recommended projects include heating the air from two solar siding systems to reduce the year round electric resistance heat energy use by generators, and heating domestic hot water with a solar system that delivers hot air to an air-to-water heat exchanger.

Purchased Renewable Energy

Most HHS facilities have not entered into competitive contracts for the procurement of electricity with a green component, which is often the only way the purchase of renewable energy is economical. Current estimates show that the increase in cost for direct renewable energy procurement may not prove cost effective and may prohibit the purchase of this energy source for many HHS facilities.

The IHS Albuquerque Area's major utility provider implemented an alternative wind energy program. The Albuquerque Indian Hospital and Santa Fe Indian Hospital, the area's highest electricity users, purchase roughly three percentage of their electricity from wind energy. The Area is looking to expand the procurement of wind energy at other IHS sites. In addition, more than 12,219 million Btu of waste heat was purchased in FY 2005 from local utility companies and piped into a heat exchanger at the Bethel Hospital in the IHS Alaska Area.

Petroleum

In FY 1990, HHS energy intensive facilities used 2.2 trillion Btu of fuel oil and LPG/propane. In FY 2005, these facilities used 612.9 billion Btu of petroleum products, resulting in a 72.7 percent reduction in consumption.

From FY 2004 to FY 2005, petroleum use increased by 28.4 percent primarily due to an operational problem at the FDA MOD 1 & 2 facility. A leaky central utility piping system at MOD 2 was shut down and temporary boilers were installed that use propane. In addition, the fuel oil tanks that supply the diesel emergency generators were filled this fiscal year.

Water Conservation

The HHS OPDIVs reported usage of 1.7 billion gallons at a cost of \$7.0 million in FY 2005. This represents a 10.9 percent increase from FY 2000 the baseline year and a 3.6 percent decrease from FY 2004. Often changes in scientific mission can significantly change the consumption of water at HHS facilities.

This consumption is a low reading or estimate of the actual water used for the entire agency. Due to a lack of manpower and data, IHS has been unable to provide

accurate metered or estimated data on water consumption in the 155 facilities they manage. The IHS Areas will continue to gather water consumption data, however, it is expected that accurate data and sound estimates will be very difficult to obtain. Several facilities reported that local water utility billing procedures were often erratic and difficult to monitor. Therefore, development of water management plans at IHS sites has been delayed and will be a focus in FY 2006.

In FY 2005, several HHS OPDIVs refined water management plans in accordance with Executive Order 13123 and 22.8 percent of HHS facilities implemented Best Management Practices in water conservation. This task enabled facility managers to further prioritize water conservation projects and highlight areas of waste or opportunity. Many HHS laboratories reported that it was common for facilities to change the type of experiment performed or the frequency of performance, which would in turn, change the amount of water used in that facility.

The IHS Bemidji Area installed new water softener units that use reduced volume regeneration cycles and reduce water waste. The IHS Tucson Area facilities, along with many other IHS Areas, are replacing outdated toilets, faucets, shower heads and other devices with water saving products. The facilities offices are reviewing watering schedules and desert landscaping to reduce the amount of water used maintaining landscaping. The replacement of irrigation system with lower usage system will be accomplished when funding becomes available. In addition, new facilities will minimize the quantity of landscaping requiring watering and implement the use of native plants to minimize landscape watering.

Innovative grounds maintenance initiatives at NIH minimize water use on campus. "Treegator" water bags are used around trees. These large water bags can be filled and provide slow drip irrigation over the root ball. A plan has been developed to install 1,600 linear feet of drip irrigation in five shrub bed locations. In addition, NIH uses native trees that are drought resistant to reduce the need to water. Gardens at NIH continue to include drought resistant plant material and native species such as crape myrtle, butterfly bush, juniper varieties, native viburnum, holly and dogwood varieties, seven varieties of day lilies and drifts of black-eyed susans and purple cone flowers and incorporates water absorbing pellets, to help absorb and retain natural moisture and then slowly release that moisture to the plants over an extended period.

Implementation Strategies

Life-Cycle Cost Analysis

All HHS OPDIVs use life-cycle cost (LCC) analysis to prioritize and justify the implementation of energy efficiency projects.

LCC analysis is used by FDA in the early design phases of new construction projects. For example, a life-cycle cost analysis was performed for an HVAC system renovation at the Dauphin Island Laboratory in Alabama. LCC analysis was also used in the design of the White Oak Laboratory in Maryland, and the FDA laboratory in Irvine, California.

The IHS Areas use LCC analysis extensively to analyze and prioritize energy and water efficiency projects. The IHS Aberdeen Area performed LCC analyses on new facility designs for the Winnebago and Sisseton sites influencing the decision on building utility systems. In the Bemidji Area, LCC is required for all contract services and procurement of products, services, construction, and other projects that will lower energy and water consumption.

Facility Energy Audits

In FY 2005, 2.8 million square feet, or 10 percent, of HHS facilities were audited. CDC, IHS, and NIH performed comprehensive audits, many in conjunction with utility energy services contracts. To date, approximately 95 percent of the HHS facility square footage has received energy and water efficiency audits. OPDIVs are responsible for ensuring that 10 percent of their facilities are audited each year according to the OPDIV Ten Year Audit Plans established in FY 1994 (in compliance with Executive Order 12902).

Financing Mechanisms

In FY 2005, the HHS Energy Program continued efforts on promoting and facilitating the use of alternative financing mechanisms to implement energy and water efficiency projects, and two new contracts were signed.

Approximately 60 percent of all CDC facilities have had alternative financing contracts implemented. The continued use of energy savings performance contracts (ESPCs)/utility energy services contracts (UESCs) at CDC may be with new construction since the OPDIV expects a large amount of new work in the near future.

In FY 2005, FDA spent \$2.3 million of direct agency funding on UESC annual payments for the Jefferson Laboratory Complex (JLC) contract and projects funded from FDA headquarters. Larger projects within FDA have also been funded through alternative

financing contracts. In FY 2005, project implementations continued under two follow-on task orders of the JLC UESC with Entergy. The largest task order included the construction of an \$8 million dollar project to upgrade the district cooling system by replacing chilled water piping, installing variable volume pumping, and expanding the chilled water loop; replace an energy management control system (EMCS) to monitor and control HVAC equipment and lighting; and install an energy recovery system on a 100 percent outdoor air configuration. The project will include removing 11 chillers and reconfiguring 15 water-cooled chillers in the central (district) chilled water loop, thereby, significantly decreasing domestic water consumption and costs. The estimated annual energy savings of these projects total \$500,000 and the payback period is ten years.

In FY 2005, NIH entered into two UESCs totaling \$3.1 million that are estimated to save 38.0 billion Btu annually. One contract was a PEPCO UESC, used to refurbish and commission air to air heat recovery system. The other was a Washington Gas UESC, used for upgrades in Building 10.

In total, in FY 2005, HHS used \$7.4 million of direct agency funding to implement energy and water efficiency projects and audits. The funding projected for FY 2006 is \$6.2 million. It is anticipated that most energy and water efficiency work will be completed under alternative financing contracts.

ENERGY STAR and Other Energy-Efficient Products

The HHS Energy Officer uses the HHS Energy Program communication tools to relate to the OPDIVs the significance of using ENERGY STAR and other energy efficient products. Methods for procurement of these products are also highlighted and described. In general, OPDIVs use the GSA Schedule to procure energy efficient products and have revised project specifications and standard procurement contracts to include their purchase. Many HHS facilities purchase standard stock items, such as light bulbs and ballasts, as recommended by FEMP and ENERGY STAR guidelines.

PSC facility management met with the Cadmus group (ENERGY STAR contractor) on the implementation of the EPA EZ-Save PC power management software for the Parklawn Building. The PSC information technology (IT) staff at the building experienced problems with software compatibility with the existing security patches and hardware. The IT staff informed facility management that the current network software did have energy saving functions that were not fully utilized and

in time they would try to improve on those features. In addition, energy efficiency criteria have been incorporated into guide specifications for Parklawn Building alterations.

ENERGY STAR Buildings

In FY 2002, the IHS Blackfeet Hospital in Browning, Montana, was awarded this Department's first ENERGY STAR label from the U.S. Environmental Protection Agency (EPA). The Blackfeet Hospital is part of the IHS Billings Area. In addition to the Blackfeet Hospital, there are two other hospitals in the Area that are in the ENERGY STAR Label Database. At this time the other hospitals do not meet the top 25 percent ranking, but the Area engineers and managers will continue to improve the efficiency of these sites in hopes of achieving the required energy savings for the ENERGY STAR label.

The new Winnebago Hospital in the IHS Aberdeen Area may meet ENERGY STAR building criteria, but has not been officially designated as such. The Sophie Trettevick Health Clinic in the IHS Neah Bay Service Unit within the Portland Area is eligible to be officially designated as an ENERGY STAR Building. An application will be submitted in FY 2006.

Sustainable Building Design

In FY 2005, the HHS Energy Program continued to highlight the concept of sustainable building design, and the use of the Whole Building Design Guide and LEED rating system through the awareness newsletters, training, and direct facility management correspondence.

FDA utilizes basic sustainable building design criteria when planning new construction. For example, the FDA Irvine Laboratory is tall and narrow to take advantage of natural lighting, and the walls will be constructed of architectural concrete that will not require insulation and drywall. In addition, native vegetation was planted to reduce maintenance and irrigation requirements of the landscaping. Reclaimed water is on a timer system used for the necessary irrigation of those plants at the optimal time. Currently, the FDA new construction and renovation design policies are being reviewed to ensure that sustainable building design principles are clearly stated.

The Oklahoma City Area made significant progress in FY 2005 on the use of sustainable building design principles into the siting, design, and construction of new facilities. LEED certification is being pursued on a 36,760 square foot expansion project at the Lawton Indian Hospital, and a Design Development LEED Submittal for the project was received in July of 2005.

Aspects of the performance criteria in five environmental categories (sustainable sites, water efficiency, energy & atmosphere, materials & resources, and indoor environmental quality) will be complied with in order to achieve the certification.

The Tucson Area has one facility currently in the design phase. The plans have been reviewed for sustainable building concepts and as a result will incorporate more efficient lighting and environmental systems, native vegetation with water efficient landscaping, and reduced storm water runoff. The Tucson Area also began establishing the requirements of a comprehensive energy audit that will incorporate the LEED for Existing Buildings criteria.

Energy Efficiency in Lease Provisions

Only 7.2 percent of the reportable HHS square footage is leased space. Where appropriate, OPDIVs review lease agreements to give preference to buildings with sustainable and energy efficient designs.

FDA leases 9.5 percent of its square footage. Whenever possible, energy and water efficiency measures are implemented in the leased facilities. The Atlanta Laboratory is a leased facility which will be up for renewal in FY 2006. FDA is currently working with GSA and has issued a requested scope of work to include energy and water efficiency measures in the new lease.

The White Oak Campus is a GSA leased property. Currently, GSA, FDA, and SEMBRA Energy Services are working together to design and construct an energy efficient state-of-the art laboratory and office campus. Phase I of the project has been completed and Phase II will begin in FY 2006. The design and construction is being completed by SEMBRA under a photovoltaic energy savings performance contract with GSA. Since FDA is the client for the facility, the FDA has outlined specific requirements and energy efficient technologies to be included in the design. Once the construction is completed, FDA will pay for utilities as part of the lease payment to GSA. However, the utility portion of the lease payment will be significantly less than that for a standard laboratory facility under GSA rates, due to the increased energy efficiency.

Industrial Facility Efficiency Improvements

The majority of HHS square footage is considered energy intensive. Therefore, most energy projects address energy intensive systems such as steam systems, boiler operation, fuel switching, and cogeneration.

In new energy-intensive renovations or new construction, HHS looks to improve automated control meth-

ods, night setback operations, and energy recovery methods. Due to changes in lab functions and layouts, many new laboratories have higher airflow requirements. This has also been the case with major renovation projects. It has been found that older laboratory facilities did not meet the existing standards and therefore, the new renovations result in even more energy-intensive facilities.

FDA laboratories are continuously studying new ways to save energy in the facilities. The project design of a major HVAC upgrade for the Gulf Coast Seafood Laboratory at Dauphin Island was completed in FY 2005. The project includes the installation of new self contained HVAC system for each room with supplemental fresh air from central system and air-cooled chillers. All new equipment will be energy efficient type models.

The JLC facility continued task orders in FY 2005 involving the construction of an \$8 million project to upgrade the district cooling system by replacing chilled water piping, installing variable volume pumping, and expanding the chilled water loop; replacing an EMCS to monitor and control HVAC equipment and lighting; and installing an energy recovery system on a 100 percent outdoor air configuration. The estimated payback period of this project is ten years. The specific projects are described below.

Under the UESC, a comprehensive HVAC and energy management controls renovation was completed in Building 53. This project cost \$2.8 million and will have annual energy savings of \$152,000. The project consisted of a new air-to-air heat exchanger, a manifold fume hood exhaust system, 310 new variable air volume terminal boxes, new DDC systems for 39 laboratories and 54 animal holding areas, and a conversion from a constant volume air distribution system to variable air volume air distribution system. The new DDC controls replaced a pneumatic system that required frequent calibration and was not capable of implementing sophisticated energy conservation control strategies. The energy savings will be realized through the implementation of energy efficient control strategies including: chilled water reset, condenser water reset, heating water reset, optimal start/stop, unoccupied/occupied temperature and air flow settings. The project is currently in the commissioning and inspection phases, and will be completed in early FY 2006.

Another project was the upgrade and redesign of the campus-wide energy management control system totaling \$1.4 million of work. The contract included the installation of 1,374 DDC points that replaced a pneumatic system requiring frequent calibration and was not

capable of implementing sophisticated energy conservation control strategies. The energy savings will be realized through the implementation of control strategies such as chilled water reset, condenser water reset, heating water reset, optimal start/stop, unoccupied/occupied temperature and air flow settings. The estimated annual energy savings of this project total \$50,000.

The largest project completed in FY 2005 was the implementation of a district cooling system and regional condenser water systems. Significant energy savings will be achieved through the elimination of inefficient air cooled chillers, optimum dispatch of cooling equipment, high efficiency motors, cooling load diversity, and variable frequency drives on the cooling tower fans. The projects completed under the UESC cost \$4.4 million and will save an estimated \$300,000 and 8.2 million kilowatt-hours annually.

In FY 2005, JLC also began the construction of two additional projects. The first is a renovation of eight animal rooms in Building 5A. This project is being completed with \$1.5 million of funding from the National Toxicological Program. All architectural and mechanical systems will be upgraded including an energy recovery unit with an air-to-air heat exchanger, and variable frequency drives for supply and exhaust fans. New ductwork with nine supply and exhaust terminals, controlled by DCC, will be installed. In addition, a new complete heating water system consisting of dual steam-to-hot water heat exchangers, dual pumps, controls and piping is planned. The project will be completed in early FY 2006 and is expected to save \$6,400 yearly on energy costs.

The second project is the laboratory and HVAC renovation in Building 51. This \$2.1 million project is being implemented with Buildings and Facilities Funds, and will include the installation of three energy recovery units with air-to-air heat exchangers, new ductwork, a manifold fume hood exhaust system, 13 VAV fume hoods, and a DDC system. A new efficient water heating system will be installed consisting of dual steam-to-hot water heat exchangers, dual pumps, and DDC controls. The projected energy savings are \$21,600 annually.

FDA ORPS focused FY 2005 efforts on new construction design projects and integrating energy efficient technologies. The newly constructed Irvine Laboratory has been designed to maximize natural lighting and includes low-e windows. The White Oak Campus will include a 10-kilowatt photovoltaic system, cogeneration, absorption chiller, variable frequency drives on chilled and condenser water pumping and cooling

tower fans, reduced lighting loads, variable air volume systems with variable frequency drives, demand control ventilation, night-setback strategies, and an economizer cycle.

IHS Areas implemented several energy efficiency improvements in their energy-intensive hospitals and clinics. In the Aberdeen Area, new direct digital controllers were installed at six locations to achieve computer automated control of heating and cooling systems. Several construction and renovation projects were completed in FY 2005, and have improved energy efficiency performance. These include roof replacements at Kyle Health Center, Wagner Health Center, and Rosebud Hospital; ground source heat pump installations at Mandaree and Twin Buttes Health Stations plus 33 staff quarters units at Pine Ridge and three staff quarters units at New Town; HVAC controls upgrades at Minne Tohe Health Center; and equipment replacement at Pine Ridge Hospital for VFDs, evaporative coolers, boiler burners and controls, and cooling tower packing.

Highly Efficient Systems

The FDA White Oak Campus will utilize cogeneration. As designed, one 5,800 kilowatt dual fuel (natural gas and diesel) engine-driven generator will produce 100 percent of the power for the main office building on the campus. The annual cost of natural gas and diesel fuel for the engine is less than the annual cost of purchased power from PEPSCO. The "free" waste heat recoverable from the engine oil cooler and water jacket is transferred to the hot water heating system. Recoverable higher temperature waste heat from the exhaust stack gases is used in warm weather to power a 900-ton absorption chiller. In cold weather the recoverable engine stack gas heat is added to the heating hot water system. At the IHS Anchorage Area, a ground water cooling project has been completed for the Alaska Native Medical Center. Facility management must wait until the spring to operate the system when temperatures are more temperate. The estimated savings of the project is \$50,000 annually. The Aberdeen Area installed ground source heat pumps in FY 2005 at two health centers. The IHS Oklahoma City Area will utilize a vertical closed-loop ground source heat pump system for the new Pawnee Health Center.

Distributed Generation

The HHS Energy Program promotes the installation of distributed generation projects and alternatives through its established communication tools. Lack of funding is often the prohibitive factor when considering a distributed generation project. Many of these types of projects, already identified by the HHS OPDIVs, are too

small to take advantage of alternative financing mechanisms.

The NIH 23-megawatt cogeneration unit, constructed by the local utility under a UESC, generates off-grid power to supply the NIH Bethesda Campus with its base electrical load. Also, a steam driven electrical generating turbine is under construction at the NIH Mark O. Hatfield CRC facility to convert steam pressure reduction energy to electricity. It is expected that the turbine will be on-line in FY 2006.

Electrical Load Reduction Measures

In FY 2005, HHS facility managers fine-tuned existing load reduction plans for their buildings in place for emergency situations and made improvements as necessary. These plans were used to respond to high demand days and curtailment periods. Ninety percent of the HHS square footage is energy-intensive space that includes hospitals, laboratories, and animal centers. The bulk of the electrical loads in these facilities are mission critical or life, health and safety driven. Therefore, these facilities are limited in the extent to which equipment can be powered down.

The Presidential Directive of September 2005, required OPDIVs to identify actions to reduce energy consumption during the first half of FY 2006. Many of the actions identified by the OPDIVs resulted in substantial planned electrical reductions totaling 16,950 megawatt-hours. Electricity conservation opportunities included reducing HVAC equipment operating hours and temperature set-points, optimizing lighting for energy efficiency, improvement of facility operations and maintenance procedures for peak performance and actions such as the installation and calibration of direct digital controls, adjusting temperature setpoints, curtailing use of elevators, shifting nighttime janitorial

services to day, and prohibiting use of space heaters. ENERGY STAR and energy-efficient designated products will be procured whenever applicable.

Most HHS facilities have established communications with local utility companies in regards to peak load periods and demand load reduction programs. In response to these discussions, OPDIV facility managers have developed individual facility plans to reduce peak demand on high load days. For example, the NIH Bethesda Campus participates in the PEPCO Curtailable Load Program and the Voluntary Load Reduction Program. Several HHS facilities established a system to alert employees of expected high demand days. Facility managers monitored weather forecasts and communicated with local utilities to predict high demand days.

Where available, energy management control systems were used to monitor total facility demand and loads for individual pieces of major equipment. This allowed facility managers to determine target levels for demand reduction and to monitor daily use patterns. When electrical demand approached high levels, or during utility curtailment periods, the control systems were programmed to automatically power down nonessential equipment.

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F. DEPARTMENT OF HOMELAND SECURITY (DHS)

Management and Administration

The Chief Administrative Officer is the designated Senior Agency Official for the DHS Energy Program, with overall responsibility for the design and implementation of energy policies and practices within DHS. Each organizational element is required to designate a Senior Agency Official.

The DHS energy management committee has oversight responsibility for management and direction of the energy program. The committee is chaired by the DHS Energy Analyst, DHS headquarters, and includes the DHS Energy representatives from each Under Secretary, DHS Procurement and the energy point of contact from each organizational element. The energy management committee consists of two subcommittees: the Energy Commodity Committee, and the Fuels Working Group.

DHS energy usage is consolidated and reported by eight agencies: Customs and Border Protection (CBP), Federal Law Enforcement Training Center (FLETC), Immigration and Customs Enforcement (ICE), United States Secret Service (USSS), Transportation Security Administration (TSA), the United States Coast Guard (USCG), Federal Emergency Management Agency (FEMA), and the Plum Island Animal Disease Center (PIADC). These are the only DHS agencies which pay their utility bills directly; all other agencies reside in space provided by the General Services Administration (GSA) and GSA reports the consumption and cost information for that space.

For FY 2005, DHS has reclassified some buildings and is exempting the USSS computer operations, and some CBP buildings. These changes will influence some comparisons to the baseline figure. The report meets the requirement that DHS submit an annual report for energy management, and it accurately reflects DHS management activities and energy consumption based upon the best data available.

Management Tools

Awards

As incentives for implementation of proactive energy efficiency and conservation measures, DHS and its organizational elements participate in the Department of Energy's annual energy award program and the "You Have the Power" recognition campaign.

Training and Education

Information regarding energy training and education is distributed through DHS energy websites and email. A master energy stakeholder email list provides a mechanism for outreach activities that includes disseminating information from the Department of Energy's Federal Energy Management Program (FEMP) and Environmental Protection Agency (EPA) regarding ENERGY STAR and other energy-related topics.

DHS employees participated in the Energy 2005 Workshop and the FY 2005 DHS Safety, Energy, and Environmental Forum (SEEF).

Informative quarterly fuel and energy meetings are also held. Energy conservation and outreach was conducted at both TSA Headquarters and the TSOC facility in October 2005 as part of Energy Awareness Month.

Showcase Facilities

The US Coast Guard Training Center in Petaluma, California was designated as the Coast Guard's showcase facility in September 2005. The Training Center has established a system to reduce overall energy consumption while embracing renewable energy. In FY 2004, the Training Center installed 125 kilowatts of photovoltaic modules on the roofs of several buildings. The photovoltaic modules were installed with a non-penetrating mounting system to allow for ease of installation while maintaining the integrity of the roof. The Training Center is also investigating additional wind applications given their success with the wind turbine that is used to circulate water in the lake.

DHS will consider nominating the TSOC facility in FY 2006 as the DHS Federal Energy Saver Showcase and will consider certifying the building as an ENERGY STAR Building. The TSOC building is designed with the latest energy efficient and effective lighting design, extensive energy management controls, exhaust heat recovery wheels, high efficiency chillers and roof top units, and water-saving plumbing fixtures.

Energy Efficiency Performance

Standard Buildings

In FY 2005, DHS reported a 27.6 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. Since the agency did not exist in the FY 1985 baseline year, energy reduction performance against this goal is not measured. Estimated FY 1985 energy use was constructed using historical data from the DHS component

agencies. DHS used an estimated 94,910 Btu per gross square foot in its standard buildings during the year. DHS received credit for purchases of 68.4 billion Btu of renewable energy, lowering the energy intensity of these facilities from 96,624 Btu per square foot to 94,910 Btu per square foot.

Most DHS buildings are classified as standard. The DHS facility space figure includes owned and leased buildings where DHS pays for utilities. Energy consumption data is derived from financial performance and Energy Information Administration pricing data, extraction from actual utility bills, or a combination thereof.

Industrial and Laboratory Facilities

TSA, USCG and Plum Island have facilities that are classified as industrial, laboratory, research, and other energy intensive facilities. In FY 2005, DHS used an estimated 225,326 Btu per gross square foot in its energy intensive facilities during the year.

TSA's Cabot Tech building is energy intensive. The TSA has only one reporting facility, the TSOC facility. The TSA TSOC facility has over 50 percent of its occupied square footage devoted to energy intensive functions such as computer command centers requiring strict temperature and humidity settings 24 hours per day, seven days per week. The 114,000 square foot facility uses electricity as the primary energy source with fuel oil used as a backup during outages. In FY 2005, the building used 5.7 gigawatthours, or 19.4 billion Btu of electricity at a cost of approximately \$318,600. Fuel oil, the back-up energy source, was used at a rate of 620.5 gallons, or 90.3 million Btu, for the year at a cost of \$924. The resulting energy consumption rate was 171,000 Btu per square foot.

The PIADC is classified as a laboratory facility (BSL-3Ag laboratory). Fuel and electric power consumption have increased.

During FY 2004, the USCG Yard and the Aircraft Repair Service Center (ARSC) were reclassified as industrial, and serves as the baseline for comparison. The FY 2005 USCG industrial facility energy consumption increased by 4.6 percent on a Btu per gross square foot basis. This reflects the impact of external factors such as production requirements and weather, as well as operational readiness.

Exempt Facilities

The USSS classifies its James J. Rowley Training Center (JJRTC) Computer Science building with about 30,500 square feet, (255,049 Btu per square foot) as an exempt facility due to its energy intensive computer

operations. This building houses an extensive amount of computer equipment that is used 24 hours per day, seven days per week.

CBP has (intense) Lighting and Remote Video Surveillance (RVS) systems along the border. CBP currently tracks electricity consumption and cost data for those sites and systems that are separately metered. However, some are connected to facilities and are not separately metered. For these sites, consumption and cost data is still included and reported in the FY 2005 usage data. A project to sub-meter and track electricity usage at these sites and reclassify them as exempt in FY 2006 is being considered. A total of 40 buildings with a floor area of about 219,566 square feet are considered exempt facilities due to the lighting, RVS, and telecommunications requirements. However, since energy use information was not available for these buildings at the time of this report, they are not included in the energy data report.

The USCG currently reports shore-electricity used by vessels as facility consumption. In the long term, this moored vessel usage will be pursued as part of a metering project and appropriate adjustments will be made to exempt this usage in FY 2006.

Non-Fleet Vehicle and Equipment Fuel Use

DHS mobile energy consumption includes fuel consumed by cutters, boats, aircraft and automobiles.

In FY 2005, DHS used a total of 11.9 million gallons of gasoline, a 6.3 percent decrease from FY 2004. Jet fuel consumption increased by 5.6 percent, and diesel fuel decreased by 57.3 percent from the previous year.

Renewable Energy

Self-Generated Renewable Energy

The Coast Guard continually evaluates renewable energy projects for economic viability. Several Energy Saving Performance Contract (ESPC) projects are under development containing renewable energy sub-components. In FY 2005, the following self-generated renewable energy projects were in operation:

Solar Water Heating:

- 62 housing units in Honolulu, Hawaii;
- 149 homes in Puerto Rico Air Station;
- Indoor swimming pool in Alameda, California; and
- San Francisco Air Station.

Photovoltaics:

- Roof panels in Petaluma, California;

- Mobile photovoltaic system for charging battery for emergency generator in Puerto Rico; and
- Lighted aids to navigation: 4,779 solar panel/battery powered light-buoys and 11,620 solar panel/battery powered lighted-fixed aids to navigation.

Other:

- Bio-diesel project for marine applications at USCG Academy in Connecticut; and
- Ground source heat pump in Cape Cod, Massachusetts.

The USSS has installed 50 solar daylighting systems in classrooms, exercise workout rooms, active storage areas and other locations. This system has proven to be an effective load reduction method.

CBP has an ongoing program to install solar energy cells on each Remote Video Surveillance System (RVS) along the Northern and Southern borders. The use of solar energy cells aids in the transitioning of the RVS energy consumption from commercial power to solar power to maintain a 24-hour operational requirement. There is a need to maintain the RVS at optimum effectiveness, which increases the efficiency, effectiveness, and safety of the Border Patrol officers.

Purchased Renewable Energy

DHS purchased 20.0 gigawatthours of Renewable Energy Certificates for FY 2005 through the Defense Energy Support Center (DESC). This alone represents about three percent of total DHS annual electricity use, and exceeds the 2.5 percent goal for FY 2005. In addition, the USCG facilities in New York City are included as part of an electric utility contract awarded in FY 2004 and continuing through FY 2007. Part of the award package included a requirement that the equivalent of 10 percent of the total load (roughly 60 megawatthours per year) must be purchased from renewable sources. The buildings covered under these contracts are all standard buildings.

Petroleum

DHS used approximately 7.6 million gallons of heating oil in 2005 and 346,700 gallons of propane. The 1985 baseline for these fuels is 16.6 million gallons of fuel oil and 338,700 gallons of propane. This represents a 54.5 percent reduction in fuel oil usage and essentially no change in propane usage over the 1985 baseline.

TSA's TSOC facility uses fuel oil to power two 1,500-kilowatt emergency generators. In FY 2005, 650.5 gallons, or 90.3 million Btu, of fuel oil was used at the facility at a cost of \$925. The electrical service to the

facility experiences frequent outages that require the use of the emergency generators.

USCG consumption calculations indicate that 5.8 million gallons of heating oil and 384,859 gallons of propane were used by all USCG facilities (including industrial) in FY 2005. 15.8 million gallons of petroleum fuel and 251,000 gallons of LPG were reported in FY 1985. This represents a usage reduction of 63 percent in petroleum fuel and a 53 percent increase in propane consumption from the baseline year.

Water Conservation

The National Education Training Center (NETC, operated by FEMA) continually explores new and emerging technologies for their adaptability to the facilities along with updating, expanding or replacing existing equipment or technologies as they reach their useful life expectancies. During FY 2005, the NETC, operated by FEMA, increased their water usage from 60.8 million gallons in FY 2004 to 64.4 million gallons. The local water district approved the use of their water to cool the NETC emergency generators in the event the well runs dry. Less water per minute should be required from the water district due to the design setup.

FLETC has made significant efforts with regard to water savings. A project has been funded at Glynco for the City of Brunswick to meter the water usage. This will allow the facility to realistically quantify water usage, so water consumption Best Management Practices can be implemented and efficiency can be determined.

Implementation Strategies

The DHS Energy Management Council is responsible for analyzing and developing Departmental projects to achieve efficiencies in the DHS Energy program and implement strategies to achieve efficiency goals. The group is also responsible for acting as the group of Departmental subject matter experts for all issues referred to it by the DHS Joint Requirements Council (JRC), DHS Management Council, or DHS Strategic Sourcing Group. The DHS energy management council has oversight responsibility for the management and direction of the energy program. The council is chaired by the DHS Energy Analyst, and includes the DHS Energy representatives from each Under Secretary, DHS Procurement and the energy point of contact from each organizational element. This council met monthly in FY 2005.

Life-Cycle Cost Analysis

The architectural and engineering firm that performed the design of TSA's Cabot Tech facility used life-cycle cost analysis to determine the most efficient HVAC design.

The Coast Guard Shore Facility Capital Asset Management (SFCAM) principles consider total ownership costs through the full life-cycle of a facility. Included in these costs are energy costs. The USCG Facilities Energy Manual, COMDINST M1000.7, outlines policy and procedures for life-cycle analysis in new construction and major renovation projects.

Facility Energy Audits

FLETC has audited all of its Glynco facility. Most of its other facilities are new or represent new floor area. The net result is that FLETC has audited all its eligible floor area, and in total has audited 67 percent of its floor area through FY 2005.

The TSOC facility was not audited in FY 2005 due to continual space development and operational security concerns. However, OSHE did perform a discovery visit to the facility, and plans to conduct an official energy audit in 2006.

By FY 2003 about 80.7 percent of USCG facility square footage had been audited. In FY 2005, a Resource Efficiency Manager (REM) was put in place for the Pacific Area. As a part of the PAC REM program, portions of all major facilities in the PAC area were audited, or 14.7 percent of the total USCG facility square footage. In FY 2006, the USCG may update the total tabulation or, more likely, use the FY 2005 data as a new base year for starting the auditing process over.

The USSS is in the process of further defining the infrastructure at the JJRTC through a study which will conclude in the spring of FY 2006. From this study, additional energy conservation opportunities will be identified. The USSS will also continue to develop the utility energy services contract (UESC) contract with Washington Gas for further energy savings.

Financing Mechanisms

FLETC and USSS have both previously used UESC mechanisms to implement energy retrofits at their facilities.

The Coast Guard obligated an estimated \$1.7 million towards projects directly addressing the goals of Executive Order 13123. These included Federal Energy Efficiency Fund (FEEF) projects which are low-cost and high return-on-investment (less than 10-year pay-back) facility retrofits and/or they enable the utilization of renewable energy.

The Coast Guard has awarded one energy savings performance contract (ESPC) on the West Coast, which is in the design phase. It will accomplish multi-million dollars of energy efficient retrofits after a final delivery

order is awarded. An ESPC is under negotiation at the Coast Guard Shipyard to utilize landfill gas in a co-generation plant. Two more ESPCs are in a pre-“notice of intent” phase in Kodiak, Alaska and the lower New York state area.

ENERGY STAR and Other Energy Efficient Products

DHS agencies actively disseminate ENERGY STAR rated product information to its field units and encourages use of the products. Through published agency guidance to the field, the Coast Guard has offered financial as well as public recognition incentives to units that meet the ENERGY STAR goals. GSA and their associated ENERGY STAR program, serves as a source for energy consumables.

TSA has purchased high efficiency motors and HVAC equipment, energy efficient lighting products, and ENERGY STAR office equipment in the TSOC facility. Project and product specifications and designs for new construction in the building will be reviewed to ensure that energy efficient and ENERGY STAR products are the standard requirements.

CBP actively disseminates ENERGY STAR-rated product information to its field units and encourages the use of ENERGY STAR products. Through published agency guidance to the field, CBP has offered financial and public recognition incentives to units that meet the ENERGY STAR goals.

The Coast Guard disseminates ENERGY STAR-rated product information to its field units and encourages use of the products. GSA and their associated ENERGY STAR program, also serves as a source for energy consumables.

The USSS, under its UESC contract is expected to look into using monitoring controls on the HVAC systems that operate only when needed. They will also evaluate the outside street lights with consideration to convert it to a solar powered source. The existing guard booths will also be reviewed for powering by solar energy.

With each construction and renovation project, the FLETC is replacing less efficient items/equipment (i.e. lamps, HVAC equipment, windows, and motors) with more efficient models.

ENERGY STAR Buildings

USSS actively works with BG&E and independent contractors to determine if buildings can eventually qualify as ENERGY STAR buildings.

It is established USCG engineering practice to require new construction and renovation projects to comply with ENERGY STAR criteria.

Sustainable Building Design

TSA is currently planning a 13,000-square foot build-out construction project for the TSOC facility and will use the Whole Building Design Guide and the Field Guide for Sustainable Construction as sustainability guidelines for the new construction.

SFCAM principles balance sustainability design features with other operational requirements. The principles of the Green Building Council's Leadership in Energy and Environmental Design (LEED) are being applied to a building retrofit in Emerald Isle, North Carolina.

The design for the New Border Patrol Station in El Paso, Texas will seek a LEED rating. CBP already incorporated designs at the CCD phase to earn some points. For this facility, concrete flooring is used in 90 percent of the building instead of resilient flooring. CBP is planning to contain all surface runoff into catch basins on the property. The facility was designed to use low-level lighting for perimeter use.

Energy Efficiency in Lease Provisions

The majority of the DHS facility leases follow the direction of GSA when leasing existing buildings and vehicles. When evaluating structures prior to entering into direct leases, the DHS considers the projected lease rate structure along with energy costs. The projected energy cost is a major consideration during the lease evaluation.

TSA leases all of its square footage. In the case of the TSOC building, only the shell of the building is leased and all of the mechanical, electrical, and office equipment within the building is owned by TSA. Therefore, the implementation of energy and water efficiency measures will be considered and the provisions of Executive Order 13123 and the Energy Policy Act of 2005 will be upheld.

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The majority of Coast Guard facility leases follow the direction of GSA when leasing existing buildings and vehicles. When evaluating structures prior to entering

into direct leases, the Coast Guard considers the projected lease rate structure along with energy costs. The projected energy cost is a major consideration during the lease evaluation.

USSS, through the GSA, uses energy saving provisions in their leases for Secret Service offices. They encourage the Lessor to contact an energy service company qualified under the Energy Policy Act to perform ESPCs to determine whether opportunities for cost-effective improvements to the space are available.

Industrial Facility Efficiency Improvements

In FY 2004 the USCG classified two facilities as industrial: USCG Shipyard and the Aircraft Repair and Service Center (ARSC). FY 2004 is the baseline year for future comparisons. Both sites have been actively engaged in energy improvement activities in recent years and plan to continue their efforts.

The TSA TSOC building is an energy intensive facility with over half of the occupied square footage devoted to extensive, open space coordination centers housing large numbers of computers, plasma screen monitors and televisions, and other audio-visual equipment. These areas operate 24 hours per day, seven days per week. Space temperature settings are held at fairly tight settings and humidity control is a priority.

In order to achieve optimal comfort and efficiency in these large areas, several Liebert air-conditioning units are employed to maintain temperature and humidity set points. For example, in the Transportation Security Coordination Center (TSCC) and the Federal Air Marshall Coordination Center, three zones have been designed to meet the loads of the area. This strategy allows part of the extensive area to be controlled separately to meet varying loads due to occupancy or usage patterns. The conditioned air is supplied to the space via a sub-floor plenum and then exhausted through the ceiling space to maximize natural airflows.

Rooftop HVAC units are used to supply conditioned air to the office areas in the building and are also used as back-up systems to the Liebert units. The all-electric rooftop units employ economizer cycles to take advantage of free cooling during temperate months. The office area units are operated on a schedule to mirror the building occupancy. In FY 2004, the rooftop units were reconfigured to receive full three-phase power that will improve the efficiency of the units.

There are two 1,500-kilowatt oil-fired emergency generators for the building. The generators are used during electrical outages. A solar heating system has been identified to heat the generator enclosure space and to

heat the fuel oil. This system will save an estimated \$2,000 per year on energy costs. The project will be implemented once funding becomes available.

All lighting in the building is energy efficient with T-8 lamps, electronic ballasts, and compact fluorescent bulbs in the recessed lighting. The lighting design is state-of-the-art and efficient, employing pendant and wall-washing lighting with surface task lighting. However, occupancy motion sensors have not been installed at the facility. In FY 2006, a pilot study will be completed on the use of the occupancy sensors in the building. The men's and women's locker rooms and the fitness center will be retrofitted with occupancy sensors to test their performance as applied to the existing low voltage lighting system.

The exterior glass of the building is double-pane and solar tinted. Plumbing fixtures are low-flow models. Domestic hot water is supplied by point-of-use hot water heaters located at each restroom and break room.

The CBP Laboratory and Scientific Services facility in San Francisco is an energy intensive facility with over half of the occupied square footage devoted to extensive laboratory equipment, open space coordination centers housing large numbers of computers, plasma screen monitors, and other audio-visual equipment. These areas operate 24 hours per day, seven days per week. Space temperature settings are held at fairly tight settings and humidity control is a priority. In order to achieve optimal comfort and efficiency in these large areas, several air-conditioning units are employed to maintain temperature and humidity set points. This strategy allows part of the extensive area to be controlled separately to meet varying loads due to occupancy or usage patterns. The conditioned air is supplied to the space via a sub-floor plenum and then exhausted through the ceiling space to maximize effectiveness.

In FY 2004 the USCG classified two facilities as industrial. Both sites have been actively engaged in energy improvement activities in recent years and plan to continue to do so. One site, the USCG Curtis Bay Shipyard in Maryland is currently in negotiations with the City of Baltimore and an energy services company to install a methane capture system at a neighboring landfill and replace current natural gas services.

The USSS's Wilkie Building, which experienced a major fire in FY 2004, was redesigned in FY 2005 using energy efficient improvements.

Highly Efficient Systems

In FY 2005, the Coast Guard installed a ground source heat pump system for HVAC heat transfer at Air Station Cape Cod.

Distributed Generation

In FY 2005, the 250-kilowatt molten carbonate fuel cell system at Coast Guard Air Station Cape Cod, Massachusetts continued to generate local (distributed) power. Additionally, 700 megawatt-hours of renewable energy was generated at USCG locations nationwide.

The PIADC has notable generation capacity and is presently completing construction of a new power station. Existing generation capacity has historically been used to receive rebates from the utility company for assisting during peak power demand. On these critical days, PIADC operates its generators to lighten the load on the power grid, and receives credit from the power company in the form of a rebate in the electric bill. This has not happened since the new power plant is being constructed, and since the New York Department of Environmental Conservation has added requirements to allow this peak shaving by customers of the utility. It is anticipated that the power plant construction will be concluded in 2005 and PIADC will once again be able to participate in this program.

Electrical Load Reduction Measures

TSA has an emergency-operating plan in place to address periods of power emergencies. This plan incorporates normal load shedding principles. A secondary power line was installed in FY 2005 to feed the building as a backup electricity source.

FLETC continues to add buildings under its real time pricing meter rate at its Glynco facility. Load shedding of chillers is the principal means to achieve emergency electrical load reductions. The facility's energy management control systems are used to reduce electrical loads.

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G. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

Management and Administration

The Senior Energy Official for the Department of Housing and Urban Development (HUD) is the Assistant Secretary for Administration, who is responsible for meeting the goals and requirements of Executive Order 13123. HUD's energy team is comprised of staff members from the agency's Facilities Management Division, Building Maintenance and Energy Branch, Office of Budget and Administrative Services, Office of the Chief Procurement Officer, and Office of Information Technology. The members of the agency energy team provide support consisting of appropriate procurement, budget, management, and technical expertise to expedite and encourage the agency's use of appropriations, utility energy services contracts (UESCs), and other alternative financing mechanisms necessary for energy conservation initiatives.

Management Tools

Awards

HUD uses the Department of Energy's "You Have the Power" awareness campaign to reward employees for exceptional performance in implementing Executive Order 13123.

Training and Education

During FY 2005, nine personnel were trained on the operation of the building's new energy management control system. These included eight contract maintenance personnel and one government technical monitor.

Energy Efficiency Performance

Standard Buildings

In FY 2005, HUD reported an 8.8 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. HUD used an estimated 74,441 Btu per gross square foot in its standard buildings during the year.

Petroleum

In FY 2005, HUD Headquarters used 174.1 thousand cubic feet of natural gas. The building's emergency generator used 476 gallons of fuel oil.

Water Conservation

In FY 2005 HUD Headquarters used approximately 16.7 million gallons of water, at a cost of \$58,519. During the year, the building's cooling tower maintenance procedures were modified to significantly reduce water consumption. Additionally, water-saving flush valves were installed on many of the restroom plumbing fixtures in the building.

Implementation Strategies

ENERGY STAR and Other Energy Efficient Products

HUD continues to require that all office automation equipment procured is ENERGY STAR-compliant. Design specifications for HUD's capital improvements projects, accomplished through GSA contracts, incorporate energy efficiency criteria.

Electrical Load Reduction Measures

HUD Headquarters Building participated in the PEPCO Load Curtailment Program. Under the program, the water temperature of the building's main air conditioning chillers is raised, as is the supply air temperature of the main air handling units.

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H. DEPARTMENT OF THE INTERIOR (DOI)

Management and Administration

The Assistant Secretary for Policy, Management and Budget is the Department of the Interior's (DOI's) Senior Agency Official responsible for meeting the goals of Executive Order 13123. Implementation of the Energy Management and Conservation Program within DOI is the responsibility of the Assistant Secretary for Policy, Management and Budget and is delegated to the Office of Acquisition and Property Management through the Deputy Assistant Secretary - Business Management and Wildland Fire. DOI's Energy Management Team consists of Senior Bureau Asset Management Officers who are responsible for managing DOI's real property assets. In addition, the Departmental Energy Conservation Committee (DECC), established in 1981, and comprised of bureau representatives ranging from property management specialists to engineers provides advice and recommendations to senior leadership on energy management initiatives and policies as well as guidance on bureau energy management operations.

Management Tools

Awards

Three DOI projects were recognized by the Department of Energy's FY 2005 Federal Energy and Water Management Awards.

- Fish and Wildlife Service's (FWS's) Brazoria Environmental Discovery Education Center, Brazoria National Wildlife Refuge (NWR), Texas, received a Renewable Energy Award to Small Groups.
- U.S. Geological Survey (USGS) National Center in Reston, Virginia, received an Organization Award for Energy Efficiency/Energy Program Management.
- FWS Rhode Island National Wildlife Refuge Headquarters and Kettle Pond Visitor Center, Charlestown, Rhode Island, received an Energy Saver Showcase Facility Award.

Four facilities were recognized by the DOI FY 2005 Environmental Achievement Awards. Areas of activity recognized by this award include: environmental stewardship, waste/pollution prevention, recycling, green purchasing, sustainable design/green building, minimizing petroleum use in transportation, and environmental management systems.

- FWS Brazoria Environmental Discovery Education Center, Brazoria NWR, Texas;
- National Park Service (NPS) Midwest Regional Office, Omaha, Nebraska;
- BLM Rawlins Field Office, Wyoming; and
- NPS Xanterra Employee Housing at Yellowstone National Park, Gardiner, Montana, Honorable Mention.

Training and Education

In FY 2005, energy management training was provided for 149 of the 1,057 appropriate personnel. Energy managers involved in building energy efficiency and water conservation have attended workshops offered by the Department of Energy's (DOE's) Federal Energy Management Program (FEMP). Several have also attended training offered by other organizations such as the General Services Administration (GSA), Environmental Protection Agency (EPA), the Association of Energy Engineers, U.S. Green Building Council, public utilities, and Bureau energy coordinator's meetings on topics such as green power purchasing, the LEED rating system, building insulation advances, and water conservation. Several DOI energy managers attended the Energy 2005 Workshop in Long Beach, California.

During the reporting period, DOI energy managers provided information to personnel on available energy management training and encouraged them to attend as much training as operational requirements and funding permitted. Energy managers disseminated relevant information concerning emerging technologies, alternative means of financing, and energy efficient practices; and developed employee outreach programs to educate building occupants about energy and water management programs.

DOI's Energy Web pages "Greening of the Department of the Interior" and "Energy Management Information" were continually updated in FY 2005. These web sites provide relevant information and related internet links to numerous energy management and conservation initiatives and environmental, green building, and alternative fueled vehicle information.

BLM issued pertinent Instruction Memoranda (IMs) in FY 2005 which are directly applicable to the energy management and conservation efforts. These memoranda, which establish official bureau policy, are issued to all employees and contract employees of BLM. Specifically, BLM issued IM No. 2005-006 on the subject "Solar Energy Development Policy," IM 2005-109 on BLM Space Leasing Program and Priorities, IM 2005-

192 on BLM Biomass Utilization Strategy, and IM 2005-203 on Inclusion of Biomass Use as a Proposal Evaluation Factor.

Showcase Facilities

Two DOI facilities were designated by DOE as Federal Energy Saver Showcase Facilities:

- BLM Escalante Science Center at Grand Staircase-Escalante National Monument, Utah.
- FWS Rhode Island National Wildlife Refuge Headquarters and Kettle Pond Visitor Center, Charlestown, Rhode Island.

Energy Efficiency Performance

Standard Buildings

In FY 2005, DOI reported a 4.9 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. DOI used an estimated 83,664 Btu per gross square foot in its standard buildings during the year. DOI received credit for purchases of 5.6 billion Btu of renewable energy, lowering the energy intensity of these facilities from 83,755 Btu per square foot to 83,664 Btu per square foot.

Factors affecting variability of the data include:

- Accurate measurement of standard building energy using gross square footage;
- Concerted efforts to ensure accuracy of the data;
- Changing weather conditions;
- Impacts of Hurricanes Katrina, Rita and Wilma required the use of FY 2004 data for some southeast region facilities;
- Increased number and use of more electric devices;
- Increased plug load;
- Acquiring aged, inefficient buildings and facilities through land acquisition; and
- Accurate separation of process energy from building energy use in buildings with only one electric meter.

Building consumption of all major fuels was reduced from that reported in FY 2004. Usage of electricity declined by 0.64 percent, fuel oil by 34.5 percent, natural gas by 24.3 percent and propane by 0.3 percent.

Although DOI has been reporting building and process energy use for many years, methodologies to separate these energy uses vary widely. Process energy is for operating equipment and facilities that are not used to provide building energy. Process energy is significant

and is difficult to quantify because it is usually not metered separately at field stations.

Non-Fleet Vehicle and Equipment Fuel Use

In FY 2005, DOI used 1.4 million gallons of auto gasoline, diesel, and propane for use in vessels, heavy equipment, standby generators, all terrain vehicles, blowers, mowers, outboard motors, and other small equipment not reported on-line via GSA's Federal Automotive Statistical Tool. A total of 1.4 million gallons of aviation gasoline and jet fuel were used.

Renewable Energy

In FY 2005, DOI used 30.3 billion Btu of renewable energy from self-generation and through purchases. In January 2005, DOI issued "Renewable Resources for America's Future" which reemphasized DOI's commitment to increase renewable energy production on Public Lands and implementation of the recommendations of the National Energy Policy.

In June 2005, BLM issued the final Wind Programmatic Environmental Impact Study. The principal outcome of this study was the development of best management practices, which address wind energy siting, construction, and operations mitigation activities to reduce adverse environmental impacts. These best management practices are being incorporated into the BLM Wind Energy Development Policy as additional guidance for BLM field offices for National Environmental Policy Act (NEPA) actions in wind development right of way applications.

BLM also issued Instruction Memorandum (IM) in FY 2005 on "Solar Energy Development Policy," establishing policy for processing right-of-way applications for solar energy development projects on public lands administered by BLM, and evaluating the feasibility of installing solar energy systems on BLM administrative facilities and projects. This IM provides basic information about solar technology, resources and potential use within the bureau. BLM also issued IM "Biomass Utilization Strategy" which provides a policy framework to allow and encourage the use of biomass from BLM lands for purposes including power generation.

FWS issued Interim Guidance on "Avoiding and Minimizing Wildlife Impacts from Wind Turbines" on May 13, 2003, with a two-year comment period, which was later clarified by the Director in April 2004, in a memorandum entitled, "Implementation of Service Voluntary Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines." The public comment period closed on August 10, 2005. FWS is

reviewing all comments received, and will be working with the wind industry and other stakeholders to minimize avian impacts with best practices.

Self-Generated Renewable Energy

DOI has implemented 838 renewable energy projects since 1990, including standalone and grid-connected photovoltaic systems, solar thermal (hot water) projects, geothermal (ground source) heat pumps, and wind-related projects.

BLM photovoltaic systems that went on line in FY 2005 include: a 3-kilowatt array on Washburn Ranch in California, a 5.2-kilowatt standalone array at Kane Gulch Ranger Station, Utah and a 7.5-kilowatt, grid-connected array at the Escalante Science Center, Utah. Photovoltaic systems were also installed for the Lark Canyon water supply well in the El Centro District of California, and a similar campground supply well in the Elko District in Nevada.

BLM completed a biomass utilization project for the Campbell Creek Science Center in Anchorage, Alaska for heating buildings in this complex. The project does not generate electrical power, but does reduce the need for nonrenewable energy at the complex. The biomass heating system, wood source heating a circulating glycol solution, has a capacity of approximately 160,000 Btu per hour, calculated at the heat exchanger.

FWS Brazoria NWR Environmental Education Building, Texas, completed in FY 2005, includes the installation of an off-grid, 12.5-kilowatt photovoltaic electric system to provide 100 percent of the electrical power to the building. Solar lighting at the Tundra Swan Watch Boardwalk, Eastern Neck NWR, Maryland; a new 33-ton geothermal heat pump HVAC system installed at Crab Orchard NWR, Illinois; and a hybrid solar/wind system installed at Galbraith Lake Cabin, Arctic NWR, Alaska, to provide 600-watt solar and 400-watt wind electric generation to this remote cabin were completed in FY 2005.

NPS, in cooperation with Electric Power Research Institute, Case Western Reserve University, the US Army Research and Development Center-Construction Engineering Research Laboratory and First Energy Corporation will install a 10-kilowatt fuel cell at the November Lodge at the Cuyahoga Valley Environmental Education Center in Cuyahoga Valley National Park, Ohio. The fuel cell system installed in two phases: Phase I - a 5-kilowatt fuel cell was installed in April 2005; and Phase II - a second 5-kilowatt fuel cell is scheduled for installation in Winter 2005/2006. When fully installed, the fuel cell system will provide 10 kilowatts of energy, which can be operated grid inter-

connected or stand alone, to power the November Lodge. NPS installed a photovoltaic system on maintenance facilities at Cabrillo National Monument, California. This system provides 96 Kyrocera 187 panels for a CEC/AC rating of 15.19 kilowatts, which works out to be a DC rating of 17.95 kilowatts. A 1,800-watt solar panel array was installed at the Marion Creek Ranger Station, Alaska. Coal Creek Camp, Yukon-Charley Rivers NP, Alaska, is expected to complete the installation of a photovoltaic system to provide all the camp's electrical needs in FY 2006.

Purchased Renewable Energy

DOI continues to purchase energy from renewable sources. In FY 2005, total DOI renewable energy purchases amounted to 1.6 gigawatthours.

BLM continues to purchase wind-generated renewable energy for its Moab Field Office, as well as for the new Escalante Science Center during FY 2005. These purchases were made under the Blue Skies Program offered by the utility company, Utah Power and Light. Total purchased renewable energy was approximately 52.9 megawatthours during FY 2005.

The Bureau of Reclamation and USGS purchased 35.2 million Btu of geothermal heat for the new Snake River Area West office building in Boise, Idaho. The geothermal heat (purchased hot water) is the primary heating source for several buildings on campus.

Petroleum

In FY 2005, DOI used 530 billion Btu, a 50.5 percent decrease from consumption of 1.1 trillion Btu in FY 1985. Consumption of LPG/propane increased 46.4 percent versus FY 1985, from 521 billion Btu to 763 billion Btu in FY 2005.

Fuel switching continues to be a viable energy management strategy for DOI. In FY 2005, FWS and NPS projects included lighting retrofits, HVAC replacements, addressing deferred maintenance, and installation of new energy efficient equipment at many refuges and parks. BLM focused on lighting and envelope improvements and the USGS worked towards minimizing emissions resulting from petroleum-based fuel usage, by increasing the efficiency of existing equipment, switching to cleaner burning natural gas, replacing inefficient equipment and specifying natural gas for new equipment where justifiable through life-cycle cost analysis.

Water Conservation

While there is no specific water reduction goal outlined in Executive Order 13123, DOI issued policy on baselining water usage in March 2000. Bureaus established

a baseline of potable water usage at owned buildings, report in millions of gallons of per year, and focus conservation efforts on those buildings with the highest use. Many of DOI's buildings do not have metered water consumption; Bureaus were encouraged to provide estimates of the water consumption. For FY 2005, DOI reports potable water consumption of 2.8 billion gallons. This is a decrease of 1.4 billion gallons from the March 2000 baseline and a 47 percent decrease from FY 2004.

DOI continues to design and install low-flow or ultra low-flow plumbing fixtures in all new facilities. Landscaping design and construction has emphasized the use of native plant species, minimization or elimination of artificial irrigation, and maximizing efficiency of necessary irrigation, such as through use of drip systems, precipitation detection systems, and optimal timing. Public information related to drought and water conservation is available at many facilities and is recognized as a Best Management Practice (BMP) in the FEMP guidance.

BLM performed water audits at the Red Rock Canyon National Conservation Area Visitor Center Complex in FY 2005. BLM will be implementing water conservation and wastewater reclamation and reuse projects at the complex as a result, expected to be completed in FY 2006. It is anticipated that potable water use at these facilities will be reduced at least 350,000 gallons per year after the improvements are completed. BOR Snake River Area West Office Building utilizes water-saving and reuse technologies to reduce waste water volumes.

Implementation Strategies

Life Cycle Cost Analysis

DOI utilizes life-cycle cost analysis in making decisions about investment in products, services, construction, and other projects to lower costs and to reduce energy and water consumption. DOI actively manages a portfolio of capital investments in order to maximize the return on investment to the taxpayer and government at an acceptable level of risk. DOI's Asset Management Plan outlines the process whereby DOI is moving from a current reliance on a project-based review process to a life-cycle, asset-based portfolio management process. Effective capital planning within DOI requires improved long range planning and a disciplined budget process as the basis for managing a portfolio of assets to achieve performance goals and objectives with minimal risks, lowest life-cycle costs, and greatest benefits to the business of the bureaus and DOI overall.

DOI has developed and continues to refine its approach to establishing a more consistent, structured, performance-based, integrated approach to its Capital Planning Investment Control (CPIC) process. As its portfolio-based approach matures, DOI and the bureaus will continue to improve their ability to manage risks and returns of capital assets throughout their life cycle necessary to ensure that DOI's investments are well conceived, cost-effective, and support strategic mission and business goals. The analysis of these investments is a tool that will be continually revisited, refined and updated. It is articulated in a business case, the extent of which is commensurate with the cost and impact of the investment on the organization and mission.

DOI has incorporated language into the annual budget formulation guidance and into DOI's five-year deferred maintenance plan that identifies planned energy projects and emphasizes life-cycle costing. Projects identified to be cost effective (10-year simple payback rule) will be ranked in accordance with their payback and funded within resource limitations. Bureaus will retire inefficient equipment on an accelerated basis where replacement results in lower life cycle costs.

Facility Energy Audits

In FY 2005, DOI completed audits for 2.5 million gross square feet or four percent of total gross square footage. Since 1992, audits were completed on a total of 74.2 percent of total gross square footage. DOI continues to use facility energy audits to identify potential energy and water conservation projects. Facilities with the highest consumption rates of energy or high water use are audited first.

In FY 2005, DOI received funding from DOE's SAVEnergy audit program at the FWS Genoa National Fish Hatchery, Wisconsin. The audit was completed in August 2005. Montana State University completed an "Alternative Energy Feasibility and Conservation Study" at the Bozeman Fish Technology Center, Montana. Various facility energy audits were conducted by the local service providers.

USGS has incorporated preliminary energy audits into the Condition Assessment and Building Engineering Report contract as part of the Deferred Maintenance Program. These reports identify facilities with the greatest potential for energy and water related savings.

In FY 2005, BLM performed energy audits on the Turn Point Light House and Keepers Quarters, San Juan Islands, Washington; and on the Piedras Blancas Light House in California. Recommendations from these audits will be implemented as these facilities are stabilized and rehabilitated in FY 2006. Energy conserva-

tion opportunity recommendations from previous audits in Oregon and Wyoming are being implemented and will produce measurable savings beginning in FY 2006. This year an energy audit was conducted at the Fort Simcoe Job Corps office. As a result of this audit, BOR has entered into an interagency agreement with Bonneville Power Administration to perform an energy retrofit for this site which will provide an estimated annual savings of 273.0 megawatthours and \$19,000.

Financing Mechanisms

No utility energy services contracts or energy savings performance contracts were entered into in FY 2005. The most common problem encountered is the low return on investment because of the relatively small size of DOI's facilities, which does not provide sufficient incentive for contractor participation. DOI will continue to investigate opportunities for use of these mechanisms.

Partnerships help leverage funding for a range of energy efficiency and renewable technologies. The partnership between FWS Eastern Neck NWR, the State of Maryland, and the Maryland Energy Administration is expanding into utilizing sustainable energy in conjunction with wetland management. Grant proposals are being developed that would install solar-powered pumps for water level manipulation at waterfowl impoundments on state, Federal, and county lands in Kent County, Maryland. In FY 2005, NPS partnered with the Corps of Engineers, Electric Power Research Institute, Case Western Reserve University, and First Energy Corporation for installation of a propane powered grid-connected fuel cell at the November Lodge at the Cuyahoga Valley Environmental Education Center.

The Green Energy Parks partnership continues to result in parks nationwide receiving funding and technical support from DOE and other public/private partners for projects that promote the use of energy efficient and renewable energy technologies and practices in our National Parks, and to educate the visiting public about these efforts. Energy projects completed in FY 2005 under the Green Energy Parks Program include photovoltaic powered interpretive devices at Petersburg National Battlefield, Virginia and Richmond National Battlefield, Virginia.

ENERGY STAR and Other Energy-Efficient Products

Since FY 2003, the Federal Procurement Data System has been updated to track the Resource Conservation Recovery Act requirements. The data element for tracking the use of recovered material provides for data collection on the use of recycled material, including

materials that promote and enhance energy management.

DOI continues to pursue goals established in its Strategic Plan for greening the agency under Executive Order 13101, incorporating energy efficiency considerations into all levels of procurement, resulting in a greener DOI. Under DOI's Government-wide Acquisition Intern Program, selected participants are provided with training on purchasing environmentally preferable and energy-efficient products and services.

DOI continued its practice of purchasing energy efficient appliances (especially microwave ovens and refrigerators for offices and a card was developed of "do's and don'ts" for using the purchase card that refers to buying green and energy-efficient items on the GSA schedule through the Javits Wagner O'Day (JWOD) Program, which aggressively incorporate energy-efficient items into their product lines. The JWOD Program provides employment opportunities for thousands of people with severe disabilities to earn good wages and move to greater independence.

DOI established a policy that only re-refined oil would be used in its vehicles and equipment. To ensure compliance with the policy, DOI requested that the Defense Logistics Agency substitute re-refined oil when virgin lubricating oil is ordered. In addition, DOI has encouraged bureaus to replace many of its gasoline-fueled vehicles with alternative fueled vehicles using biodiesel. The use of biodiesel is a significant part of DOI's strategy to reduce dependence on foreign petroleum.

Yosemite National Park acquired 18 diesel-electric hybrid buses. This, coupled with an extensive public education effort will increase awareness about hybrid bus technology and cleaner transportation options.

BLM's Guide Specifications, which are tailored for use in construction projects nationwide, are being converted for application of the American Institute of Architects MasterSpec system. Customization made during FY 2005 and which will be completed in coming years includes specific requirements and/or provisions related to minimum efficiencies of energy-consuming equipment and motors, performance of systems related to energy-efficiency and waste minimization and recycling at construction sites.

ENERGY STAR Buildings

DOI has requested that its bureaus identify office buildings (minimum of 5,000 gross square feet) that may qualify as ENERGY STAR buildings by using the benchmarking tool developed by EPA. DOI is planning

to partner with EPA to include visitor centers in the ENERGY STAR Building Labels program.

Draft policy has been developed that would require any new construction or rehabilitation of buildings to be consistent with industry standard building ratings, such as LEED Green Building Rating System, and ENERGY STAR -compliant.

Sustainable Building Design

Sustainable building design principles have been incorporated into the siting, design, and construction of DOI projects. In FY 2005, 17 design/construction projects were identified as being LEED certifiable. Energy coordinators are working closely with their engineering, architect, and design offices to address energy conservation retrofits and new building designs and ensure that buildings comply with Federal energy laws and regulations. All cost effective, energy conservation opportunities are analyzed for consistency with resource management objectives. Energy conservation efficiency standards are included as an integral part of all engineering design and construction project technical specifications.

Four DOI projects recently obtained LEED certification:

- NPS Carl T. Curtis Midwest Regional Headquarters, Omaha, Nebraska, earned LEED Gold certification;
- Bureau of Indian Affairs (BIA) Baca/Dlo'ay azhi Community School, in Prewitt, New Mexico;
- NPS South Rim Maintenance and Warehouse Facility, Grand Canyon National Park, Arizona; and
- NPS Xanterra Parks and Resorts/National Park Service Concessioner Employee Housing, Gardiner, Montana.

Energy Efficiency in Lease Provisions

The Strategic Plan for Greening the Department of the DOI includes in its action plans that DOI ensure that leased building space incorporates sustainable design, green products and services, recycling, energy management and water conservation in building development and operation.

BLM's standard leasing provisions require energy efficient (T-8 or better) lamps and light fixtures in all interior and exterior lighting, use of occupancy sensors, scheduled programmed controls or daylight dimming controls for all lighting applications, and contain glazing, cladding and thermal break requirements for windows. Energy cost savings provisions include achievement of ENERGY STAR Building Labels and the use of

DOE qualified Energy Service Companies. The guidance also includes requirements for maintenance of indoor air quality standards and use of certified sustainable wood products in new applications, and provisions for use of recycled content and environmentally preferable materials. BLM recently procured new leased space for the Utah State Office, which will be LEED-certified, likely at the silver level. BLM is considering requiring LEED certification for all newly leased space in the future.

USGS is making an effort to ensure that when entering leases, including the re-negotiation or extension of existing leases, provisions that encourage energy and water efficiency are incorporated. Build-to-suit lease solicitations shall contain criteria encouraging sustainable design and development, energy efficiency, and verification of building performance. In addition, a preference for buildings having the ENERGY STAR building label will be included in the selection criteria for acquiring leased buildings, and leasing companies will be encouraged to apply for the ENERGY STAR building label.

Highly Efficient Systems

DOI used the technological tools developed by DOE and its laboratories and other tools, including the LEED rating system, to identify the potential use of highly efficient systems, including the use of biomass, geothermal, or other renewable energy sources. The National Business Center used the LEED rating system to help guide them toward greater energy efficiency for the Main Interior Building. Bureaus analyze the potential for use of district energy systems, and other highly efficient systems, in new construction or retrofit projects. Bureaus are to consider combined cooling, heat, and power when upgrading and assessing facility power needs and use of combined cooling, heat, and power systems when life-cycle cost-effective. Other steps include incorporation of certification procedures to ensure major projects are reviewed for energy efficiency.

Distributed Generation

DOI continues to pursue projects that self-generate energy using renewable sources (such as photovoltaics or wind turbines) or renewable energy thermal projects (such as solar thermal, biomass, or geothermal) where life-cycle cost effective.

Following are examples of distributed generation and off-grid generation that were implemented in FY 2005:

- BLM, Kane Gulch Ranger Station, Utah, included a 5.2-kilowatt standalone photovoltaic system.

- FWS, Brazoria NWR, Texas, a 12.5 kW photovoltaic system provides 100 percent of the electrical power to the new Environmental Education Building.

DOE funded a \$40,000 Request for Technical Assistance for a Wind/Solar Resource Assessment on National Wildlife Refuges in the northeast region. FEMP awarded \$20,000 to the National Renewable Energy Laboratory to conduct a GIS-analysis of wind resources on refuges in the northeast region. Wind resources within one-half mile around 50 sites were analyzed and 30 sites were found to be suitable for small (10-kilowatt, 80 feet tall) wind turbines. The analysis will be further refined by collaborating with refuge managers and personnel from other programs to determine potentially appropriate sites for installing turbines. Sandia National Laboratory was recently awarded a similar contract with regards to solar resources in the northeast region. The goal of this program include demonstrating to the public responsible use of renewable energy, developing sound criteria for monitoring and minimizing impacts on wildlife, reducing annual operating costs at FWS stations, and educating the public about overall environmental impacts of various energy sources.

NPS Channel Islands National Park continued to implement sustainable practices and utilization of alternative fuel programs. From past years the park has been operating 77 renewable energy systems on the islands, which have been providing 29 kilowatts of energy for remote power, water pumping, communications and resource monitoring. These energy systems have continued to eliminate or preclude the usage of 28,000 gallons of diesel fuel for power generation. On Santa Rosa Island the photovoltaic systems providing power to the housing area were expanded by 2.5 kilowatts to account for increased demand due to resource management activities and new communications equipment. The National Marine Mammal research facility on Channel Islands National Park's San Miguel Island was reconstructed and a 1,600-watt photo-

voltaic/600 watt wind hybrid system was installed by park staff to provide power to the facility.

Electrical Load Reduction Measures

DOI continues to implement operational strategies to reduce electrical load and peak demand. The strategies include specific identification of short- and long-term electricity load reduction measures, monitoring of total facility demand, strengthened coordination with local utilities, and enhanced communications with employees about the benefits of and best practices for increased energy efficiency. DOI facilities continue to address the energy situation in areas that are vulnerable to energy shortages and rising energy costs.

In addition, the Main and South Interior Buildings continued as active participants in the Pepco Load Curtailment Program which reduces energy consumption and costs while helping the local utility meet its customers' demand for energy during periods of high demand.

At the close of FY 2005, the nation witnessed the devastation caused by Hurricanes Katrina and Rita on the Gulf Coast States. On September 26, 2005, President Bush issued a Presidential Memorandum which directed Federal agencies to take immediate actions to conserve energy and fuel use throughout Federal facilities. DOI Bureaus have and will continue to respond to the President's Memorandum to conserve energy and fuel through the FY 2006 heating season.

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I. DEPARTMENT OF JUSTICE (DOJ)

Management and Administration

In the Department of Justice (DOJ), the Assistant Attorney General for Administration is the designated Senior Agency Official. The members of the DOJ Energy Team are comprised of representatives from DOJ's Facilities and Administrative Staff, Procurement Services Staff, Budget Staff, Finance Staff, Personnel Staff, and the Office of the Procurement Executive.

Management Tools

Awards

DOJ implemented a combined Energy and Environmental Awards program during FY 2002 to recognize excellence in each of these areas annually. In addition, employees are nominated for the Department of Energy (DOE) Federal Energy Management Program (FEMP) Federal Energy and Water Management Awards and are recognized at the local level for outstanding performance.

Training and Education

The DOJ periodically conducts meetings with its bureaus to disseminate DOE, Office of Management and Budget and other energy-related information and provides direction, guidance and assistance to the bureaus in meeting energy efficiency goals and requirements. Budget constraints have limited the amount of energy training available on a large scale to Bureau of Prisons (BOP) staff. The number and complexity of issues inherent to institution staff, including handicapped accessibility, life safety, environmental regulations, seismic safety, and other responsibilities have limited the potential for having a dedicated position for an energy specialist at every institution. Through telephone contacts between institution staff, the Regional Energy Conservation Coordinators, and the Central Office Energy Conservation Program Manager, specific concerns are addressed. Energy conservation remains a very important topic at the Facilities Management training course held bi-annually and at the National Facilities Managers Conference. The bi-annual course generally has 25-30 participants from throughout BOP who hold a wide variety of positions. Topics include such items as reviewing the energy program and required documentation for requesting energy projects, life cycle costing, and the requirements of Executive Order 13123. A videotape outlining energy reduction goals and highlighting energy conservation projects is being distributed to institutions throughout BOP.

Showcase Facilities

The BOP complies with national model codes for construction and mandates the use of life-cycle costing in the selection of energy consuming systems. Based upon this, all new institutions should be as energy efficient as life cycle costing allows. Due to the nature of the BOP mission, security requirements pertaining to physical access to the institution and the need to maintain control over what operating information is released, it is not practicable to designate prisons as showcase facilities. Similarly, for security reasons, the FBI has not designated any showcase facilities. DOJ will strive to designate at least one showcase facility annually and will work with the bureaus towards achieving that goal.

Energy Efficiency Performance

Standard Buildings

In FY 2005, DOJ reported a 40.0 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. DOJ used 176,537 Btu per square foot in its standard buildings during the year.

Industrial and Laboratory Facilities

In FY 2005, DOJ used an estimated 225,319 Btu per gross square foot in its energy intensive facilities during the year.

In FY 2005, the Department of Justice began reporting its Bureau of Prisons facilities (formerly categorized as standard buildings) as energy intensive facilities. Since BOP did not begin reporting its facilities until FY 1986, no revisions were made to FY 1985 data. (No revisions were provided to any year's data prior to FY 2005.) BOP facilities operate 24 hours per day, 365 days per year with energy consuming functions that include daily food preparation, dishwashing, inmate showers, laundry, and industrial activities. DOJ also changed the reporting of the FBI headquarters facility from the energy intensive facilities to the standard buildings category in FY 2005. DOJ has not provided FY 1990 baseline data for its energy intensive facilities.

Based on a formula that DOJ believes most accurately reflects the energy conservation accomplishments of its largest real property holding organization, the BOP has reduced its energy intensity in Btu per gross square foot per inmate by 63.5 percent from its FY 1986 baseline. This formula takes into account the significant increases in the housed federal prison population, a

direct determinant of energy consumption in BOP facilities.

Other DOJ industrial and laboratory facilities are comprised of large data centers, FBI and Drug Enforcement Agency (DEA) labs, the United States Marshals Service airplane hangar and the FBI training facility in Quantico, Virginia. These facilities operate 24 hours per day, 365 days per year and are not typical office buildings. In the past, these facilities have been reported in the category of "Exempt Buildings." While these facilities were previously designated as being exempt from the energy reduction goals due to the critical nature of their operations, there have nevertheless been significant improvements in the energy consumption. Several energy efficiency projects have been undertaken at these locations to improve HVAC systems, lighting and electrical distribution. New data centers have recently been constructed utilizing energy efficient equipment and construction materials. DOJ will continue to improve the operating efficiencies of these facilities in the future. Toward this goal, the FBI has relocated its labs from the headquarters facility into a newly constructed, energy efficient facility in Quantico, Virginia. DOJ encourages lab operators to participate in the Environmental Protection Administration (EPA)-sponsored "Labs for the 21st Century".

Renewable Energy

The BOP entered into an energy savings performance contract (ESPC) during FY 1996 to provide domestic hot water, heated by solar energy, at the Federal Corrections Institute (FCI), Phoenix, Arizona. The system became operational in February 1999. The BOP is seeking to expand the original scope of this contract to include absorption chillers, if proven viable, and they are in the process of identifying additional locations where such technology would be operationally viable and economically beneficial. The BOP currently is working with DOE on potential ESPCs for FCI La Tuna, Texas (solar hot water system) and FCI Englewood, Colorado (solar hot water and wind generation systems). An ESPC was signed on September 30, 2003, for FCI Victorville, California to provide both electrical solar array and wind turbine electrical generation systems; this project became operational in June 2005.

Petroleum

The DOJ has several projects underway to reduce the use of petroleum in its facilities. The BOP has an operational solar hot water system at FCI, Phoenix, Arizona; the FBI has converted its central heating and cooling plant at Quantico, Virginia from fuel oil to natural gas.

The BOP is continuing its efforts to reduce the use of petroleum within its facilities by utilizing alternative fuels where applicable. The BOP also has a policy mandating the use of life-cycle costing that has served to limit the use of petroleum-based fuels where it is not the most cost-effective option.

Water Conservation

The DOJ revised its initial water baseline data during FY 2002 and will be re-evaluating the accuracy of this data during FY 2006. There will be an increased emphasis on implementing DOE-established Best Management Practices to reduce water consumption at DOJ facilities nationwide.

Implementation Strategies

Life-Cycle Cost Analysis

All DOJ Procurement Chiefs were initially notified of the changes to the Federal Acquisition Regulation to implement Executive Order 13123 by memorandum dated May 31, 2000, and a subsequent annual notification has been issued. These changes include the use of life-cycle cost analysis, procurement of ENERGY STAR products and guidance to contracting officers on the use of ESPCs and other alternative financing mechanisms. In December 2001, a Procurement Conference for all DOJ Offices, Boards, Divisions and U.S. Attorney procurement offices was conducted and compliance with the Greening of the Government Executive Orders was emphasized.

The BOP has a policy in place mandating the use of life-cycle cost analysis. Facilities Operational Manual, Program Statement 4200.09, Chapter 6, Energy Conservation, clearly outlines procedures ensuring that life-cycle cost analyses are conducted on all projects involving replacement of energy consuming major equipment, new construction, renovation, and expansion. The FBI Headquarters Engineering Staff uses life-cycle cost analysis in its designs or has them included in design and construction contract language for projects it monitors.

Facility Energy Audits

The BOP has completed energy audits for approximately 89 percent of its facilities nationwide. These audits were completed at a wide variety of institution types subject to diverse climates. Audits completed to date have resulted in requests for funding and the establishment of energy conservation projects. The remaining institutions that do not have audits scheduled were activated within the past ten years and it would better serve the purpose of energy conservation to focus resources on the energy conservation needs of older institutions. Institutions that are 50 years or older

are under a Physical Plant Review Survey and Long Range Master Plan Program (LRMP). These institutions will have energy and water conservation opportunities identified in the LRMP and FEMP is providing assistance on this project. The DEA has completed an energy audit of its headquarters complex.

The FBI uses its own in-house engineering staff to conduct energy conservation surveys in addition to using ESPCs. Each facility is reviewed by the FBI's engineering staff for energy savings projects for prioritization and implementation. Projects with the best investment-to-payback return are given the highest priority. Projects with specific funding from the General Services Administration or that coincide with replacement of equipment that has reached the end of its useful life are given a high priority. Energy intensive facilities are reviewed for improved equipment installation as technologies become available. After conducting an extensive analysis, the FBI has used an ESPC to replace the original 30 year old chillers in the J. Edgar Hoover Building in FY 2004. This ESPC was utilized to replace constant speed air handler fan units with variable speed frequency drives in FY 2005.

Financing Mechanisms

The BOP has actively taken part in a number of utility incentives and rebate programs in an effort to reduce the amount of Government funding required to complete energy conservation projects. Both electric and natural gas utilities have worked with BOP by providing services, guidance and financial incentives on such systems as lighting and HVAC. The cost savings generated by such efforts allow for additional projects to be funded in a time of limited resources. The BOP currently is working with DOE and the local utility company on a utility energy services contract (UESC) at the FCI in Englewood, Colorado and reviewing additional sites for potential UESCs.

The BOP entered into an ESPC in FY 1996, construction began in FY 1998, and operation commenced in FY 1999 at the FCI in Phoenix. This ESPC was for the installation of a solar energy system that provides a large percentage of the domestic hot water for this FCI. Assuming that savings are represented by the total cost of energy that would have been incurred had electricity been purchased in lieu of solar energy, savings for FY 2005 were approximately \$70,000 with the retention of \$7,000 by BOP. Additional savings of approximately \$500 per month accrue due to the decreased maintenance required for the existing hot water heaters.

A second ESPC was awarded on September 30, 2003, for a solar photovoltaic system and wind turbine electrical generation system at the FCI Victorville, Califor-

nia. In addition, BOP continues to work with DOE at potential ESPC sites, including at the Federal Corrections Center in Allenwood, Pennsylvania that will incorporate landfill gas to fuel the institution's boiler system. The FBI utilized an ESPC to replace the 30 year old chillers in its headquarters facility during FY 2004 and to replace the constant speed air handler fan units with variable speed frequency drives in FY 2005.

ENERGY STAR and Other Energy Efficient Products

DOJ Bureaus have incorporated energy and water efficient design and construction practices in specifications for new construction and alteration projects. DOJ procurement officials have been notified of the requirement to purchase ENERGY STAR products whenever available.

Sustainable Building Design

The new Alcohol, Tobacco, Firearms and Explosives headquarters facility in Washington, D.C. is being designed and will be constructed to the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED)-certified standards with a goal of achieving the higher LEED Silver rating. Bureaus have incorporated sustainable design principles in new design and construction projects.

Industrial Facility Efficiency Improvements

The BOP relies on a computer-based maintenance scheduling and tracking system. This system is a valuable asset in assuring that preventive maintenance is completed according to schedule, and helps to assure equipment will continue to run as efficiently as possible. There has also been increased energy awareness by the staff throughout BOP which has proven to be a valuable tool in efforts to reduce fuel consumption despite a rapidly increasing inmate population.

A new energy management system and new energy efficient HVAC equipment has been installed during the major renovation project for the Robert F. Kennedy Building in Washington, D.C. Phase I of this project was completed in FY 2000, Phase II was completed in FY 2002 and the final Phase III was completed in FY 2004. Continuous commissioning of installed equipment has resulted in identifying and correcting equipment operating deficiencies.

The DEA utilizes the services of a Commercial Facilities Management (CFM) contractor to provide operation and maintenance services for its headquarters facility. The contractor is mandated to provide DEA with onsite energy management guidance and implementation in the performance of their daily contractual duties and responsibilities. The contractor is vigilant in per-

forming all preventive maintenance on all operating equipment and machinery to achieve optimum operating efficiency. The CFM contractor utilizes a computer based maintenance program that is based on GSA's comprehensive preventative maintenance handbook. Strict adherence to the maintenance schedules ensures that equipment is operating in the most energy efficient condition. There has been an increased awareness by both DEA staff and contractor personnel regarding equipment operation, thus further enhancing efforts to improve energy conservation.

The BOP, with 95 percent of DOJ's total space, is continuing with its efforts to meet the reduction goals. Policies have been updated to reflect the new mandates regarding the level of energy reduction. Over 80 per-

cent of BOP institutions have had energy conservation surveys and BOP has established limited funding for a number of energy conservation projects. It is anticipated this source of funding will be available to assist institutions to meet the required reduction goals.

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J. DEPARTMENT OF LABOR (DOL)

Management and Administration

In the Department of Labor (DOL), the Assistant Secretary for Administration and Management serves as the Environmental Executive.

DOL's Energy Team consists of individuals who have been assigned primary programmatic responsibility for energy management and conservation, and agency representatives who promote and oversee the energy programs within their organization. The team plans and directs DOL's energy initiatives, implements best practices and promotes energy awareness and conservation.

The team includes members from DOL's Business Operations Center, Administrative Services, Procurement, Finance and Budget, Procurement Policy, Facilities Management, Building Management, Fleet Management, Bureau of Labor Statistics, Occupational Safety and Health, Employment and Training Administration, and the Mine Safety and Health Administration (MSHA).

In addition, the MSHA and the Employment and Training Administration, Office of Job Corps (Job Corps), have established internal working groups that provide continuing support for their individual program efforts.

Management Tools

Awards

Beginning in 2002, DOL has recognized groups and individuals who have made significant contributions to the conservation and efficient use of energy by awarding a DOL Energy Conservation Award at the Annual Secretary's Honors Award Ceremony Program.

In addition, individual agencies sponsor internal awards recognizing the efforts of individuals within their organizations. For example, the Office of Job Corps, which owns and operates over 120 Job Corps Facilities nationwide, awards Job Corps Centers that achieve a 30 percent reduction in energy use, mandated by Executive Order 13123 with program incentives and its own Energy Saver Award. DOL also submitted nominations for the 2005 Federal Energy and Water Management Awards, and the Department of Energy, Federal Energy Management Program's (FEMP's) 2005 Energy Champion awareness program.

Training and Education

Program flyers and mini-training sessions are used to promote energy savings and environmental initiatives and to keep staff updated with the latest conservation requirements. DOL participates in training information sessions provided by the Environmental Protection Agency, Office of Federal Facilities Enforcement, and FEMP. These forums provide an information exchange that is shared with the sub-agency staff responsible for energy management.

The Office of Job Corps' internal reporting system provides quarterly updates on progress toward achieving energy conservation targets. These reports become the cornerstone of follow up meetings to discuss energy awareness and conservation issues.

A number of specific initiatives that promote energy awareness are highly visible. Notably, the Office of Job Corps has developed a web-based training curriculum of courses in partnership with the International Facility Management Association covering the following energy and environmental topics:

- Facility and Energy Management;
- HVAC;
- Preventive Maintenance; and
- Renewable Energy.

Job Corps includes information promoting energy conservation awareness among its participants as part of regular student development and vocational skills training. Job Corps' base curriculum includes the importance of energy conservation, and ways to improve the conservation and energy efficiency of residences and the overall campus.

Energy Efficiency Performance

In FY 2005 the Office of Job Corps developed a web-based energy tracking and monitoring system for the utilities consumed at its sites. The system's reporting and graphics package has provided a valuable tool to analyze utility data. One example of the benefits derived from the information generated by the system is demonstrated in the clarification of a \$440,000 utility billing error from the Muhlenberg Job Corps Center. The error was identified and documented utilizing the new web-based tracking system. The system is also utilized to generate the information contained in this report.

Standard Buildings

In FY 2005, DOL reported a 15.5 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. DOL used an estimated 99,593 Btu per square foot in its standard buildings during the year.

Significant impact and changes in energy usage have occurred at Job Corps facilities. Energy usage per square foot for FY 2005 was 34 percent below the FY 1985 base year. Overall, Job Corps FY 2005 energy usage per square foot is 7.2 percent below what was recorded in FY 2004. This change is, in part, attributed management guidance set forth in the Job Corps Policy Requirements Handbook. It establishes performance measures, giving consideration to local conditions and the availability of energy resources. In addition, this guidance outlines long-term goals, including preventive maintenance for all major energy systems.

Renewable Energy

Self-generated Renewable Energy

In partnership with the FEMP renewable energy project in Louisiana, DOL has made significant progress in generating renewable energy. Job Corps continues to adhere to its Strategic Energy Plan and pursue a number of renewable energy projects. A FEMP renewable energy grant will be used to identify a suitable site after the initial study is completed. The following projects are currently underway:

- Potomac Job Corps Center: Installation of a geothermal heat pump;
- Puerto Rico Job Corps Center: Installation of solar hot water unit;
- Albuquerque Job Corps Center: Installation of a Leadership in Energy and Environmental Design (LEED) solar hot water system utilization system; and
- New Haven and Woodstock Job Corps Centers: Feasibility study for solar ventilation air preheating.

Petroleum

DOL reported a 20 percent decrease in petroleum usage compared to FY 2004 and a 52 percent energy reduction compared to the 1985 baseline.

Water Conservation

As part of enhanced water conservation effort, in FY 2005 implementation of the Job Corps Energy Strategic Plan resulted in the consumed 1.05 billion gallons of water at a cost of more than \$4.6 million. This is a 0.4 percent decrease in consumption from the FY 2004

amount, which cost \$4.2 million. The escalating costs are attributed to local water rate increases.

Implementation Strategies

Life-Cycle Cost Analysis

A life-cycle cost analysis is required for all Job Corps construction projects. All design contracts include life-cycle analysis and are reviewed for compliance with 10 CFR 435 and Executive Order 13123 life-cycle investment analysis requirements

Facility Energy Audits

The Job Corps program performs audits on at least 10 percent of its facilities each year. Every Job Corps Center undergoes a total facility survey on a three-year cycle. A team of architects and engineers surveys the entire facility for building deficiencies and evaluates the general condition. Since energy issues are an integrated part of the survey, problem areas are identified during the more frequent three-year cycle instead of the required ten-year time-frame.

Financing Mechanisms

DOL has provided direct funding for audit and energy conservation initiatives utilized by Job Corps. Over \$1.0 million was made available for the installation of energy efficient technologies at 13 centers selected for energy and conservation improvements in FY 2005.

ENERGY STAR and Other Energy Efficient Products

DOL continues to meet or exceed requirements to purchase post-consumer content paper. As has been DOL practice, service contracts for the headquarters Frances Perkins Building include energy efficient criteria in the contract specifications. These requirements mandate that materials and services promote the efficient use of energy and recycled materials.

Under the Job Corps program, the 51 audits already completed and 15 completed energy savings performance contracts formulate an energy conservation strategy for specific energy conservation measures. The completed audits are alike in energy saving strategy and the same technologies can be implemented at centers where audits have not been completed. This is the most cost effective strategy for centers with similar equipment and facilities.

Since Job Corps Centers are similar in building configuration and construction, the results of completed energy audits at Job Corps Centers have pointed to four primary methods of energy consumption reduction:

- Lighting retrofits, including changing T-12 ballasts to T-8 fluorescent ballasts and replacement of incandescent lighting with compact fluorescent;
- Installation of low flow plumbing fixtures such as toilets, sinks, and showerheads;
- Installation of occupancy sensors for lighting; and
- Installation of thermostat controls (i.e. programmable, night setback).

Sustainable Building Design

Job Corps building design guide has been revised to incorporate sustainable design building principles that are incorporated into each scope of work.

Energy Efficiency in Lease Provisions

Lease provisions under which Job Corps Centers operate do not assign responsibility for energy efficiency to the lessor. Most leases are one dollar per year intergovernmental relationships, which place responsibility for energy efficient measures on the tenant. Cost effective energy and water conservation measures are monitored through the energy audits conducted at each facility.

Highly Efficient Systems

During 2005, the General Services Administration completed the chiller replacement project in the Frances Perkins Building. The project included replacement of four existing 1,500-ton Carrier centrifugal chillers with three 1,600-ton York centrifugal chillers and the addition of a plate heat exchanger that provide free cooling if needed during the fall/winter months. The new chillers and the free cooling system control have been connected to the building automation/energy management system, the system monitors and will automatically control the chillers, based on building loads, and determine when to cycle the chillers to provide the required cooling while minimizing energy consumption.

Under the Job Corps program, experience has shown that basic systems are the most effective and energy efficient implementation strategy. Preventative maintenance manuals are completed and tracked by Center facility managers, and provide the Center with first hand knowledge of the levels of efficiency of operating equipment. The infrastructure developed to track energy and utility usage through EnergyWatchdog.com.

is currently being implemented for all 93 Job Corps Centers, and should provide additional energy savings.

Funds have been redirected to focus on LEED and renewable energy as a strategy to improve energy efficiency devices that rely on sophisticated control systems. For example, Job Corps Centers in Puerto Rico are constructing solar water heaters and the Job Corps Facility in Albuquerque, New Mexico is constructing a LEED facility focusing on capital investment in lieu of reliance on operators to extract energy performance.

Electrical Load Reduction Measures

The local power supplier (PEPCO) has abandoned the Curtailable Load Program, however the Frances Perkins Building is available to reduce electrical loads during emergencies or network grid capacity concerns. When requested, DOL will apply load shedding and power reductions to meet emergency requirement in the area following their notification. Further reductions in electrical consumption have been achieved through reduced running hours of heating and cooling equipment and temperature setbacks.

Job Corps Center buildings are relatively small in size and are not usually considered for formal demand reduction programs administered by local utility companies. Job Corps examines each facility's ability to shed loads and participate in these local programs on a case-by-case basis. No opportunities were found for load reduction agreements during the energy audits performed in FY 2005. However, in a declared emergency situation, it is standing policy that centers must shed air conditioning loads and other related electrical loads, as needed.

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K. DEPARTMENT OF STATE (State)

Management and Administration

In the Department of State (State), the Assistant Secretary for Administration is the Senior Energy Official. The Deputy Assistant Secretary of Operations assists the Senior Energy Official. The State energy team develops and implements the various activities and initiatives to meet the goals of Executive Order 13123.

Management Tools

Awards

State uses various employee incentive programs to reward exceptional performance in implementing Executive Order 13123. The most frequently given financial awards are the Extra Mile and Franklin awards, which are under \$2,000 and are given to outstanding achievers. Other awards over \$2,000 are given in conjunction with performance evaluations. Awards are usually given only to government employees, but a few have been awarded to contract employees for outstanding performance in implementing energy efficient measures in State buildings.

Training and Education

State employees are encouraged to receive appropriate training for implementing Executive Order 13123.

Showcase Facilities

State has two Showcase facilities. The George P. Shultz National Foreign Affairs Training Center (NFATC) has incorporated energy efficient lighting and variable speed drives into the facility. Motion sensors and daylighting are used to curtail energy used for lighting.

The Florida Regional Center is the State "Solar Energy Showcase" facility. Photovoltaic cells provide power for parking lot and exterior building lighting. A survey for an additional photovoltaic and solar trough project is being explored.

Energy Efficiency Performance

Standard Buildings

In FY 2005, State reported an 18.6 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. State used an estimated 106,020 Btu per square foot in its standard buildings during the year.

Renewable Energy

Self-Generated Renewable Energy

State has installed photovoltaic cells for parking lot lighting and a passive solar trough for water heating in its Florida Regional Center. The array and trough generate approximately 159 kilowatt-hours per year. Additional photovoltaic panels are scheduled to be installed for net-metering and to provide electrical power to the facility. In addition, a small, 35.1-kilowatt-hour array is installed on the Harry S Truman 8th floor building roof.

Implementation Strategies

Facility Energy Audits

State completed energy audits in its FY 2002 buildings inventory. Buildings coming into the FY 2003 and FY 2004 workload will also be audited in a reasonable time period. This will complete the audit cycle for all buildings in State's domestic inventory.

Sustainable Building Design

State encourages the adoption of sustainable building practices through training staff in the use of LEED as a framework for sustainable analysis, developing sustainability standards for State projects, and promoting opportunities for sustainable product vendors to present their products to State personnel.

Electrical Load Reduction Measures

All State facilities developed electrical load reduction plans for a 10, 20, and 30 percent electrical load reduction, in accordance with the President's May 3, 2001 Memorandum for Energy Conservation at Federal Facilities.

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L. DEPARTMENT OF TRANSPORTATION (DOT)

Management and Administration

The Department of Transportation (DOT) is organized into ten Operating Administrations and the Office of the Secretary (OST). Six of the Operating Administrations and OST operate facilities and report energy use in buildings and facilities. Each of these organizations has energy and water management programs in place. The Federal Aviation Administration (FAA) is the largest of the Operating Administrations in DOT managing 85 percent of the buildings and facilities. A large percentage of the FAA facilities have been exempted from energy reduction requirements because they are critical to the safety of air travel.

The Acting Assistant Secretary for Administration is the Designated Senior Agency Official responsible for implementation of energy and environmental requirements at DOT.

The Department established a technical support team at the headquarters level within OST to assist the Operating Administrations in implementing the requirements of the National Energy Conservation Policy Act as amended, and Executive Order 13123.

Management Tools

Awards

Within DOT, incentive awards are widely used to reward conscientious and innovative energy management activities. For example, each year the FAA awards an Administrator's Environmental Excellence Award.

In FY 2005, the Office of the Federal Environmental Executive recognized the FAA Northwest Mountain Region for their efforts in constructing a certified sustainable design building, the Seattle-Tacoma Terminal Radar Approach Control (TRACON). FAA representatives were awarded a White House Closing the Circle Award, this past spring, for their efforts.

In addition, two FAA employees were recognized as Energy Champions in the "You Have the Power" campaign for their roles in securing over \$2 million for the purchase of energy efficient obstacle lighting that is being installed in the Regions.

Training and Education

With the limited training and travel funds available, it is critical that DOT leverage these resources. DOT relies heavily on the broad training opportunities offered by the annual energy conferences sponsored by the Department of Energy (DOE), the General Services

Administration (GSA), and the Department of Defense (DOD). DOT also relies on the "You Have the Power" campaign materials for our outreach and employee awareness efforts.

The FAA Air Traffic Organization's Energy Management Program Office funded, organized, and facilitated a national training workshop in FY 2005 for Center and Regional Energy Managers. The workshop was held in Long Beach, California following the DOE-sponsored Energy 2005 and provided education and training on:

- The new ATO Corporate Work Plan;
- The new Power Monitoring System for air route traffic control centers, terminal radar approach controls, and airport traffic control towers;
- The FY 2006 and FY 2007 Energy Program Business Case; and
- Photovoltaic power systems at remote sites.

Energy Efficiency Performance

Standard Buildings

In FY 2005, DOT reported a 34.2 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. DOT used and estimated 93,971 Btu per square foot in its standard buildings during the year.

Exempt Facilities

DOT organizations continue to perform energy and water audits and implement cost effective conservation projects in exempt facilities.

The FAA continues to evaluate its exempt buildings and facilities list to determine which spaces should be re-categorized as either standard or industrial.

The Maritime Administration (MARAD) has three facilities and 45 out ported ships which are carried as exempt. These are the three reserve fleet locations and 45 ships that are anchored, which use "Cold Iron Energy".

Energy use reduction planning and conservation measures are being implemented for exempt spaces, as well as for facilities in the standard building category.

Non-Fleet Vehicle and Equipment Fuel Use

Jet fuel and aviation gasoline used by FAA represents the majority of consumption in this category. Consequently, consumption levels are highly dependent on mission requirements and efficiency of the equipment

in the fleet. In FY 2005, consumption was up slightly due to increased operations as a result of increased hurricane activity. Over the years, significant energy reductions have been made through improved operations such as combining missions and training flights. Future reductions, however, will have to be made through equipment replacement and modernization.

Renewable Energy

Self-Generated Renewable Energy

FAA generated approximately 371 megawatt-hours of renewable energy in FY 2005 from a combination of hydrogen-powered fuel cells, photovoltaic, and wind power systems. These systems are located in the Western Pacific, Alaskan, Great Lakes, Northwest Mountain, Southwest, and Eastern Regions.

Two new 1-kilowatt fuel cell projects were installed in FY 2005. One fuel cell, partially funded by the Construction Engineering Research Lab (CERL), was installed in the Eastern Region. The other fuel cell was installed by the Northwest Mountain Region. In addition, two 1.5 kilowatts wind turbines were installed at a non-directional beacon in Alaska and three 1 kilowatt photovoltaic systems were installed in the New England Region.

MARAD is completing the installation of two geothermal heat pump systems rather than two 440 ton chillers and a new gas boiler at the U.S. Merchant Marine Academy (USMMA). The geothermal heat pumps are estimated to be 25 percent more efficient in cooling and 400 percent more efficient in heating.

Also, the FAA's William J. Hughes Technical Center in Atlantic City, New Jersey has installed solar panels, which produce 30 kilowatts of power.

Purchased Renewable Energy

The FAA's Northwest Mountain Region is purchasing two percent of its energy requirements from renewable resources.

Petroleum

In FY 2005, DOT used a total of 1.2 million gallons of fuel oil compared to the 3.0 million gallons of fuel oil reported in FY 1985 in its buildings and exempt facilities. This represents a reduction of 60.7 percent in fuel oil. Since 1985, many DOT facilities have switched to natural gas for heating due to the better efficiency and lower cost of natural gas resulting in reduced fuel oil usage.

Water Conservation

DOT estimates that \$2.5 million was spent for water in FY 2005. However, it is extremely difficult to develop accurate water consumption data due to the wide variation in units of measure used by water authorities and the lack of any metering at some locations. DOT continues to establish a supportable baseline using the minimal information that is available. This requires that consumption be estimated for the majority of the facilities. Upon review, the lack of data precluded the development of an accurate estimate. Therefore, water consumption is strictly an educated estimate at this time. There will be continued efforts to improve water data collection.

While emphasis has been placed on water conservation, such as the use of waterless urinals at the USMMA and at the Nassif Building no specific data is available to quantify the Agency reduction. The implementation of the ESPC at the USMMA has provided for specific water conservation through the installation of over 900 new water fixtures.

Implementation Strategies

Life-Cycle Cost Analysis

The requirement for life-cycle cost (LCC) analysis is formalized in the Transportation Acquisition Manual (TAM). Each of the Operating Administrations in turn has requirements for LCC analysis in alteration, construction, and the procurement of energy consuming equipment. Staffs have been trained on and utilize the National Institute of Standards and Technology's Handbook 134 and the associated LCC software.

In FY 2005, FAA used life-cycle cost analyses to justify the Energy Program Business Cases for FY 2006 through FY 2016. The overall present value benefit-cost ratio for the energy program was shown to be 5.6 over this 10-year time frame. Also, MARAD used LCC to justify the ESPC modifications at the USMMA.

Facility Energy Audits

The FAA has used comprehensive audits on certain typical facilities and extrapolated the results to facilities of the same type nationally. In FY 2005, FAA found that some facilities previously thought to have fit within these prototypical categories in fact do not. Consequently, additional audits will need to be performed. Because of this change, we now estimate that 85 percent of its facilities have been audited.

Financing Mechanisms

In FY 2005, the FAA Air Traffic Organization received \$690,000 for implementing an alternative financing program. The FAA Southern Region is reviewing an

ESPC proposal from a qualified energy service company (ESCO) to implement \$6.75 million in energy efficiency measures. The ESPC has a proposed term of 15 years.

ENERGY STAR and Other Energy Efficient Products

DOT has made it a requirement to purchase energy-consuming products in the top 25 percent efficiency, in the department's procurement guidance, the TAM.

The FAA In-Service Review Master Specification (ISR Checklist) requires designers to review new design scopes to identify areas where ENERGY STAR technologies are applicable. Four national design scopes were evaluated in FY 2004 using the ISR Checklist.

Sustainable Building Design

The FAA's Northwest Mountain Region has incorporated sustainable building features into several new designs. The recently completed TRACON facility at the Seattle-Tacoma Airport was built to sustainable design guidelines sufficient to attain the prestigious LEED Gold certification from the Green Building Council. In addition, the Aeronautical Center in Oklahoma City, Oklahoma is using sustainable building design in two facilities currently under design: the 11,035-gross square foot Security Control Center and the 14,000 gross square foot Screening Facility.

Energy Efficiency in Lease Provisions

DOT continues to work with GSA to have energy efficiency and sustainable design principles incorporated into the new DOT headquarters to the extent possible within budget constraints.

Highly Efficient Systems

DOT has not installed any cogeneration projects in FY 2005. However, MARAD evaluated and is installing geothermal systems during FY 2005 and should com-

plete installation in FY 2006 as part of the barracks renovation at the USMMA.

Distributed Generation

An FAA non-directional beacon in Summit, Alaska, will be powered by two 1.5 kilowatts wind turbines that were installed at the end of FY 2005. Wind turbines will replace the existing diesel generator as the primary power source for the site. In the New England Region: an outer marker in Providence, Rhode Island; a middle marker in Hyannis, Massachusetts; and a visual approach slope indicator in Provincetown, Massachusetts, will each be retrofitted with a 1-kilowatt photovoltaic system to provide primary power.

Two new 1-kilowatt fuel cell projects were installed in FY 2005. One fuel cell project, partially funded by CERL, was installed in the Eastern Region. The other fuel cell was installed by the Northwest Mountain Region.

Electrical Load Reduction Measures

Most of DOT's major buildings have at least a limited curtail plan or have identified systems that can be shut down in time of crisis. The DOT building has a curtailable load agreement with the local utility (PEPCO) and is able to reduce demand through the building energy management system.

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M. DEPARTMENT OF THE TREASURY (Treasury)

Management and Administration

In the Department of the Treasury (Treasury) the Senior Energy Official is the Assistant Secretary for Management and Chief Financial Officer. Each of the Treasury Bureaus has designated a Senior Bureau Energy Official to direct its energy program. The Senior Agency and Bureau Officials provide energy policy guidance in accordance with the National Energy Conservation Policy Act (NECPA), Energy Policy Act of 1992 (EPACT), and Executive Order 13123.

The members of the Departmental level team include the Chief of Procurement, Senior Counsel for Technology, and staff from the Environment, Safety and Health Division (ESHD). Additionally, several of the Bureaus already have formed their own teams. These teams are addressing how to budget for energy projects, design award programs and prepare performance plans. ESHD provides oversight for Treasury's energy management program.

Management Tools

Awards

Treasury has been utilizing existing performance award systems to recognize individual employees. The Bureau of Engraving and Printing (BEP) and the U.S. Mint (Mint), as non-appropriated Bureaus, use their gain-sharing programs and beneficial suggestion programs to award cash for energy savings.

The Internal Revenue Service (IRS) submitted one successful nomination for "You Have the Power" poster campaign featuring their site energy team from Memphis, Tennessee. Other IRS site energy teams received cash awards.

The Office of the Comptroller of the Currency (OCC) provides spot awards and free lunch coupons to employees shown to have taken extra steps to conserve energy.

Training and Education

Treasury sent 37 employees to energy training at a cost of \$60,300 during FY 2005. Treasury utilized the Department of Energy (DOE) Federal Energy Management Program (FEMP) course offerings whenever available because of their high quality and low cost. Energy training and efficient product links have been maintained on the Office of Procurement's and the Environment, Safety and Health Division's web sites to assist the Bureaus. Treasury remains an active participant in the "You Have the Power" energy aware-

ness program and disseminated materials from the campaign to support the Department's Earth Day, Load Reduction, and Energy Awareness Month efforts.

In FY 2005, 18 IRS employees attended the Energy 2005 Workshop. Several field energy coordinators attended various regional DOE classes on purchasing renewable energy, energy savings performance contracts (ESPCs), distributed generation, and other topics. Site coordinators provide conservation news to building occupants through campus newsletters, e-mail logos, and slides shown on in-house Closed Circuit TV systems.

In FY 2005, the BEP trained employees in direct digital control/energy management system for heating, ventilation, and air conditioning and Johnson Controls' Metasys Control System.

Energy Efficiency Performance

Standard Buildings

In FY 2005, Treasury reported a 21.3 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. Treasury used an estimated 79,328 Btu per square foot in its standard buildings during the year. Treasury received credit for purchases of 18.1 billion Btu of renewable energy. This lowered the energy intensity of its standard buildings from 84,380 Btu per square foot to 79,328 Btu per square foot.

During FY 2005, the majority of the Treasury and its Bureaus occupied space was located in General Services Administration (GSA)-assigned facilities. Treasury reports energy statistics only for the Treasury owned and GSA delegated space for which it controls the utilities. In FY 2005, Treasury reported consumption for 3.5 million square feet of space in the standard buildings category.

Some 2.1 million square feet of space for the Internal Revenue Service (IRS), the Bureau of the Public Debt (BPD), and the Financial Management Service (FMS) was managed directly by the bureaus under the GSA Buildings Delegations Program. IRS occupied the majority of delegated space for standard buildings.

Treasury-owned or leased standard buildings consisted of 1.4 million square feet of space in Departmental Offices (DO) (the Main Treasury and Annex buildings), the OCC, and the Office of Thrift Supervision (OTS).

However, three Bureaus exceeded the FY 2005 reduction goal and exceeded the 2010 goal mandated by Executive Order 13123. The FMS achieved a 56 percent reduction, OTS reported a 43 percent reduction and IRS reported a 35 percent reduction.

In FY 2005, renovation of the Main Treasury Building continued. This includes energy efficient doors, windows, lighting, and cooling and heating.

Although IRS occupied many of its existing buildings in 1985, GSA did not delegate responsibility until the 1987-1988 timeframe. In addition, IRS has vacated some buildings, gained some new buildings, corrected the classification of buildings and moved from one building to a larger building during the interim. Those buildings classified as standard buildings are: the 1932-era IRS Headquarters building in Washington, D.C.; the Atlanta, Georgia returns files and the Atlanta warehouse; the Austin, Texas warehouse; the Covington, Kentucky child care center; and the Philadelphia, Pennsylvania warehouse.

Industrial and Laboratory Facilities

Treasury reports energy consumption for 9.1 million square feet of industrial space. Some 5.6 million square feet for the IRS was managed directly by IRS under the GSA Buildings Delegations Program. The remaining 3.5 million square feet of space belongs to the BEP and the Mint. The lack of a common unit of production across the bureaus continues to require the use of the Btu per square foot as the reporting unit for Treasury's industrial/energy intensive facilities.

As of FY 2005, Treasury's industrial facilities have achieved an 18.1 percent reduction in consumption over their FY 1990 baseline on a Btu per square foot basis. Treasury received credit for purchases of 26.6 billion Btu of renewable energy for these facilities, lowering the energy intensity from 210,054 Btu per square foot to 207,103 Btu per square foot.

Sixteen IRS buildings are classified as industrial due to multiple shift occupancy, computer rooms, heavy personal computer use and centralized group printers, intensive telecommunications systems, laser print operations, etc. During FY 2005, IRS's industrial facilities were able to reduce energy consumption by 21 percent.

Although the Mint strives to meet the goals and objectives of the Energy Policy Act and Executive Order 13123, the process of stamping coins is an energy intensive activity, and the Mint is subject to the requirements of Congress and the nation's demand for coinage. Fluctuations in demand cause fluctuations of energy consumption for coin manufacturing activities.

An HVAC feasibility study was completed on August 29, 2005. The purpose of the study was to determine whether renovating the HVAC of the Washington, D.C. facility would be economically justified.

The study includes energy modeling of the existing building envelope, lighting, and HVAC against the proposed building envelope, lighting, and HVAC system. The energy model predicts that the proposed HVAC system would reduce annual consumption of electricity from 50.2 gigawatthours to 33.7 gigawatthours and reduce steam consumption from 105.3 million pounds to 44.7 million pounds. The 20-year life-cycle cost (LCC) analysis predicts the present value of energy saving is \$35.5 million, while the HVAC upgrade cost is \$24.0 million.

A study was also conducted to examine the feasibility of installing variable frequency drives at the secondary chilled water pumps at the Washington, D.C. facility. Three existing secondary chilled water pumps circulate chilled water through the distribution system and through all of the air handling units. The pumps are designed to operate at constant speed with two pumps operating simultaneously and one pump on standby. Two 200 horsepower variable frequency drive (VFD) pumps are proposed to be installed to vary the speed of the two chilled water pumps. An estimated energy saving of 2.4 gigawatthours per year is expected from the VFD installations. With the electricity unit rate of \$0.062 per kilowatthour, the annual saving is calculated to be \$147,700. Simple payback is within three years.

Installation of the direct digital control/energy management system (DDC/EMS) was completed during May 2005. The DDC/EMS, on a daily basis, starts and stops 86 air handling units (AHUs) and opens and closes their outside air dampers during weekdays. During the weekend, the 86 AHUs are stopped and the outside dampers are closed. The DDC/EMS is interfaced through the Washington, D.C. facility's Ethernet network, thus the system can be programmed and monitored through any web browser.

Having the ability to turn the 86 AHUs off during unoccupied hours saves fan, cooling, and heating energy. From the preliminary estimation, the DDC/EMS will save approximately 3.2 gigawatthours of electricity and 13.4 billion Btu of steam. The estimated annual utility saving is \$600,000.

A lighting system retrofit survey was performed during FY 2005 in the Main and Annex buildings of the Washington, D.C. facility. This survey was performed by PEPCO Energy Services (PES), an area-wide con-

tractor. This survey included the feasibility of replacing fluorescent and other lighting, and the feasibility of installing occupancy sensors at appropriate locations. At the time of the survey, the budget estimate for this project was \$1.6 million. PES estimates that implementation of the project would result in a total energy reduction of approximately 7.2 gigawatthours or a reduction of 57.4 percent from the lighting energy baseline of approximately 12.6 gigawatthours.

Exempt Facilities

IRS received guidance from DOE to exempt the parking lot lights at Atlanta and Covington because the consumption data is metered separately from the main facilities. In addition, the Atlanta main facility and the Atlanta Child Care electricity and natural gas are reported by GSA Atlanta due to a consolidated purchasing agreement.

Non-Fleet Vehicle and Equipment Fuel Use

The BEP owns three armored vehicles - two at the Washington, D.C. facility and one at the Fort Worth, Texas facility. Only the armored vehicles owned by the BEP are included in this report. The amount of diesel fuel used in FY 2005 was 556 gasoline gallons equivalent. Due to the special security requirements, a number of BEP's vehicles require high performance engines, special tires (non-retread), as well as other security features which result in higher operating and maintenance costs than conventional motor vehicles. During FY 2005, BEP replaced nine petroleum-base fueled vehicles with nine alternative-fuel vehicles, for a total of 12 alternative-fuel vehicles.

IRS has implemented the Federal Automotive Statistical Tool prescribed by DOE to assist in meeting data reporting requirements. The IRS General Fleet is comprised of 480 vehicles: 276 sedans, 83 light duty trucks, 20 medium duty trucks and 52 heavy duty trucks. IRS used diesel, E-85, and gasoline fuel.

Renewable Energy

Purchased Renewable Energy

In past years, the Denver Mint has participated in an energy savings performance contract (ESPC). The savings from that project was re-invested in purchasing wind power. The Denver Mint has contracted in FY 2005 with the local utility to provide 1.2 gigawatthours per year of renewable energy. The contracted amount is approximately 9.6 percent of the Denver Mint consumption, which exceeds the goal of 2.5 percent. In addition, the Philadelphia Mint also purchased 787.4 megawatthours from a local utility.

Based on 2004 research into costs and availability, during 2005, IRS made a corporate purchase of 7.0 gigawatthours of Renewable Energy Certificates (RECs) from generated wind technology. This exceeded the goal of 2.5 percent of the electricity consumption in FY 2004. IRS Procurement worked with a local utility to purchase the RECs for a cost of \$8,750, which represents 3.0 percent of the total electricity consumption. IRS qualified for and joined the Environmental Protection Agency Green Power Partnership in 2005.

Petroleum

At the Washington, D.C. facility, BEP owns and operates for testing or actual emergency conditions, two diesel engines which provide power to the Fire Protection Systems, one for the Annex building and the other for the Main building. There is also a small diesel-powered generator that provides emergency power for critical operations, which is operated for test purposes or emergencies.

At the Fort Worth, Texas facility, the BEP owns and operates three boilers that can be operated by natural gas or No. 2 oil for producing building steam. Three diesel-fueled generators provide emergency power for critical operations.

Seven of the 11 IRS sites use fuel oil primarily for emergency power backup generation. Some sites have dual fuel boilers that can be switched to fuel oil when natural gas prices rise. These numbers indicate a substantial reduction; however, consumption is reported in the year fuel is purchased. A number of IRS locations purchased enough quantity in FY 2003 to use in future years. The Atlanta, Georgia facility replaced an old underground storage tank including new pumps.

Water Conservation

Treasury consumed 451 million gallons of water at a cost of \$1.6 billion during FY 2005. During the year, 27 percent of Treasury facilities met the requirement for water management plans and implementation of Best Management Practices (BMPs).

The BEP continues to investigate the possibility of recycling water from the spent intaglio water wipe solution that is used for cleaning engraved inked plates used for printing Federal Reserve Notes. This process accounts for the use of as much as 65,000 to 80,000 gallons of water per day. At the Bureau's Western Currency Facility, located in Fort Worth, Texas, a regenerative thermal oxidizer is used for the destruction of volatile organic compounds (VOCs). Domestic water is used to cool the bearings during this VOC destruction operation. This one time use of domestic water was

wasteful of the BEP's resources. A new condenser loop was installed to provide cooling of the bearings. This resulted in savings of approximately one million gallons of domestic water annually.

In the IRS, water is used for a variety of purposes including cooling tower condensers, restrooms, kitchen/canteen equipment, lawn irrigation, fire suppression, etc. The Brookhaven, New York campus is unique in having an on-site sewage treatment plant. All 11 IRS sites developed Water Management Plans. The IRS Headquarters building in Washington, D.C. is not billed for water, but starting in FY 2005 has obtained consumption data. Their water is supplied under a multi-agency agreement between GSA and the District of Columbia. As a result, the IRS water consumption figures have increased to reflect the new District of Columbia data. IRS sites have been taking a variety of conservation measures, including changing restroom fixtures to low flow, sensor operated. This data is then posted to a matrix showing the same data for the prior FY 2004 for comparison. Any anomalies are quickly identified and investigated to see if corrective actions are necessary.

For the 11 IRS sites covered by the 10 existing BMPs, there are 110 implementation possibilities. The sites have implemented 64 of the 110 and identified 32 as non-applicable, so IRS is well ahead of the required 40 percent goal to implement by 2004.

In FY 2005, IRS consumed 211.1 million gallons, versus 172.7 million gallons in FY 2004. The consumption increase is due to new reporting by the IRS Headquarters building in Washington, D.C. of 28.2 million gallons. In prior years, consumption data was unavailable due to an agreement with the District of Columbia and Federal Triangle agencies. If not for this one increase, IRS would have shown an overall decrease in consumption.

Implementation Strategies

Life-Cycle Cost Analysis

Treasury's energy directive specifically requires the use of life-cycle cost (LCC) analysis for all energy projects and procurements. All of the Bureaus continued to use LCC analysis for their energy projects. In addition, the following are completed for each project:

- Alternatives and Assumptions;
- Return on Investment;
- Investment Analysis and Recommendation; and
- Net Present Value.

The IRS project managers regularly use the Federal LCC procedures to evaluate energy related projects. In addition, IRS is factoring in the future status of the buildings as a result of internal process changes and modernization efforts. For example, the LCC analysis may indicate a payback of 10 - 15 years on a proposed project; however, workload considerations may indicate the building will be vacated or totally gutted and rehabilitated in less than 10 years. As a result, for those IRS sites most immediately impacted by these workload changes (e.g., Andover, Massachusetts, Philadelphia, Pennsylvania and Atlanta, Georgia), only energy projects with very short payback periods are being considered. For example, Philadelphia was funded for short-term lighting and restroom water projects because the pay-back is two years or less. Philadelphia has just received Congressional funding for a campus replacement, so minimal expenditures will be made on that campus.

When practical, the BEP uses Federal LCC procedures to evaluate energy related projects. In other instances, estimated LCC analysis is utilized, a requirement of 10 CFR 436. This procedure evaluates energy-related investments on the basis of minimum life-cycle costs.

Facility Energy Audits

In FY 2005, Treasury performed energy audits in 26 percent of its space. This brings the total space audited to 87 percent since 1992.

In the BEP, starting in November 2003 and ending in January 2004, an Investment Grade Audit was performed by Washington Gas Energy Services (WGES). WGES provided energy conservation measures, including equipment power requirements yielded by this audit, that were used in business cases for the Direct Digital Control/Energy Management System (DDC/EMS) and Supervisory Control and Data Acquisition (SCADA) efforts. During September FY 2004, an agreement was signed with Potomac Power Electric Company (PEPCO) Energy Services to perform a free lighting survey. The survey was completed during FY 2005. The business case for the lighting project is scheduled for approval and funding in the 3rd quarter of FY 2006 with implementation projected for the 4th quarter of FY 2007.

In the IRS, the Martinsburg, West Virginia site had a DOE/IRS-funded SAVEnergy audit during the year. The Brookhaven, New York facility had an ESPC audit in FY 2005. The Memphis, Tennessee site received the energy assessment report in FY 2005 of a review conducted in late FY 2004, and the team has implemented three of the five recommendations (two were later determined not feasible). The Andover, Massachusetts

site had a demand response energy audit by Massachusetts Electric. The Philadelphia, Pennsylvania facility had an audit conducted by Exelon Corp. The Atlanta, Georgia facility is the only campus to not have an audit, but their consumption is the smallest and potential workload changes in the near future preclude any significant investment. In addition, IRS has conducted Energy Program Operational Reviews on four of the reporting sites.

The OTS controls and pays for utilities at one facility located in Washington, D.C. and is audited annually as part of long-term planning for operating and budgeting purposes. Numerous energy saving projects have been identified during audits over the past several years including the installation of direct digital controls and upgrading energy management systems.

Financing Mechanisms

The BEP's strategy for meeting the requirements of Executive Order 13123 is to use funding from its revolving fund for energy-related projects.

The Mint has three on-going ESPCs awarded in 1997 and 1998. In addition, the San Francisco Mint has identified funding for energy savings through the Pacific Gas & Electric Savings Performance Projects. The facility will develop SPC submissions prior to construction.

IRS traditionally self-finances energy and program related alterations. IRS has had delegated funds from GSA and agency-appropriated funds to use and will continue to do so as funds are available. The IRS Energy Team has been exploring the use of ESPC and utility energy services contract funding as well as having discussions with the Bonneville Power Administration. An energy savings contractor conducted an initial assessment in the Brookhaven, New York site; however, due to funding and responsibility issues with GSA, the ESCO project has not moved forward.

ENERGY STAR and Other Energy-Efficient Products

Treasury has had a policy of purchasing only ENERGY STAR-compliant computers since 1995. Treasury also purchases ENERGY STAR copiers and fax machines, and follows the product recommendations in DOE's Energy Efficient Products Guide. Links to web sites for DOE's, GSA's and the Defense Logistic Agency's web sites have been added to the ESHD and Office of Procurement's web sites to assist the bureaus in obtaining information of energy efficient products.

ENERGY STAR Buildings

The IRS Austin, Texas facility has received the first ENERGY STAR® designation in 2005 for any buildings within Treasury.

Sustainable Building Design

Treasury has mandated, through Directive, use of the Whole Building Design Guide for its new facilities. GSA coordinates most of the design work for Treasury facilities using the Leadership in Energy and Environmental Design (LEED) standards.

The IRS plans to incorporate LEED certification into the new Philadelphia, Pennsylvania campus design criteria.

Energy Efficiency in Lease Provisions

Treasury has provided the Model Green Lease provisions to each of its Bureaus. The Bureaus are using them where they have independent leasing authority, and GSA includes the provisions when obtaining space for the Bureaus.

Industrial Facility Efficiency Improvements

In the BEP, 16 energy inefficient vacuum pumps were replaced during FY 2005. It is estimated that the new pumps will reduce the electrical energy consumption 1.6 million kilowatthours per year. This electrical energy saving exceeds the preliminary estimate of 881.2 megawatthours per year. Based on the electricity rate of \$0.062, this translates into a saving of \$99,200 per year. Also, during FY 2005, BEP spent \$30,000 for a compressed air survey. The survey identified system deficiencies and made recommendations on air distribution modifications, compressor control schemes, and modifications to the compressor plant. The anticipated energy saving from the implementation of this project is 1.5 million Btu.

The Mint is working toward improving its energy efficiency performance and optimizing the savings which would be partially reinvested into making further improvements over time. The following facility efficiency improvements are either being implemented currently or are to be reviewed for possible implementation:

- HVAC equipment consolidation;
- Air compressor replacements;
- Building envelope upgrades such as replacement energy efficient windows;
- HVAC controls; and
- Expanding energy management systems to control additional equipment such as additional HVAC and electrical equipment.

The Austin, Texas IRS site replaced 171 parking lot lights with energy efficient lights. They also replaced a rotary Uninterruptible Power Supply (UPS) with energy efficient static UPS. The Andover, Massachusetts office replaced a 40 year-old, 460-ton steam absorption chiller with a high efficiency chlorine-free 225-ton chiller in July 2005. In addition, a 1967 era electric chiller was removed from service, and the associated cooling tower was decommissioned. The new chiller qualified for a rebate of \$13,905 from Massachusetts Electric. Savings should be realized in the 2006 cooling season. The Andover, Massachusetts facility also installed variable speed drives on all three cooling tower fans with an expected savings of 69.0 megawatthours annually. This project was funded completely with funds received from rebates in FY 2004 and a rebate that was paid directly to the vendor by Massachusetts Electric. Two refurbished Data-Air units were installed in the telephone switch room replacing three Leibert units. The new units were tied into the existing dry-coolers, eliminating the three old Leiberts, three roof top condensing units, three local chillers and associated equipment. They are now able to use free cooling and reduced the amount of refrigerant from approximately 600 pounds to 48 pounds.

Electrical Load Reduction Measures

Every Treasury-owned or fully delegated facility continues to follow the electrical load reduction plan developed in FY 2001 based on DOE's "Plan of Action Energy Conservation at Federal Facilities" and the load reduction measures listed on the FEMP web site. Several bureaus in leased space implemented plans and awareness campaigns. Peak demand reduction and conservation awareness materials from the FEMP "You Have the Power" campaign were distributed across

Treasury. All Treasury Bureau facilities participated in their utilities' load reductions programs.

Each of the 11 IRS sites developed an electrical reduction plan. Treasury identified critical loads and options for keeping the facilities operational during extended commercial utility outages.

The Covington, Kentucky site installed variable frequency drives and incorporated them into a Metasys BAS system. All programming was done in-house. Various control loops in the BAS were studied and tuned up for more efficiency. Covington also upgraded the BAS system to include York chillers allowing for remote reset of chilled water temperatures. All base-board heating systems were wired into the BAS system. Temperatures were reset based on actual space temperatures. Three air handler units were converted to DDC controls. Snow-melting infrared lamps were tied into the BAS system, providing remote control and outside air temperature lockout. In addition, Covington automated the chiller plant start/stop and chiller plant selection in the BAS. Automated blow down systems were installed on both main boiler systems. The cooling tower blow down systems were tied into the BAS system for remote monitoring and alarming.

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N. DEPARTMENT OF VETERANS AFFAIRS (VA)

Management and Administration

The Senior Energy Official for the Department of Veterans Affairs (VA) is the Assistant Secretary for Management. The Senior Energy Official is responsible for Department-wide energy policy and oversight of the VA Energy Conservation Program. The Office of Asset Enterprise Management (OAEM) is the lead office at the Department level for providing management and oversight of the energy program.

VA's energy conservation program is a team effort with a core Agency Energy Team headed by a senior agency official and an energy official representing each of VA's three administrations: Veterans Health Administration (VHA), Veterans Benefits Administration (VBA); National Cemetery Administration (NCA) and staff offices. The administrations, along with staff offices, have in turn created their own Administration Energy Team.

Management Tools

Awards

Three VA facilities in South Dakota and Minnesota, part of the VA Midwest Health Care Network, won a Federal Energy and Water Management Award during the year. They used a two-phase energy savings performance contract to fund \$14 million in capital improvements for energy and water efficiency, replacement of aging infrastructure, and enhanced energy security.

VA's Honolulu medical and regional office center received its second ENERGY STAR award in the medical office building category. The award, received in September 2005, sets an example for all of VA. Honolulu's efforts to create an energy efficient building while providing top-notch medical care will serve as a model for future VA award applications. In the upcoming fiscal year, VA anticipates more VA facilities awards, particularly in the Acute Care Hospital category.

In March 2005, the Environmental Protection Agency recognized the team at VA's San Diego, California medical center with this award for their team approach to recommending and implementing on-site tri-generation of electricity, steam, and chilled water. The 4.2-megawatt Solar Turbines Mercury 50 gas-fired turbine used in this project was developed under the DOE's Advanced Turbine Systems program and is guaranteed to emit no more than five parts per million by volume of nitrogen oxides.

The medical and regional office in Honolulu also won an award for sustainable design/green building.

Training and Education

In FY 2005, over 100 VA employees participated in energy-related training. These training events included:

- Technical and financial assistance to improve the energy efficiency of Federal facilities;
- Water resource management; and
- ENERGY STAR web-based conferences.

VA also provided in-house training. The VA Office of Acquisition and Materiel Management offered conferences designed to assist all Administrations and staff offices to meet Federal mandates regarding acquisition of energy efficient products and materials.

Finally, OAEM represented VA at several energy conferences, including the Energy 2005 Workshop in Long Beach, California.

Energy Efficiency Performance

Electricity comprised the largest VA energy expenditure and natural gas the largest amount of energy consumed in FY 2005. VA is working to reduce both natural gas and electricity consumption and to control associated costs. Healthcare is increasingly dependent on imaging and other advanced technologies that increase "plug" load over time, and facility workloads are growing. In addition, VA facilities continue to add to their information technology infrastructure and acquire state-of-the-art medical equipment to provide the best treatment possible for veterans. In the face of this contribution to increasing energy intensity, VA is making all efforts to manage facilities as cost-effectively as possible to keep overall energy costs in check.

Standard Buildings

In FY 2005, VA reported an 11.6 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. VA used an estimated 175,609 Btu per square foot in its standard buildings during the year. VA received credit for purchases of 464.1 billion Btu of renewable energy. This lowered the energy intensity of its standard buildings from 178,495 to 175,609 Btu per square foot. This decrease is partly a result of correcting for interstitial spaces.

Renewable Energy

FY 2005 was the first full fiscal year in which VA collected renewable energy data from facilities throughout the VA portfolio. VA continues to improve Depart-

ment-wide understanding of this new category and anticipates increases in both purchased and self-generated renewable energy use. FY 2004 total renewable energy use was 1.82 billion Btu versus FY 2005 use of 307 billion Btu, or 89.2 gigawatthours, at a cost of \$45,000. This reflects more accurate reporting of existing self-generation as well as additional purchased renewable energy. VA hopes to increase renewable use even more in FY 2006.

Petroleum

VA consumed 6.5 million gallons of fuel oil at a cost of \$14.1 million during the year, an 18 percent decrease versus FY 2004.

Water Conservation

VA increased its water consumption 5 percent from FY 2004 to FY 2005, with a 21 percent increase in cost. Consumption was 9.2 million gallons during the year, at a cost of approximately \$21.6 million.

Implementation Strategies

Life-Cycle Cost Analysis

Since 1975, it has been VA's policy to fund only those energy projects that are cost-effective based upon the life-cycle cost (LCC) analysis that determines the savings to investment ratio (SIR). The higher the SIR, the better the return will be on the investment. In FY 2004, VA established a policy regarding the term of payment and life-cycle of energy projects. The policy states that the term of financing for an energy project should not be longer than the shortest life-cycle of an individual energy improvement. This is to ensure that VA is not financing an energy project that will need to be replaced before it has been fully funded.

Financing Mechanisms

VA began its energy investment pilot program in the summer of 2003. The purpose of the pilot program is to test and obtain independent advice on: 1) Commodity acquisition practices; 2) Establishment of a baseline for energy savings contracts; 3) Identification of potential cogeneration opportunities; 4) Identification of energy conservation measures (ECMs); 5) Development of competitive solicitations for ECMs; and 6) ECM installation and post-installation oversight.

The pilot program is underway in four regions. In three of these regions, a baseline has been established and a prioritized list of ECMs has been finalized based on the results of independent energy assessments of facilities in the region. Energy services companies will be invited to bid on implementation. In a fourth region, VA is contracting for ECM installation and maintenance at five medical centers as consideration under an existing

energy center enhanced use lease agreement. VA anticipates completing the energy services agreement for these measures early in FY 2006.

In FY 2004, Veterans Integrated Service Network, Region 4 (VISN 4) (a region comprised of most of Pennsylvania, all of Delaware, and portions of New Jersey and West Virginia) completed a study to determine the feasibility of implementing cogeneration energy centers at high-potential locations utilizing VA's enhanced-use lease authority. Findings were favorable for five Pennsylvania sites. At the close of FY 2005, VA was nearing completion of the source selection process for one or more developers to finance, construct, own, operate, manage and maintain an energy center at each of these sites.

ENERGY STAR and Other Energy Efficient Products

VA has mandated that all contracting officers, purchasing agents, purchase card holders and other procurement officials purchase ENERGY STAR-rated equipment when cost effective. If ENERGY STAR-certified equipment is not available (as is the case with many medical devices and imaging equipment), officials are to acquire energy efficient equipment on the basis of cost effectiveness. This standard for procurement is also being incorporated into VA's standard specifications and product specifications for new and renovation construction projects.

ENERGY STAR Buildings

The Spark M. Matsunaga Medical Center in Honolulu, Hawaii - received an ENERGY STAR Label for the category of Medical Office Building. VA benchmarked close to 30 hospitals in FY 2005. VA's FY 2006 Implementation Plan addresses VA's plan for earning additional ENERGY STAR Labels and benchmarking most of the remaining facilities in this category.

Sustainable Building Design

VA is committed to protecting the environment. One element of VA's environmental strategic plan is to "build green." This integrates economic and environmental impacts and performance on a full life-cycle basis. The life-cycle analysis addresses the environmental, economic and performance aspects for every phase of building construction. This includes material extraction, product manufacture, product transportation, site selection, building design and construction, building operation and maintenance, and building reuse or disposal. The Office of Facilities Management is in the process of updating its design standards to incorporate the latest best practices for sustainable design.

VA has integrated the "build green" approach by:

- Incorporating sustainable design concepts into solicitation requirements for architect/engineer firms on all major VA projects;
- Participating in the U.S. Green Building Council, National Institute of Building Sciences, and other leading organizations in the sustainable design movement;
- Continuous green updating of the VA master specification design manuals and guides; and
- Integrating a design approach that features use of a highly insulated building envelope, high efficiency HVAC systems, and non-toxic building materials to create a healthy indoor environment for patients while reducing energy and water use.

Energy Efficiency in Lease Provisions

Since FY 2003, VA has included the lease provisions listed below in lease solicitation packages. In addition to price, VA evaluates proposals based upon the technical quality of the bid.

- All new construction will achieve an ENERGY STAR building label within one year after reaching 95 percent occupancy and will continue to maintain that level of performance; and
- Apply the requirements of ASHRAE/IES Standard 90.1-1989, "Energy Efficiency of New Buildings Except Low-Rise Residential Buildings" and Standard 90.1-1989 Addenda to this building.

As one example of the result of these policy changes, VBA's Houston facility was able to renegotiate the terms of its lease to specify that the landlord work with VA to improve the building's overall energy conservation efforts.

Highly Efficient Systems

VA construction standards require that consultants evaluate the use and cost effectiveness of available natural resources for new as well as retrofit projects. New and/or retrofit projects consider the use of combined cooling, heating, ventilating and power systems as an integral part of the overall project. Projects are evaluated and funded based upon LCC analysis.

Distributed Generation

VA is pursuing development of cogeneration energy centers at five medical center sites in Pennsylvania, using its enhanced-use lease authority as a vehicle for achieving significant energy cost savings and related benefits. VA has solicited developers to build, own,

and operate an energy center at one or more of these sites, leasing the relevant space and supplying energy services to the facility.

In FY 2005, VA completed cogeneration feasibility studies of ten high potential facilities in California. VA plans additional feasibility studies for cogeneration energy centers at VA facilities around the country. A 2003 study preliminarily identified a total of 48 high potential sites (including the Pennsylvania and California facilities).

In addition, selected VA facilities in Texas, Arizona and New Mexico feature solar thermal installations that supplement distribution of hot water.

Electrical Load Reduction Measures

Demand side management (DSM) offers the means for VA to achieve electrical load reduction at minimal cost. In recent years, VA has awarded numerous contract task orders to upgrade existing HVAC, lighting, and energy management control systems, install light and body sensors, and upgrade infrastructure to reduce electrical consumption. These DSM plans are consistent with Joint Commission on Accreditation of Healthcare Organizations standards.

Most VA medical centers have emergency and/or back up generators designed to act as electrical redundancy systems to serve essential areas of the hospital (such as intensive care units and operating rooms) in times of electrical failures. Some facilities have utilized these generators to shave peak electrical loads. The VA is currently working to create uniform guidance for use of generators to shave peak electrical loads. VA is also exploring the wider use of biodiesel in electrical generators to reduce reliance on imported fuel oil.

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O. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Management and Administration

The Environmental Protection Agency (EPA) has designated the Assistant Administrator (AA) of the Office of Administration and Resources Management (OARM) as the Agency Energy and Environmental Executive. The Senior Official is supported by a national energy team located in the Office of Administrative Services (OAS) and the Facilities Management and Services Division (FMSD). The Sustainable Facilities Practices Branch (SFPB) energy team works closely with architects and engineers from EPA's Architecture, Engineering, and Asset Management Branch (AEAMB) and ventilation safety experts from EPA's Safety, Health, and Environmental Management Division (SHEMD). EPA also receives support from the Department of Energy's (DOE's) National Renewable Energy Laboratory and the Federal Energy Management Program (FEMP) on a project-specific basis.

Management Tools

Awards

In FY 2005, SFPB continued its internal peer awards program, collectively known as the "Btu Buster Awards," first established in FY 2003. The program recognizes and encourages energy and water conservation among EPA facility managers and building design and construction personnel. Winners were recognized at EPA's Buildings and Facilities Conference in Philadelphia, Pennsylvania, in March 2005.

Training and Education

Employees who have energy management responsibilities are evaluated annually against criteria based on the agency's energy management principles. EPA uses several education and training programs to ensure that employees are aware of the latest technologies and opportunities to increase energy efficiency and overall sustainability.

The Laboratories for the 21st Century (Labs21) program is a joint partnership between EPA and DOE dedicated to improving the environmental performance and energy efficiency of U.S. laboratories. The program provides information on energy-efficient technology alternatives for laboratory applications and creates a forum for laboratory designers, owners, and operators to obtain up-to-date information and support for implementing energy-efficient and sustainable projects. In FY 2005, Labs21 held 14 one-day workshops on energy-efficient laboratory design and operations, training more than 600 professionals, each of whom is eli-

gible for continuing education credits. The Labs21 team designed the course to provide a comprehensive understanding of the opportunities to optimize energy performance of new and existing laboratories. The Labs21 Laboratory Ventilation Design Course, part of a series of advanced course modules on sustainable laboratory design and related topics, and based on Labs21 Best Practice Guides, was offered for the first time at the FY 2006 conference. The FY 2005 Labs21 Conference took place in St. Louis, Missouri, October 5-7, 2004. More than 500 public and private sector laboratory energy managers, policymakers, and other technical experts from the United States, Canada, Great Britain, New Zealand, and Australia attended the conference, including 30 EPA employees.

In March 2005, EPA conducted its annual three-day Buildings and Facilities Conference in Philadelphia, Pennsylvania. The 75 conference attendees included facility managers from EPA-operated laboratories and GSA-assigned regional offices and headquarters.

Energizing EPA is an internal EPA newsletter that highlights the agency's efforts to improve overall sustainability, including energy and water efficiency, at its facilities. The newsletter is produced on a quarterly basis and distributed electronically to all EPA employees to educate them about such issues as energy efficiency, green power, green buildings, alternative energy, recycling programs, water conservation, and low-impact development. In FY 2005, EPA initiated a new section in each issue focusing on tips that employees can use to reduce energy, water, and other resource use in their day-to-day lives.

EPA's Office of Administrative Services (OAS) continues to update and enhance its public web site on sustainability at the agency (www.epa.gov/greening-epa). The web site is a central source of information about energy efficiency approaches and projects, renewable energy procurement, and green buildings developed by and for EPA. The site also provides information on facility gross square footage, energy and water consumption data, facility manager contact information, and "green" building highlights for each major facility EPA occupies. In FY 2005, EPA revamped the site to improve navigation and highlight facilities with energy efficiency, water conservation, and other sustainable accomplishments.

As part of its efforts to implement environmental management systems (EMSs) at 34 agency locations, EPA has conducted a variety of training modules for its em-

ployees on energy and water conservation and other significant environmental aspects associated with the agency's facilities and operations.

Showcase Facilities

EPA's designated Showcase facilities include: the Kansas City, Kansas, Science and Technology Center; the Ralph H. Metcalfe Federal Building (a GSA-owned building housing EPA's Region 5 Office), and the New England Regional Laboratory in Chelmsford, Massachusetts.

Energy Efficiency Performance

Industrial and Laboratory Facilities

Primarily through the purchase of green power or renewable energy certificates that offset the emissions associated with its electricity use, EPA has exceeded the Executive Order 13123 goal of reducing reportable energy use by 20 percent from a FY 1990 baseline. EPA finished FY 2005 40.1 percent below its FY 1990 baseline, with green power netted out. EPA received credit for purchases of 516.8 billion Btu of renewable energy. In FY 2004, with green power netted out, EPA's energy use was down 17 percent, and in FY 2003 energy use was down 14.6 percent. While EPA currently relies heavily on green power purchases to achieve its reportable energy reductions, the agency will continue to improve its energy efficiency through infrastructure improvements and conservation measures. EPA expects to have a better balance of energy use reduction and green power procurement by FY 2010 to meet Federal greenhouse gas reduction requirements, and intends to significantly reduce its actual energy use to meet the Energy Policy Act (EPAct) of 2005 requirements.

Without deducting green power, EPA's FY 2005 energy use on a Btu per gross square foot basis was virtually even with the baseline year of FY 1990. In FY 2004, EPA's energy use on a Btu per gross square foot basis was virtually even with FY 1990; in FY 2003, it was 8.8 percent lower; and in FY 2002, it was 15.3 percent lower. EPA attributes this upward trend in energy consumption to:

- The beginning of energy data reporting for its New Main laboratory and National Computer Center in Research Triangle Park, North Carolina, on October 1, 2002 (FY 2003), both of which have greatly exceeded the energy use estimates made at the time the buildings were designed;
- A significant increase in Btu/energy use at its Human Studies Laboratory in Chapel Hill, North Carolina, where more accurate utility billing has greatly increased reported energy use; and
- Workload changes at the Ann Arbor, Michigan, National Vehicle and Fuel Emissions Laboratory facility, quirks in the energy savings performance contract (ESPC) measurement and verification agreement that discourage additional energy saving efforts, and recent energy-inefficient facility additions have degraded the energy performance of the ESPC successfully completed there in 2001. The two new RTP facilities account for approximately 38 percent of EPA's energy consumption. The Chapel Hill facility accounts for approximately nine percent of EPA's energy consumption. EPA has made RTP facilities its top energy conservation priority, but the fruits of these labors may not be realized for at least a year. The Ann Arbor NVFEL, meanwhile, accounts for approximately six percent of EPA's energy consumption.

Non-Fleet Vehicle and Equipment Fuel Use

To reduce emissions and fuel consumption and increase fuel efficiency, EPA has incorporated alternative fuel vehicles (AFVs) into its nationwide fleet of 1,163 automotive vehicles. In FY 2005, EPA leased 96 (replacement or new) AFVs that use electricity, compressed natural gas, or ethanol/gasoline mixtures, increasing the Agency's AFV fleet by 22 vehicles, for a total of 401 vehicles. In fact, for the sixth straight year, EPA exceeded the EPAct 1992 and Executive Order 13149 requirements that 75 percent of non-exempt, new vehicles be AFVs. In FY 2005, 84 percent of the vehicles acquired by EPA were AFVs.

Renewable Energy

In FY 2005, EPA continued its support of renewable energy development with the procurement of green power and/or Renewable Energy Certificates (RECs) at eight new facilities. Over the past six years, the agency has seen its green power commitments grow from one facility in 1999 to 30 facilities in FY 2005. As a sign of the maturing of its green power program, EPA also has had to replace or exercise extension options on contracts serving nine major facilities. When combined with previous commitments, EPA purchased nearly 225 million kilowatthours of green power at the 30 facilities in FY 2005, a figure equivalent to nearly 76 percent of total electric use at offices and laboratories. Nearly all of those 30 facilities procure green power to meet 100 percent of their electricity needs. On an annual basis, existing green power contracts will displace 83 percent of EPA's estimated annual electricity use. EPA also consumed 28,897 gallons of soy ester biodiesel in FY 2005 at its Narragansett, Rhode Island, and Manchester, Washington, laboratories.

Contracts covering the eight new EPA facilities receiving green power in FY 2005 include:

- San Francisco, California: In November 2004, EPA completed a green power purchase for its Region 9 Office in San Francisco through the Western Area Power Administration (WAPA). The three-year contract with 3 Phases Energy Services will provide the Region 9 Office with approximately 2.3 million kilowatt-hours of renewable energy certificates (RECs) per year. The purchase supports the generation of renewable energy at a geothermal facility in Middletown, California.
- Denver, Colorado: In early FY 2005, EPA worked with WAPA to procure green power for the Region 8 Office in Denver. A three-year contract with Aquila, Inc., for 4.7 million kilowatt-hours of RECs annually will allow the facility to offset 100 percent of its annual electricity consumption by supporting the Colorado Green Wind Project in Prowers County, Colorado.
- Kansas City, Kansas: In December 2004, EPA finalized green power contracts through WAPA for two additional locations: the Region 7 Office and Kansas City Science and Technology Center (KCSTC)-both in Kansas City. EPA signed three-year contracts for both facilities covering a combined annual total of more than 8 million kilowatt-hours of green power in RECs from Aquila, Inc. The procurement offsets 100 percent of annual electricity consumption at each location with renewable energy, 4.45 million kilowatt-hours for the Region 7 Office and 3.85 million kilowatt-hours of RECs each year for KCSTC. The RECs support the Gray County Wind Farm in Kansas.
- Narragansett, Rhode Island: In February 2005, EPA worked with the Defense Energy Support Center (DESC) to procure green power for the Atlantic Ecology Division Laboratory in Narragansett. The three-year contract with 3 Phases Energy Services for approximately 3 million kilowatt-hours of RECs annually offsets 100 percent of annual electricity consumption at the laboratory and supports wind power generation in California and Minnesota.
- Ada, Oklahoma: In April 2005, EPA agreed to terms on a three-year contract for the procurement of 3 million kilowatt-hours of RECs annually for the Robert S. Kerr Environmental Research Center in Ada. This allows the laboratory to offset 100 percent of its annual electricity consumption with green power and makes the Ada facility EPA's first carbon neutral laboratory, in conjunction with the ESPC there. The purchase supports the generation of renewable energy at wind farms in Wyoming, California, and Nebraska.

- Chicago, Illinois: In August 2005, EPA finalized a contract (through Defense Energy Support Center) for green power at EPA's Region 5 Office in Chicago. Over the course of the one-year contract, the Region 5 Office will receive 9 million kilowatt-hours in the form of RECs from the Basin Electric Power Company. With this purchase, the Region 5 Office now offsets 100 percent of its annual electricity consumption and supports wind power projects in Lamoure County, North Dakota, and Hyde County, South Dakota.
- Fort Meade, Maryland: In August 2005, EPA worked with DESC to finalize a contract for green power at the Environmental Science Center (ESC) in Fort Meade. According to the terms of the one-year contract, ESC will receive 6.4 million kilowatt-hours in RECs from the Basin Electric Power Company. The RECs, associated with renewable energy generation at wind power facilities in North Dakota and South Dakota, offset 100 percent of annual electricity consumption at ESC.

EPA replaced or extended six green power contracts for nine major facilities in FY 2005:

- Cincinnati, Ohio: In October 2004, EPA worked with the General Services Administration (GSA) to extend the green power contract at three facilities in Cincinnati: 1) The Andrew W. Breidenbach Environmental Research Center (AWBERC); 2) The Testing and Evaluation Center; and 3) The Center Hill facility. EPA exercised a three-year extension option in the original contract for RECs worth 15.56 million kilowatt-hours, 100 percent of the three facilities' annual electricity consumption. As with the original contract, Community Energy provides 778.0 megawatt-hours per year of wind power and ComEd provides the additional 14.8 million kilowatt-hours per year from landfill gas.
- RTP, North Carolina: In November 2004, EPA finalized a replacement contract through DESC for several facilities on the agency's RTP campus. In what was the largest EPA green power purchase to date, EPA procured 100 million kilowatt-hours annually in RECs for FY 2005, enough renewable energy to offset 100 percent of annual electricity consumption at the four main facilities and all ancillary facilities. The contract with Unicoi Energy Services supports renewable energy generation at a wood and paper pulp waste plant in Port Wentworth, Georgia.
- Golden, Colorado: In December 2004, EPA signed a green power contract through WAPA for its Region 8 Laboratory in Golden. The three-year contract provides the laboratory with 2.1 million kilowatt-hours in RECs, offsetting 100 percent of

annual electricity consumption. The purchase supports the Colorado Green Wind Project in Prowers County, Colorado, and replaces an earlier contract for 2 million kilowatthours in RECs annually.

- Chelmsford, Massachusetts: In August 2005, EPA signed a new green power contract through DESC for its New England Regional Laboratory (NERL) in Chelmsford. The new three-year contract provides 3 million kilowatthours in RECs per year and supports renewable energy generation at wind farms in North Dakota and South Dakota. The new contract with Select Energy offsets 100 percent of the laboratory's annual electricity consumption.
- Edison, New Jersey: In August 2005, EPA worked with DESC to replace its green power contract for the Region 2 Laboratory in Edison. The new, three-year contract with Select Energy will provide the laboratory with 6 million kilowatthours per year in RECs, offsetting 100 percent of its annual electricity consumption and supporting wind power from Wyoming and North and South Dakota.
- Richmond, California: In August 2005, EPA worked with DESC to finalize a replacement contract for green power at the Region 9 Laboratory in Richmond. The new three-year contract with 3 Phases Energy Services provides 1.9 million kilowatthours per year in RECs and offsets 100 percent of the laboratory's electricity consumption. The purchase supports wind farms in Northern and Southern California and replaces a previous contract for 1.85 million kilowatthours in RECs from landfill gas.

In addition to these procurement efforts, EPA continued to receive green power at 11 other facilities in FY 2005.

Self-Generated Renewable Energy

In December 2004, EPA completed installation of a 9.5-kilowatt photovoltaic array on the roof of its Western Ecology Division Laboratory in Corvallis, Oregon. EPA continued to operate numerous other self-generation technologies in FY 2005, including:

- Solar Arrays: EPA continued to operate a 100-kilowatt photovoltaic array installed in 2002 on the roof of its National Computer Center in RTP, North Carolina, and a 10-kilowatt solar array installed on the roof of its Region 5 Office in Chicago's Metcalfe Federal Building in 2000. EPA's Region 10 Laboratory also continued operation of 28 solar panels with a combined 2-kilowatt capacity.
- Photovoltaic Lighting: EPA's campus in RTP, North Carolina, includes solar street lights that

have served the entrance road and parking lot facilities since FY 2002. EPA believes this is the largest solar road lighting project in the United States.

- Solar Water-Heating Systems: In FY 2004, EPA installed a solar water-heating system at its Region 9 Child Care and Fitness Center in San Francisco, California. EPA's Region 2 Laboratory in Edison, New Jersey, utilizes three solar water-heating systems that have been the primary source of hot water in their respective facilities since 1998.

Petroleum

In FY 2005, EPA used a total of 183,234 gallons of fuel oil at six of its reporting laboratories. Of those six facilities, two are using a blend of soy ester biodiesel fuel as a clean-burning alternative to traditional diesel fuel. The Atlantic Ecology Division Laboratory in Narragansett, Rhode Island, and Region 10 Laboratory in Manchester, Washington, used a combined 28,897 gallons of 100 percent biodiesel, mixed with traditional diesel fuel in a one-to-four ratio. In addition, EPA used a total of 8,002 gallons of propane at two facilities during FY 2005.

Water Conservation

EPA has set an internal goal to reduce water consumption by 15 percent (from an FY 2000 baseline) by FY 2010. In pursuit of this goal, and in accordance with Executive Order 13123, EPA has conducted water use assessments and prepared detailed water management plans that include Best Management Practices (BMPs) for 45 percent of its laboratories. Through FY 2005, EPA has completed such plans for 13 of its 29 laboratories, with more underway. EPA far exceeds the FY 2005 Executive Order 13123 requirement to complete water management plans at 20 percent of its facilities (as well as the FY 2006 requirement for water management plans at 30 percent of its facilities). These and other efforts to promote water efficiency and implement water-saving projects have allowed EPA to significantly reduce water consumption.

During FY 2005, EPA facilities reaped the benefits of water conservation initiatives and continued to take steps to significantly reduce water consumption at its facilities.

For example, in Corvallis, Oregon, the National Health and Environmental Effects Research Laboratory (NHEERL) replaced a single-pass cooling system in the computer room of its main laboratory with a closed loop system that uses recycled glycol for cooling instead of a continuous flow of chilled water. This upgrade was part of a water management plan completed in 2004 that also included the installation of water

control valves on three autoclaves (which has already saved an estimated 1 million gallons of water), irrigation system controls, and less water-intensive plumbing fixtures. As a result of these improvements, in FY 2005 the Corvallis Lab used less than half the water consumed on average during the same time period in FY 2003 to FY 2004. In that time, the water efficiency upgrades have saved 5.4 million gallons of water and approximately \$27,000 in costs.

During FY 2005, EPA also completed water conservation assessments and water management plans for its facilities. For example, in July 2005 the Region 6 Laboratory in Houston completed a water assessment and established a water management plan that set a goal to reduce water consumption in 2010 by three percent. Under the environmental management system set forth in the plan, the laboratory will be tracking and evaluating water consumption in pursuit of the conservation target. Additionally, the laboratory will be investigating the feasibility of upgrading the irrigation system with a rain or moisture sensor, incorporating low flow toilets, urinals, and showerheads, installing faucet flow restrictors, and promoting water conservation awareness. The Region 6 Laboratory already recovers air handler condensate for reuse as cooling tower make-up water at the rate of 1.4 million gallons per year, resulting in more than \$3,500 annual savings.

Implementation Strategies

In FY 2005, EPA focused on its largest and most energy-intensive facilities—particularly the four in RTP, North Carolina. Addressing energy efficiency in RTP will be critical to meeting the new EPA Act 2005 energy reduction requirements, because these facilities represent 50 percent of EPA's energy consumption and are four of EPA's five highest energy users on a Btu per gross square foot per year basis.

Life-Cycle Cost Analysis

When developing, constructing, and operating its facilities, EPA makes every effort to conserve energy and water, incorporate sustainable design, and identify innovative technologies, products, and services that are environmentally sound and cost-effective throughout their life cycles. All energy projects, for example, go through life-cycle cost (LCC) analysis, as evidenced in the two ESPCs EPA implemented at its Ann Arbor, Michigan, and Ada, Oklahoma, laboratories. These projects have allowed the agency to realize significant energy efficiency upgrades and life-cycle savings that would have gone unrealized under the traditional funding process, which emphasizes up-front costs. LCC analyses help EPA justify energy efficiency improvements; in Richmond, California, for example, the

six-year payback on the upgrades EPA was seeking was short enough to warrant making those mechanical system investments, as EPA's lease expires at the end of 2013.

EPA is working to institutionalize its energy master planning process, investigating energy performance projects over a 15- or 20-year time frame, since laboratories are long-term investments. EPA has taken that idea one step further and in FY 2005 drafted a standard statement of work for sustainable master planning to examine all types of sustainable features on a life-cycle basis for EPA's future facility projects. When procuring new buildings, EPA generally uses energy modeling during the design process, to help identify additional opportunities for improvement. Such modeling, conducted during the 35 percent drawings for EPA's recently completed Science and Technology Center in Kansas City, Kansas, revealed additional economical energy conservation measures that were incorporated into the project.

Facility Energy Audits

To help identify opportunities for energy efficiency improvements to mechanical systems, EPA's office and laboratory facilities are regularly audited as part of a tiered process. The first tier, or Stage 1 audit, is a basic energy use assessment conducted as a stand-alone activity or in conjunction with water use assessments. Stage 2 assessments encompass more thorough energy consumption analysis, focus on specific areas of concern, identify various energy conservation measures, and calculate simple payback schedules, allowing facility managers to make decisions and prioritize energy improvements. Nearly every EPA reporting laboratory has had a Stage 1 or Stage 2 audit conducted in the past one to five years.

Financing Mechanisms

As mentioned earlier, EPA has taken advantage of the ESPC financing mechanism to realize significant energy and cost savings at its Ann Arbor, Michigan, laboratory (completed in 2001) as well as in Ada, Oklahoma (accepted in September 2005). EPA is also using ESPC-like mechanisms to finance future improvements. Under an agreement with the firm from which EPA leases its Richmond, California laboratory, the lessor is financing a natural gas co-generator to produce electricity and hot water, two small staging boilers to replace a larger version, and an HVAC controls upgrade. The contract for these projects was awarded in May 2004, and they were completed in Summer 2005. Lease payments will be made by EPA using the 15 percent utility savings, plus a one-time \$60,000 rebate from the utility, PG&E.

ENERGY STAR and Other Energy-Efficient Products

EPA actively promotes the purchase of energy-efficient products that carry the ENERGY STAR label, including photocopier equipment and computers. The Agency reviews and updates its purchasing specifications regularly and incorporates ENERGY STAR and other sustainable product requirements into new lease provisions when the occasion arises.

EPA encourages its employees and other Federal purchasers to participate in energy management activities through its Environmentally Preferable Purchasing (EPP) Program. EPP helps train government purchase card users on buying energy-efficient and sustainable products. In FY 2005, EPA made mandatory for agency purchase card holders use of a Blanket Purchasing Agreement (BPA) with office supply company Corporate Express, which provides environmentally preferable non-electronic office products. Through the BPA and its EPP program, EPA maintains a comprehensive database of environmentally preferable products for government purchasers and other users, as well as sample contract language for procuring these products. EPA also published newsletters, including the EPP Update and Energizing EPA, which promote the use of energy-efficient products and provide resources to EPA purchasers through articles on specific products and purchasing procedures.

ENERGY STAR Buildings

Because the ENERGY STAR program does not encompass laboratories in its labeling program, EPA cannot designate its 29 reporting laboratory facilities as ENERGY STAR Buildings. However, the agency continues to work with the General Services Administration (GSA) to achieve the ENERGY STAR Building label in office facilities it occupies, including:

- Seattle, Washington: The Park Place Building, which houses EPA's Region 10 Office, received the ENERGY STAR label in November 2004, after a series of improvements by the building's owner, Benaroya Companies, and EPA, which occupies 10 of the facility's 21 floors. EPA installed occupancy sensors and energy-efficient light fixtures, and the owner replaced the HVAC systems and modified the penthouse ventilation system to recover heat leaving the building.
- Atlanta, Georgia: In April 2005, EPA received the ENERGY STAR label at the Sam Nunn Federal Center in Atlanta, where its Region 4 Office is located. Through a pilot project with GSA and other tenants in the building, a multi-agency team evaluated the building, conducted pilot tests, and identi-

fied simple, low-cost modifications, such as occupancy sensors, lighting upgrades, and repairs.

In addition to focusing on ENERGY STAR labeling at its office buildings, EPA continued to expand collection of energy data from each of its major regional and Headquarters office buildings in FY 2005. Although GSA has had the responsibility to report energy use for these buildings under Executive Order 13123, EPA wants to use this data to further identify opportunities to improve energy performance in the offices it occupies.

Sustainable Building Design

EPA incorporates sustainable building design principles into the siting, design, and construction of all new facilities, as well as the renovation and maintenance of existing facilities. EPA outlined in its Green Buildings Vision and Policy Statement a holistic approach to minimize environmental impacts while maintaining a healthy, comfortable workplace, and its Architecture and Engineering Guidelines reflect these principles in all aspects of design, construction, and operation of its facilities.

EPA works closely with GSA in the selection of architects, mechanical engineers, and building developers, and incorporates sustainable design language into the solicitations for these vendors. The Agency requires a minimum LEED-New Construction (LEED-NC) Silver rating for its major new office building leases and requires that each major new office facility obtain the ENERGY STAR label within a fixed post-occupancy time period. EPA also typically sets a 30 percent better than the ASHRAE 90.1 (1999) goal for energy performance for all new major facilities. Future projects with sustainable design features include:

- Denver, Colorado, Region 8 Office: In June 2005, EPA and GSA broke ground for the new 250,000-square-foot Region 8 headquarters building in downtown Denver. Designed to achieve a minimum Silver LEED-NC certification, the building is likely to exceed expectations and achieve Gold. Numerous environmental features include: a 50,000-square-foot, highly reflective ENERGY STAR-rated roof to reduce energy consumption and heat island effects; native vegetation in the rooftop garden to manage and filter rain water; a nine-story atrium that provides abundant natural lighting to reduce energy consumption; photovoltaic panels that generate electrical power to supplement green power purchases and reduce energy consumption; low-flow plumbing fixtures and native, drought-tolerant landscaping to conserve water; low volatile organic compound interior adhesives,

paints, sealants, and caulks to improve indoor air quality; environmentally preferable janitorial and cleaning products to improve indoor air quality and reduce the use of toxic chemicals; an integrated pest management plan to reduce the use of toxic chemicals; a recycling collection program for newspapers, mixed office paper, cardboard, glass, plastics, metals, and toner cartridges; and extensive bike parking and shower facilities to encourage healthy, low-impact commuting. The project should be completed and ready for occupancy in October 2006.

- New Childcare Facility, RTP, North Carolina: Construction of EPA's new childcare facility in RTP, North Carolina, began in April 2004 and was completed in November 2005. Like the rest of the RTP campus, the new childcare facility incorporated green building features such as effective daylighting and energy-efficient design. By incorporating these and other sustainable design principles, the facility will strive to achieve a LEED-NC Silver rating.

Some of the newer EPA facilities that have incorporated sustainable design include:

- NCC, RTP, North Carolina: Built on the main campus in RTP, North Carolina, and opened in January 2002, NCC houses EPA's central data processing and exchange operations. The facility includes extensive daylighting and a rooftop photovoltaic system that helps power the facility. In January 2005, the facility received LEED-NC Silver certification.
- EPA Headquarters, Washington, DC: In collaboration with GSA, EPA Headquarters initiated a low-impact development demonstration project in FY 2004 designed to reduce the peak volume and pollutant load of storm water runoff entering Washington, D.C.-area waterways from the agency's Federal Triangle campus. The first phase of the project was completed in the summer of 2005 and included bioretention cells and a soil/grass stabilization/parking area installed along Constitution Avenue. Construction has started in the Ariel Rios South Courtyard on a porous paving, native landscaping, and rainwater collection system, with construction expected to be completed by Spring 2006. Design for the EPA West garage cistern began in Fall 2005, with construction also scheduled for completion in 2006. Storm water management and water conservation features will be included in GSA's design for the Benjamin Franklin Circle, and will require final review and approval by the Commission of Fine Arts and the Washington, D.C., government before moving

from concept design to the construction document and construction phases. The remaining phases, for which designs will be developed beginning in FY 2007, include plans to introduce native landscaping in the EPA West Courtyard and green roofs installed on two of the buildings.

Energy Efficiency in Lease Provisions

GSA leases most of the office buildings EPA uses. When EPA needs new space, the agency works with GSA to ensure the new office facility, whether the lease of an existing building or a build-to-suit (newly constructed) lease facility, adheres to minimum environmental performance standards. EPA originally used "green riders" to get the best possible existing or newly constructed building, recognizing that there may be limitations. Green riders were appended to GSA standard language in leases for the Region 3, Region 7, and Region 10 office buildings, including requirements for reusing materials, purchasing environmentally preferable products, recycling construction and demolition debris, promoting public transportation, and improving the facilities' energy performance through energy-efficient HVAC systems. As green buildings have become more accepted, GSA has upgraded the environmental performance requirements of its standard leases, and EPA has continued to raise the environmental performance expectations and specifications for its facilities. Now, numerous GSA and EPA environmental performance standards are incorporated throughout lease documents.

As mentioned previously, green lease provisions ensure that the new and renovated buildings under development in Denver, Boston, and Northern Virginia will promote energy efficiency, water conservation, resource reuse, and a healthy work environment. Using appropriate lease language, the Agency is able to ensure that all new facilities achieve a minimum LEED-NC Silver rating, the ENERGY STAR building label, and, typically, 20 to 30 percent better than the ASHRAE 90.1-(1999) standard (for both offices and laboratories).

EPA is currently working with GSA to incorporate mandatory quarterly energy reporting in all of its major office building leases, so that it can better understand its office energy use profile, identify poor energy performers in its inventory, and target locations where collaboration among EPA, GSA, and the landlord will economically reduce energy use.

Industrial Facility Efficiency Improvements

Even as EPA met the FY 2005 goal outlined in E.O. 13123 with a combination of mechanical improvements and green power purchases, the agency kept its

focus on commissioning, re-commissioning, and retro-commissioning the facilities that use the most energy and water, as well as identified opportunities to improve efficiencies cost-effectively within laboratories and offices of all sizes.

Research Triangle Park, North Carolina: EPA's largest energy consumers-the New Main building, NCC, and their sister facilities, the National Health and Environmental Effects Research Laboratory in Durham and the Human Studies Laboratory in Chapel Hill-continued to be a major area of focus for EPA in FY 2005.

The New Main facility was fully occupied in January 2003. When the facility was accepted, the energy metering system for the building was not functional. One of EPA's current priorities is to properly meter the facility; a contract for a web-based metering and energy management system was awarded in May 2005, and the project was completed in December 2005.

Implementation of a laboratory controls optimization pilot project initiated in FY 2004 should be completed by the end of March 2006. Using laboratory commissioning protocols developed in the summer of 2004, EPA has been safely reducing the ventilation rates of laboratory modules campus-wide since November 2004. EPA anticipates saving 187,000 cfm of outside air by eliminating single-pass air, for an anticipated campus-wide energy savings of 10 percent.

An office re-commissioning pilot project was designed in the summer of 2005 to ensure proper operation of the variable-air-volume (VAV) boxes and economizers and appropriate integration with the building automation system. If a pilot project that reconfigures one air handling unit (AHU) succeeds, EPA will apply it to all the office AHUs, for an energy savings of approximately 15 percent.

Humidification problems that first appeared in FY 2004 in one of the four main laboratory wings (the "A" Wing or the animal wing) have turned into an energy savings opportunity as well. A humidity system upgrade was designed in December 2004 for the A wing, which includes heat recovery. EPA awarded a construction contract for this mechanical system change in July 2005 and expects completion of construction in January 2006. Together, these projects should solve humidification problems in the A wing and save 25 to 30 percent of the energy used in the A wing, for a savings to taxpayers of approximately \$200,000 per year. In addition to this project, the A wing is reconfiguring its controls to reduce airflow in the vivarium laboratory 10 to 15 percent, which will result in a one to two percent campus-wide energy use reduction.

In September 2005, the ESPC at EPA's Robert S. Kerr Environmental Research Center was formally accepted, with the review and approval of a measurement and verification plan. Major systems construction was completed in November 2004. The ground-source heat pump, VAV fume hoods and air supply, new fan motors, and integrated direct digital control system for HVAC, energy, fire, and security management have resulted in energy savings even higher than expected. Energy use has decreased approximately 45 percent compared to pre-ESPC baseline consumption. Between the geothermal heat pump, which replaced natural gas use, and the green power purchase to offset energy use, the Ada laboratory became EPA's first "carbon-neutral" facility in 2005, meaning the building has virtually eliminated the greenhouse gas emission footprint associated with its energy use. To track the ESPC's success, EPA completed the review and approved a measurement and verification protocol in the summer of 2005, which includes cost verification of energy, water, and operations and maintenance expenditures.

EPA's second largest laboratory, AWBERC, in Cincinnati, Ohio, is implementing an infrastructure/energy master plan to replace the facility's long outdated mechanical systems over the next several years. Construction on a new "lead and lag" cooling tower with variable volume/separate cells and a water distribution system featuring variable drive pumps was completed in March 2005. The replacement of these 30-year-old cooling towers with new, more efficient ones should reduce energy use by approximately 4.5 percent or 5.9 billion Btu annually. An infrastructure phasing plan for air handling units, ducts, and exhaust systems replacements was completed in December 2004, and design of these systems will be awarded in FY 2006. In March 2005, EPA completed a steam study, which determined that using steam to generate hot water was more economical than replacing the steam boilers with hot water boilers. However, the laboratory will replace two 45,000 lb/hour boilers, which would have required extensive repairs, with three 22,500 lb/hour boilers, which can run more efficiently and require full capacity only at peak loads.

AWBERC is in the process of adding a second annex, Annex 2, which will feature two buildings with a combined 42,000 square footage designed to LEED-NC Gold standards, including an efficient under floor heating and cooling supply. A construction contract was awarded in September 2005, and construction should be completed May 2007.

Construction started in the fall of 2004 on several mechanical upgrades to EPA's Region 9 Laboratory in Richmond, California. Funded by utility savings

through an agreement with building owner Wareham Development, the project includes installation of a natural gas co-generation unit for electricity and hot water; replacement of a single, oversized boiler with two smaller ones; and an HVAC controls upgrade. Energy savings from the upgrades, which were completed in June 2005, are expected to be at least 15 percent. In addition to the six-year payback resulting from these savings, local utility company Pacific Gas & Electric gave a one-time rebate of \$60,000 to Wareham, or \$10,000 for every 10 kilowatts it removed from the grid by generating energy onsite through the natural gas unit.

EPA is working to increase energy efficiency at its historic Federal Triangle buildings owned by GSA and occupied by EPA. The agency initiated a three-phase commissioning effort in January 2005 that covers an evaluation of the mechanical systems/plumbing/HVAC; current status of fire/life/safety systems and certifications; and an analysis of contractor-performed operations and maintenance activities. Upon completion of the final report in October 2005, EPA began partnering with GSA to prioritize needed mechanical system changes, address required improvements in operations and maintenance services, and continue to provide expert mechanical engineering support to GSA.

Highly Efficient Systems

EPA has worked to install highly efficient combined cooling, heating, and power systems at a number of its laboratories. As part of an energy infrastructure upgrade at its Richmond, California, laboratory in 2005, the agency began operating a natural gas combined heat and power unit. The cogenerator will help conserve energy while serving electricity and hot water needs. A geothermal heat pump system was installed at EPA's Ada, Oklahoma, laboratory as part of the ESPC upgrade there. The system, which has been in operation since June 2002, generates approximately 7.8 billion Btu of energy each year, which helps augment the facility's use of electricity and natural gas.

Distributed Generation

EPA utilizes distributed generation to diversify its energy portfolio and improve the reliability of its electric supply. Off-grid electricity sources are an important fixture at NVFEL in Ann Arbor, Michigan. As part of an energy infrastructure upgrade in 2001, a 200-kilowatt capacity natural gas fuel cell was installed to provide both base load power and emergency backup power for the facility. The fuel cell supplies heating water for the reheat water loop serving the air handling units, saving significant amounts of energy that would otherwise be wasted in cooling towers and radiators.

Electrical Load Reduction Measures

EPA is doing its part to work with local utilities to reduce its buildings' electricity loads during peak times and throughout the day:

- Atlanta, Georgia: As part of the building's efforts to achieve the ENERGY STAR building label in FY 2005, EPA's Region 4 Office: strategically reduced lighting in excessively lit areas; installed occupancy sensors as standard operating procedure; repaired improperly installed or broken equipment; adjusted after-hours energy usage and system start-up by carefully analyzing the energy management system; developed policies to ban space heaters; and mandated air balancing when offices are constructed in open space.
- Edison, New Jersey: The laboratory has three solar water-heating systems that are the primary source of hot water in their respective facility areas. Because the building relies on the electrical systems only for auxiliary water heating when necessary, the solar heaters allow the facility to conserve electricity and fossil fuel. So far, Edison's solar technology has registered energy savings results significantly higher than expected.
- Golden, Colorado: The Region 8 Laboratory employs extensive daylighting, energy-efficient lighting, a solar wall, nighttime setbacks for the ventilation system, and direct digital controls to monitor the HVAC system as part of its energy-efficient operations.
- Gulf Breeze, Florida: EPA utilizes timers on approximately 20 electric water heaters to save energy during off-peak hours.
- Houston, Texas: The Environmental Services Branch Laboratory incorporates a night setback system to control exhaust fans, fume hoods, and supply air.

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P. GENERAL SERVICES ADMINISTRATION (GSA)

Management and Administration

The General Services Administration (GSA) has formally designated the Director, Office of Applied Science, as GSA's Senior Agency Energy Official responsible for meeting the goals and requirements of Executive Order 13123.

The primary role of the Senior Agency Energy Official is that of coordinator and facilitator to ensure that there is a single focal point knowledgeable of the numerous energy conservation programs in place and planned across GSA. The Energy Official is assisted by the Public Buildings Service (PBS) Energy Subject Matter Expert and the Energy Center of Expertise Staff. The Energy Official relies on the Energy Subject Matter Expert to develop and implement the various activities and initiatives undertaken by GSA to meet the goals of the Order.

Members of the GSA energy team consist of Energy Center of Expertise staff. The team meets with appropriate program representatives to address specific issues that arise regarding the furtherance of meeting the goals of the Executive Orders.

Management Tools

Awards

GSA annually participates in the Department of Energy (DOE) Federal Energy Management Program (FEMP) Federal Energy and Water Management Awards program, and received two awards at the October 2005 program.

The Great Lakes Region was honored with the 2005 Presidential Energy Management Award.

Training and Education

Under Sec.156 of the Energy Policy Act of 1992, GSA is required to hold ten energy management workshops for Federal, state, local, and tribal communities biannually. In 2005, GSA held or co-sponsored five conferences/workshops in partnership with Federal agencies and state governments toward this requirement.

These workshops included the following dates, locations and approximate attendees:

- Federal Utility Partnership Working Group, Rapid City, South Dakota, with 75 attendees;
- Get it Right Utility Acquisition, San Francisco, May 2005 with 45 attendees, Chicago, July 2005 with 50 attendees; Washington D.C., September 2005 with 40 attendees; and

- Energy 2005 in Long Beach, California, August, 2005 with 1,200 attendees.

GSA continues to train its own personnel in all aspects of energy and water management and conservation. GSA also includes project managers responsible for renovation and new construction projects in many of these training activities. GSA currently has on staff 28 trained energy managers. Routine training includes such topics, among others, as:

- Industrial Energy Process and Building Analysis;
- ASHRAE 90.1;
- Energy Management Techniques; and
- Building Life Cycle Costing.

Energy Efficiency Performance

Due to problems encountered with electric billings under deregulation, some electric figures are estimated. For example, in Texas both the supplier and the utility companies continue to send erroneous and duplicate billings, and GSA is working to resolve the billing errors and correct the data.

Additionally, GSA is encountering an increasing number of operating hours in a large portion of its inventory that has had a serious impact on consumption numbers. This after-hour usage is largely attributed to added security requirements for some agencies.

Standard Buildings

In FY 2005, GSA reported a 35.3 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. GSA used an estimated 53,725 Btu per square foot in its standard buildings during the year. GSA received credit for purchases of 2.1 billion Btu of renewable energy. This lowered the energy intensity of its standard buildings from 66,027 Btu per square foot to 53,725 Btu per square foot.

GSA achieved this reduction by directly investing in energy and water conservation opportunities with pay-backs of 10 years or less. From 1990 through 2005, GSA invested approximately \$360 million in projects.

The 1985 baseline for this category of goal-tracked facilities was modified due to the moving of appropriate energy intensive facilities to their own goal-tracked category. These facilities were selected in accordance with DOE's guidance issued on December 8, 1999.

Industrial and Laboratory Facilities

For the 12 months ending FY 2005, GSA's energy usage was 290,487 Btu per gross square foot and was

432,313 Btu per gross square foot in FY 1990, a decrease of 32.8 percent compared with the 1990 base year. This reduction incorporates the green power reduction credit of 66.2 billion Btu. The agency achieved this reduction by directly investing in energy and water conservation opportunities with paybacks of 10 years or less.

Exempt Facilities

GSA excluded buildings include those entering or leaving the inventory in a given year, buildings undergoing renovations, and outside parking garages. Typically, buildings undergoing renovations will include energy reduction opportunities as a part of the project and the building is returned to the goal group at the completion of the project.

Renewable Energy

Self-Generated Renewable Energy

GSA considers opportunities for solar and other renewable energy in building design and retrofits. When GSA performs an energy audit of a facility, renewable opportunities are identified and implemented if they are life-cycle cost effective. In addition, The Facility Standards for Public Buildings, PBS P100.2 incorporates language for solar/renewable energy sources to be considered in the proposed design.

In FY 2005, GSA received an estimated 2.2 billion Btu in energy use from self-generated projects. Approximately 60.5 megawatthours of this came from GSA's 13 photovoltaic installations, 1.200 billion Btu came from GSA's two solar thermal projects and 830 million Btu came from the one completed geothermal project. The photovoltaic output is significantly lower this year than in past years due to two system malfunctions that are currently being repaired and will hopefully be back up and running for FY 2006. GSA also has funded the repair of five existing solar thermal projects that are currently inactive to bring them back to operating condition.

In FY 2005, GSA completed one new photovoltaic system, a 1.5-kilowatt system at the new Seattle Courthouse.

GSA has begun the initial study into another photovoltaic system at a Border Station in Highgate Springs, Vermont. Additionally, in FY 2005 GSA funded a small photovoltaic array at the McCormack Post Office and Courthouse in Boston.

Purchased Renewable Energy

In FY 2005, GSA purchased a total of 660.2 gigawatthours of electricity from renewable sources through

competitive power contracts and use of green power programs offered by local distribution companies.

In FY 2005 GSA had active competitive power contracts that contained green power components in 10 of 11 Regions; New England Region, Northeast Caribbean Region, Mid-Atlantic Region, Great Lakes Region, Heartland Region, Greater Southwest Region, Rocky Mountain Region, Pacific Rim Region, Northwest Arctic Region and National Capital Region. These renewable power purchases were primarily for facilities in GSA's Standard Category, 629.4 gigawatthours. Therefore the credit should be applied to the standard category reduction. An additional 19.4 gigawatthours of green power was purchased for facilities in GSA's Intensive Category. The remaining 11.4 gigawatthours were purchased for facilities that are exempt.

GSA attempts to include the option for renewable purchases in all competitive procurements issued, and exercises the option when it makes sense. The use of Renewable Energy Certificates has become the most viable choice for these purchases.

Petroleum

GSA has traditionally encouraged the reduction in the use of petroleum-based fuel as far back as the 1973/1974 oil embargoes. From the 1975 former base year to the 1985 present base year, GSA reduced oil use from approximately 18.5 million gallons in Federally owned buildings to about 7.6 million gallons in 1985 in both owned and leased buildings. From 1985 to 2005, GSA petroleum-based fuel use in buildings dropped by 95 percent, from 7.6 million to 0.38 million gallons.

Water Conservation

GSA's water consumption for FY 2005 is estimated to be 4.5 billion gallons. This represents consumption for GSA's entire owned facility inventory. The cost of this consumption was \$25.6 million dollars. This cost also includes sewage charges.

In FY 2005, GSA funded and implemented several water conservation projects. The New England Region implemented a condensate heat recovery at the JFK Federal Building in Boston, in which 100 percent of domestic hot water needs are provided by the heat recovery system. Excess condensate is circulated through an ice-melt system that cools the heated condensate to ground. During the winter months, when outside conditions call for it, the energy management system directs heated condensate to the ice melt system keeping the perimeter areaway dry and non-slip.

GSA also funded a water conservation project at Federal Building in Austin, Texas to install 39 waterless urinals.

GSA finalized a Water Management Guide in FY 2000, which is posted on the GSA Energy Center of Expertise's website for use by any Federal agency (www.gsa.gov/pbs/centers/energy). GSA facility and project managers continue to make use of this valuable tool. This guide provides comprehensive guidance on how to meet the requirements of Executive Order 13123, from detailed descriptions of water conserving technologies and principles and how to measure water use and develop a water management plan to economic analysis and innovative financing options. The guide makes reference to the FEMP Best Management Practices (BMPs) that were developed and is referenced on FEMP's Water Management Working Group web site.

GSA utilizes a proactive approach with water management. Every GSA facility has an Operations & Maintenance plan that incorporates water management. The majority of the scopes of work for energy audits that GSA completes each year, include water conservation as well. The guidance issued that establishes a water conservation goal for Executive Order 13123, is unclear on several areas regarding when one can consider a facility complete, specifically in facilities where certain BMPs could not be implemented at all. Lastly GSA has a comprehensive maintenance program that already incorporates many of the Best Management Practices identified by FEMP into everyday requirements for maintenance at its facilities.

GSA continues to experience extreme difficulty in obtaining water consumption data for buildings located in the District of Columbia. The data comes in sometimes as much as a year behind, making it impossible to provide actual consumption data for these sites. Since the D.C. area sites comprise a large percentage of the Federal inventory, the water reporting is very uncertain.

Implementation Strategies

Life-Cycle Cost Analysis

GSA used life cycle cost (LCC) analysis as one of the primary factors in determining which energy projects to fund in FY 2005. GSA continued to train project managers in LCC analysis by conducting two training classes during the year. GSA continues to fund travel for select personnel to attend FEMP LCC analysis training classes.

Through these efforts GSA strives to make LCC analysis a part of the selection process for the majority of GSA's construction projects. In addition to being a

criteria for disbursement of dedicated energy conservation funds, other construction projects such as chiller replacements utilized this tool in the up front selection of equipment prior to issuance of the construction bid documents to ensure that the most life-cycle cost effective equipment would be installed.

With very rigid and streamlined budgets for capital improvements as well as new construction, ensuring that the most life cycle cost effective measures remain in the project after value engineering remains a constant challenge.

Facility Energy Audits

Comprehensive audits are performed by a variety of agents: In-house personnel, utilities, FEMP's audit contractors, and architect/engineer contractors or energy service companies.

Audits identify energy and water conservation measures. These measures are developed into energy conservation project proposals using LCC methodology. The project submissions are compiled into a database for ranking by Savings-to-Investment Ratio (SIR). As funding permits, projects are selected for approval and implementation.

Financing Mechanisms

GSA requested and received \$30 million in energy funding for FY 2005. The funded energy projects were selected based on SIR, a payback analysis, as well as projects, which assisted GSA in achieving some of the strategic goals.

As a result of the Government Accounting Office audits regarding appropriate use of energy savings performance contracts (ESPCs) that occurred, GSA conducted an internal review of policies and procedures used when making a decision to proceed with a financed energy project. Guidance regarding the appropriate use of ESPCs was issued in early FY 2006.

GSA identified maximizing the use of available alternative financing contracting mechanisms as a strategy in the FY 2005 Implementation Plan, provided the authority was reinstated. In FY 2005, GSA awarded one ESPC: Phase 2 of a previously awarded project in White Oaks, Maryland. This brings GSA's total to 32 ESPCs and 24 utility energy services contracts (UESCs) currently active and in place. GSA currently has three projects that are in various stages of development, with potential FY 2006 award for most of these.

ENERGY STAR Buildings

In 2005, GSA earned the ENERGY STAR Building Label for three additional facilities, the IRS Service Center in Austin, Texas, the U.S. Post Office and Courthouse in Texarkana, Arkansas, and the Duncan Federal Building in Knoxville, Tennessee, bringing the total of labeled buildings to 101 of its owned facilities and one leased facility.

GSA has inputted the majority of its inventory information into the label program and is using these scores as one tool to determine priorities for allocating appropriated energy funding for energy efficiency. There are many more facilities currently in the process of obtaining the label. Much of GSA's inventory is actually not eligible for the label due to excessive square footage that is not classified as office space.

Sustainable Building Design

GSA project managers and energy coordinators attend national conferences, which have tracks and sessions providing more information and assistance in incorporating sustainability into its retrofit and new construction programs.

The following GSA documents now include sustainable design guidance: The Design Excellence Program Guide, Facilities Standards for the Public Buildings Service, and GSA's Solicitation for Offers for Leasing.

While GSA has achieved salutary targets in sustainable design, no building constructed has obtained a point in the LEED system related to energy conservation. In 2006, thinking beyond LEED, GSA will propose guidance for design that tailors LEED to GSA's needs, and indeed, goes "beyond LEED" a theme that began just this year with a detailed examination of how the Alexandria Bay Border Station might be a better building than even envisioned at the highest current LEED level.

Energy Efficiency in Lease Provisions

The GSA 2005 Implementation Plan included continuing to incorporate lease provisions that encourage energy and water efficiency and sustainable design. GSA's Solicitation for Offers (SFO) for Leasing includes sustainable design guidance.

Distributed Generation

GSA has continued to investigate the potential for off-grid generation technologies whenever an energy audit or study is conducted at one of our facilities.

In FY 2005, GSA claimed the Source Use Reduction Credit for a cogeneration project at the Williams Building in Boston, Massachusetts. The credit uses the displaced grid electricity in kilowatthours per year multiplied times 8,438 Btu per kilowatthour. GSA's White Oak complex Super-ESPC, awarded in FY 2003, included a 5.8-megawatt cogeneration plant that became fully operational in FY 2005.

Additionally, GSA funded a large 1.46-megawatt combined heat and power project at 201 Varick Street in Manhattan, New York, with construction anticipated to begin in FY 2006.

Electrical Load Reduction Measures

In FY 2005, GSA continued to establish and implement electricity emergency load reduction guidance to be used by regions on an individual building basis. While a few regions took maximum advantage of local utility load response programs incorporating them into each facility strategy with great deal of success, most regions of GSA took minimum advantage of local utility load response programs. Additionally, GSA looked for opportunities to improve GSA's load management capabilities under deregulation of the electricity industry.

GSA also took advantage of the DOE Alert Audits to assist them in identifying additional load reduction opportunities.

GSA's Energy Center of Expertise developed a Tactical Curtailment plan to determine the effectiveness and appropriateness of a number of specific actions implemented in California and nationwide to provide convincing leadership in this area.

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Q. INTERNATIONAL BROADCASTING BUREAU (IBB)

Management and Administration

In the International Broadcasting Bureau (IBB), the Associate Director for Management serves as the agency Senior Energy Official. The agency energy team is comprised of the Director of Administration, staff from the Office of Engineering and Technical Services and the Office of Contracts, and the Chief Financial Officer.

Management Tools

Training and Education

Because the IBB transmitting stations are energy intensive broadcast facilities, the terms technical training and energy management training are synonymous. Because training is continuously provided for the operation of the stations' broadcast equipment, the requirements for specialized energy training are minimal.

Energy Efficiency Performance

Industrial and Laboratory Facilities

Although network energy efficiency declined from FY 2004, IBB still achieved the FY 2005 goal of a 20 percent improvement in energy efficiency as established in Executive Order 13123. In FY 2005, IBB achieved a 31.9 percent improvement in energy efficiency from the 1997 baseline.

The decrease in energy efficiency from the previous year can be partially attributed to the relocation of the medium wave transmitting facility in the Philippines. IBB used an old (1950) version Continental Electronics medium wave transmitter as a substitute when the Harris 1,000-kilowatt medium wave transmitter was relocated. Network energy efficiency declined because the substitute transmitter employed old technology and was much less energy efficient.

Throughout the year, each transmitting station manager was required to document steps taken to increase energy efficiency and save money. This year's efforts included the use of new energy efficient lamps for light fixtures, installation of solar water heating units, acquisition of ENERGY STAR products and appliances, installation of photocells, and the installation of on/off switches for street lighting.

In addition to these energy initiatives, IBB was tasked with the President's September 26, 2005 Memorandum to conserve energy due to shortages as a result of Hurricane Katrina. IBB responded favorably to the Memorandum and was able to conserve an additional 223.0

megawatthours of electricity, 11,030 gallons of fuel oil, and 1,000 gallons of gasoline, saving approximately 2.4 billion Btu of energy.

Petroleum

IBB's primary consumers of petroleum-based fuels are the Kavala and Sao Tome Transmitting Stations. These two stations exist without commercial power and are required to generate their own electricity. At both stations, petroleum consumption depends of the broadcast schedule.

Implementation Strategies

Life-Cycle Cost Analysis

IBB uses life-cycle cost (LCC) analysis on all procurements for major broadcast equipment items. By including LCC provisions as part of the cost criteria for transmitter procurements, IBB can obtain the modern solid state broadcast equipment that provides the best value for the government.

Facility Energy Audits

IBB has implemented a policy of conducting facilities assessments of its transmitting stations. The facilities inspection teams will review energy consumption as part of their scheduled station assessments.

Financing Mechanisms

Because of the specialized nature of its mission, IBB has not yet found an instance where the use of either an energy savings performance contract or utility energy services contract appears to be cost effective. IBB will continue to consider the future use of these alternative financing mechanisms.

ENERGY STAR and Other Energy-Efficient Products

IBB endorses and continues the use of ENERGY STAR products. In fact, energy efficiency becomes a prime consideration in the majority of IBB's equipment procurements.

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R. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Management and Administration

The National Aeronautics and Space Administration (NASA) Administrator has designated the Assistant Administrator of the Office of Infrastructure and Administration, as the Senior Energy Official responsible for meeting the goals and requirements of Executive Order 13123. The Senior Official is responsible for providing agency-wide executive and functional leadership, oversight, guidance, coordination, and advocacy for agency logistics, industrial relations, facilities, environmental management and energy efficiency programs, aircraft management, quality management systems, headquarters operations, NASA Employee Exchanges, and management policy directives, systems, and controls. The Senior Official also represents NASA on the Interagency Energy Policy "656" Committee.

NASA's Energy Efficiency Panel (EEP) provides an agency-level forum to guide the planning and implementation of energy efficiency activities, including energy and water conservation, greenhouse gas reduction, and use of renewable energy sources. EEP membership includes the following:

- Director, Environmental Management Division, Chair;
- NASA representative to the Interagency Energy Management Task Force, Executive Secretary;
- A representative of the Facilities Engineering and Real Property Division;
- A representative from each Mission Directorate, the Office of the Chief Financial Officer, and the Office of Procurement;
- The designated Energy Managers of each NASA Center and Component Facility;
- A Center Facilities Engineering representative for each Mission Directorate; and
- Representatives from the Office of the General Counsel and the Institutional Management Office to serve as non-voting advisors to the EEP.

The EEP supports the Environmental and Energy Management Board (EEMB) for research and implementation of energy programs, issues, and initiatives. Significant issues and initiatives identified by the EEP requiring agency-wide capital investments or investment policy to achieve or sustain compliance with Federal energy efficiency and water conservation goals and objectives are presented to the Operations Management Council through the EEMB.

Management Tools

NASA employed the following management initiatives and tools to promote effective energy and water management:

- NASA directive NPR 8570.1, Energy Efficiency and Water Conservation Technologies and Practices, provides agency-wide procedures and guidelines for meeting the requirements and goals of Executive Order 13123, using alternative financing, and evaluating renewable energy and water conservation opportunities.
- Program Operating Plan guidance was issued to NASA Centers and Component Facilities for including energy efficiency funds in their FY 2007 budget requests.
- The NASA Headquarters Environmental Management Division conducted six Energy and Water Management Functional Reviews during FY 2005. These Reviews were performed at Marshall Space Flight Center, Goddard Space Flight Center, Wallops Flight Facility, Langley Research Center, Goldstone Deep Space Communications Complex, and the Jet Propulsion Laboratory.

Awards

NASA has developed the Blue Marble Award, an Agency Environmental/Energy Awards Program to recognize accomplishments in implementing all of the Greening the Government Executive Orders; the award program's first call for nominations will occur in FY 2006. NASA continues to be an active participant in the Department of Energy (DOE) Federal Energy and Water Management Awards program. In addition, most NASA Centers and Component Facilities recognize employee contributions to energy and water savings through established employee suggestion programs by issuing awards and monetary rewards based on savings achieved, and by recognizing employee contributions in internal news publications. The following specific activities were pursued:

- NASA received a 2005 Federal Energy and Water Management Award in the renewable energy category for the Kennedy Space Center Solar Thermal Pilot Project that uses the sun's heat to offset electricity consumption for regenerating dehumidification desiccant.
- NASA named one new Energy Champion and featured a new Federal Energy Saver Showcase facility in FY 2005, for a total of 24 NASA Energy Champions and three Projects since the DOE Federal Energy Management Program (FEMP) initiated this program in FY 1998.

- The Kennedy Space Center Environmental Program Branch manages two award programs for Center employees and contractors. The Catch an Environmentalist Award is a quick recognition program managed by the Environmental Program Office to reinforce positive behaviors. The Environmental & Energy Award is a biannual competition conducted by the Center Awards Office. This award recognizes significant achievements in all areas of environmental and energy management, and in FY 2005 the program recognized HVAC maintenance technicians for restoring energy efficiency to a facility that had developed a control problem.
- The Kennedy Space Center Joint Base Operations Support Contractor continued its Energy Achievement Goals for Life and Environment (EAGLE) Award program to recognize employee contributions to energy and water efficiency and environmental improvement. In FY 2005, the program recognized the boiler plant foreman for operational efficiency improvements that reduced natural gas consumption.
- Ames Research Center supports pollution prevention and energy conservation awards, and provides cash awards to winners.

Training and Education

NASA employees attended a variety of training opportunities to further improve the knowledge base of its workforce. Opportunities included topics such as natural gas procurement and cost control, pumping systems, sustainable building design and Leadership in Energy and Environmental Design, large motor soft starts, building design energy analysis, indoor air quality, distributed energy, energy awareness, energy audits, life-cycle cost analysis, water conservation, renewable energy resources, and alternative financing. In addition to the above-mentioned training, NASA completed the following additional activities to help ensure that all appropriate personnel receive training for energy and water management requirements:

- NASA conducted a Sustainable Design of Facilities (SDF) course at Kennedy Space Center during FY 2005. The SDF course was developed to give energy and facilities management professionals the knowledge and skills required to successfully implement sustainable designs in new and renovation construction projects.
- Several NASA Centers hosted employee energy awareness activities as part of October Energy Awareness Month and Earth Day observances.
- NASA Headquarters continued broadcasting recurring energy conservation messages to all employ-

ees via the Headquarters Information Television closed circuit system.

- Twelve NASA and contractor energy-related personnel attended the Energy 2005 Workshop, one of whom supported planning and implementation of conference sessions, and one of whom presented at a session.
- Approximately 37 NASA employees and contractors received energy and water management training through NASA- and FEMP-sponsored courses, industry conferences, and commercial or academic sources at a cost of approximately \$117,500.

Showcase Facilities

NASA nominated and DOE recognized newly constructed Building 4600 at Marshall Space Flight Center as a Federal Energy Saver Showcase facility in FY 2005. The building's east-west orientation and sun shades minimize sun exposure, while an open floor plan allows for an abundance of natural light. Other energy-saving features include light sensors, photovoltaic roof panels that provide about 5 percent of the facility's power, photovoltaic parking lot lighting, and a reflective white ENERGY STAR roof membrane. Waste water from the campus chiller plant is distributed to a retention pond for irrigation, saving 3.5 million gallons of potable water annually. More than 85 percent of construction waste was re-used or recycled, and 20 percent of the building material is made of recycled content. Low-Volatile Organic Compound (VOC) materials, efficient air flow, and greater access to daylight and views provide a healthy and productive interior work environment. NASA's two previous Showcase Facilities are the Project Engineering Facility Building 4203 at Marshall Space Flight Center designated in FY 1996, and the Aircraft Maintenance Hangar Building 1623 at Dryden Flight Research Center designated in FY 2001.

Energy Efficiency Performance

In FY 2000, NASA realigned its facility designations and historical energy consumption baselines to comply with the definitions and goals established by Executive Order 13123 for the three new categories of Federal buildings and facilities. These categories are:

- Standard buildings/facilities subject to Section 202, Energy Efficiency Improvement Goals. NASA refers to these as Non-Mission Variable (NMV) buildings.
- Industrial, laboratory, research, and other energy-intensive facilities subject to the goals of Section 203, Industrial and Laboratory Facilities. NASA refers to these as Energy-Intensive Facilities (EIF).

- Exempt facilities as defined under Section 704. NASA refers to these as Mission Variable (MV) facilities.

Standard Buildings

In FY 2005, NASA reported a 30.4 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. NASA received credit for purchases of 272.5 billion Btu of renewable energy. This lowered the energy intensity of its standard facilities from 191,052 Btu per square foot to 178,860 Btu per square foot.

Industrial and Laboratory Facilities

NASA has elected to use Btu per gross square foot as the agency-wide aggregate performance measure for these facilities. However, NPR 8570.1 establishes other performance measures, such as Btu per Production Unit per Degree-Day, Btu per Tracking Hour, and Btu per Gross Cubic Foot for individual industrial facilities, space flight tracking stations, and clean rooms.

After removing credit received for 165.4 billion Btu of purchased renewable energy, the average energy intensity for NASA's EIF facilities was 271,710 Btu per gross square foot at the end of FY 2005, as compared to the FY 1990 baseline value of 323,972 Btu per gross square foot. This represents a 16.1 percent decrease, which falls short of the required 20 percent reduction for FY 2005 due in part to including buildings in the category that would more appropriately have been exclusions. NASA plans to address this as the agency responds to EPA's 2005's requirements of re-baselining to FY 2003 and eliminating the Energy Intensive Facilities category.

Exempt Facilities

In FY 2005, only 5.2 million gross square feet, or 13.1 percent, of NASA facility square footage is designated as exempt. These facilities are highly specialized and energy intensive, having been constructed for specific space flight and research programs. Examples are wind tunnels driven by multi-thousand horsepower electric motors, space simulation chambers, and space communication facilities. The facilities range from pre-World War II aeronautical test installations to new facilities that support the Space Shuttle and International Space Station programs. Energy consumption in these facilities varies directly with the level and intensity of program activities. Concise justifications are provided for each MV facility exemption to explain why it is either technically infeasible to implement energy efficiency measures or to apply conventional performance measures due to the overwhelming proportion of process-dedicated energy consumed in these facilities.

NASA adopted an internal goal to improve the energy efficiency of exempt MV facilities, where cost effective and without adversely affecting mission performance, by 10 percent by FY 2005 compared with FY 1985 levels. Due to the unique nature of their design and operation, wind tunnels are excluded from this goal. After removing purchased renewable energy, the average energy intensity for NASA's exempt MV facilities was 271,443 Btu per gross square feet at the end of FY 2005, as compared to the FY 1985 baseline value of 310,000 Btu per GSF. This represents a 12.4 percent decrease, which is better than NASA's internal goal of 10 percent reduction for FY 2005.

Renewable Energy

NASA increased its use of self-generated and purchased renewable energy by 82 percent from FY 2004 to FY 2005. This increase resulted in an amount of renewable energy use equivalent to 8.4 percent of NASA's electricity consumption, which well exceeds the FY 2005 goal of 2.5 percent.

Self-Generated Renewable Energy

NASA's use of self-generated renewable energy is not directly metered, and the quantity produced is relatively small.

Two NASA sites installed new photovoltaic systems in FY 2005, which more than tripled NASA's on-Earth use of photovoltaics:

- The Marshall Space Flight Center Building 4600 roof-mounted array produces about 5 percent of the facility's power; the system can serve 30 kilowatts of load under optimal insulation conditions. The parking lot lighting at this facility utilizes an additional nine kilowatts of photovoltaics.
- At the Kennedy Space Center landfill, which is not connected to the Center's electrical distribution system, KSC installed a 5-kilowatt photovoltaic modular autonomous power system to replace two diesel generators that ran five days per week to power landfill operations.

NASA also continues to generate renewable energy from the following:

- Marshall Space Flight Center 2-kilowatt solar parking lot lighting at the Wellness Center, Building 4315.
- Ames Research Center has 10 kilowatts of rooftop photovoltaic arrays in operation.
- Kennedy Space Center 1.05-kilowatt photovoltaic system for lightning sensing equipment at Field-Millsite #18. The system replaced a diesel generator that was operated continuously to provide

power to an area that had been disconnected from the Center's distribution grid.

- White Sands Test Facility Sewage Lagoon Aerators. This project utilizes wind-powered turbines to produce compressed air and replaces four 5-horsepower continuously run electric motors.
- Kennedy Space Center continues to offset electric resistance heating using evacuated tube heat pipe solar collectors to generate hot water to regenerate a desiccant dehumidification wheel at the Film Storage Building.

NASA continues to study potential additional applications of renewable energy technologies:

- White Sands Test Facility has an ongoing study to determine the feasibility of developing wind power and solar power to run environmental remediation systems.
- Wallops Flight Facility is nearing completion of an extensive wind power study to determine the feasibility and costs for implementing a wind turbine to provide a portion of the facility's electrical power. This work is in conjunction with James Madison University under a grant from the DOE.
- Goldstone Deep Space Communications Complex has contracted for support to collect wind data from atop a windy ridge within the Complex.
- Florida Power & Light has approached Kennedy Space Center and neighboring Cape Canaveral Air Force Station to consider a wind-driven electricity generation project.

Purchased Renewable Energy

NASA has focused its efforts on purchasing renewable energy from sources that are cost-competitive with conventional energy sources. The following purchases qualify for reporting:

- Goddard Space Flight Center continues to minimize its natural gas and fuel oil consumption by utilizing landfill methane from the local county landfill. Purchasing landfill methane rather than conventional fuels resulted in a \$2 million cost avoidance in FY 2005.
- Johnson Space Center began purchasing the equivalent of 20 percent of its incoming electricity from Renewable Energy Certificates (RECs). These RECs cover the incremental cost of generating electricity from biomass, specifically municipal solid waste, which was only \$16,000 per year or a \$0.0004 per kilowatt-hour premium.
- Dryden Flight Research Center purchases electricity from Edwards Air Force Base, which obtains 65 percent of its electrical power from renewable sources.

NASA also purchases energy from renewable sources that does not qualify for reporting against metrics:

- A portion of Ames Research Center's electricity is from Pacific Gas and Electric, whose generation mix is 13 percent renewable.
- The Jet Propulsion Laboratory and Goldstone Deep Space Communications Complex both purchase electricity from Southern California Edison, whose generation mix is 20 percent renewable.
- Langley Research Center purchases electricity from Dominion Virginia Power, whose generation mix is 3.4 percent renewable.
- Langley Research Center purchases steam generated from municipal solid waste, but this plant was built before 1990 and hence does not qualify.
- Marshall Space Flight Center purchases steam partially generated from municipal solid waste, but does not have a means of distinguishing renewable from conventional energy.

Petroleum

NASA reduced facility petroleum use by 66.4 percent since FY 1985. The following projects were undertaken to further reduce NASA's use of petroleum in facilities and transportation uses:

- Goldstone Deep Space Communications Complex reduced its on-site power generation requirement for distant spacecraft communication operations, which will decrease diesel consumption roughly 120,000 gallons per year.
- Marshall Space Flight Center has contracted with a consultant to select and design boiler modifications for burning biodiesel fuel (B20) in two boilers in Building 4567, which will save approximately 36,000 gallons of fuel oil annually.
- Marshall Space Flight Center plans to purchase ethanol motor fuel (E10) to be used for all fleet vehicles in response to the Presidential Memorandum of September 26, 2005. The E10 initiative requires no infrastructure modifications, and is expected to conserve 865 gallons of gasoline annually.
- White Sands Test Facility converted an existing gasoline storage tank to be compatible with ethanol motor fuel (E-85) and acquired 31 vehicles from GSA in preparation for FY 2006 E-85 fuel procurement.
- Kennedy Space Center's renewable energy project directly replaces two diesel generators.

Water Conservation

NASA used 2.2 billion gallons of potable water in FY 2005, compared with 2.3 billion gallons in FY 2000, a 4.8 percent decrease. Water management plans are in place and at least 4 of the DOE Best Management

Practices for Water have been fully implemented at 28.6 percent of Centers and Component Facilities. Centers implemented the following water conservation activities in FY 2005 to comply with Executive Order 13123 requirements:

- Goddard Space Flight Center awarded a UESC project to fund toilet replacements Center-wide and reduce water use by two gallons per flush. In addition, maintenance costs will decrease from the installation of new equipment.
- Goldstone Deep Space Communications Complex refurbishment of an administrative building included upgrading to waterless urinals, low flow toilets, and low flow faucets.
- Jet Propulsion Laboratory expanded use of low-flow devices in various buildings.
- Marshall Space Flight Center is continuing its efforts to identify and eliminate all once-through cooling systems, such as 2.6 million gallons per year at Building 4711.
- White Sands Test Facility reduced water consumption by switching to digital photography and thereby eliminating wet film photographic processing's water use for print rinsing and single-pass cooling.

In addition, Langley Research Center plans to replace high-flow fixtures with low-flow fixtures (73 urinals and 107 faucet aerators) and is conducting a Preliminary Engineering Report to reduce city water consumption for laboratory cryogenic pump cooling.

Implementation Strategies

Life-Cycle Cost Analysis

Members of the energy teams at each Center and Component Facility propose projects and surveys, which compete for funding along with other Center requirements. To compete successfully, projects having energy conservation as their sole purpose must have relatively short amortization periods since construction funds are very limited and there are many other high priority projects competing for funding. Life cycle costing is the primary tool for analyzing energy retrofit projects. Full economic analyses are performed for all construction and revitalization projects in excess of \$1.5 million in accordance with OMB Circular No. A-94. NASA Policy Directive (NPR) 8820.1, "Design and Construction of Facilities" establishes this requirement.

Facility Energy Audits

NASA is required to complete facility audits for 10 percent of its building square footage each year beginning March 1994. NASA Headquarters provided guidance to Centers and Component Facilities indicating

the level of auditing that will be required for different types of facilities, recommendations on which mission variable facilities could benefit from comprehensive audits, and suggested criteria for determining audit priorities. Using this guidance, Center energy managers developed plans to perform the audits. NASA has completed audits for 114 percent of its total building square footage (includes square footage re-audited). This includes 101 percent of gross square feet for standard buildings and 139 percent of gross square feet for industrial and exempt facilities. NASA Centers will continue to employ current strategies to target facilities for additional audits and opportunities to reduce energy and water use.

Financing Mechanisms

NASA made continued progress in implementing energy savings performance contract (ESPC) and utility energy services contract (UESC) delivery orders. NASA awarded two UESC projects in FY 2005 for an approximate investment value of \$4.2 million. These projects reduce water, electricity, and natural gas consumption and costs and associated maintenance costs by replacing flush valves for toilets and urinals with water saving units, replacing boilers and chillers with right-sized new equipment, upgrading HVAC equipment and controls, and implementing automated load shedding to reduce electrical peak demand. To date, NASA has awarded ten ESPC and seven UESC delivery orders at seven locations (Ames Research Center, Glenn Research Center, Goddard Space Flight Center, Johnson Space Center, Kennedy Space Center, Stennis Space Center, and Wallops Flight Facility), and participated in DOD-managed ESPC and UESC contracts at two Centers (Dryden Flight Research Center and Kennedy Space Center). These actions have resulted in \$45.6 million in energy improvements for NASA facilities that are saving \$6.2 million annually. Additionally, the Jet Propulsion Laboratory is set to award an ESPC contract in early FY 2006 which will include lighting and HVAC retrofits.

ENERGY STAR and Other Energy-Efficient Products

NASA Centers and Component Facilities are actively procuring energy efficient goods and products that are the most cost-effective, considering the life cycle, pursuant to the requirements of the Federal Acquisition Regulations. In FY 2005, NASA Centers and Component Facilities continued to install high efficiency electrical products such as liquid crystal display (LCD) and other ENERGY STAR-rated computer monitors, dry transformers, variable frequency drive systems for fans and pumps, high efficiency fluorescent lamps, electronic ballasts, compact fluorescent lamps as replacements for incandescent bulbs, light emitting diode

(LED) and other low power consumption exit lights, and occupancy sensors. NASA took the following actions in FY 2005 to purchase ENERGY STAR and other energy-efficient products:

- Goldstone Deep Space Communications Complex modified procurement procedures to ENERGY STAR and FEMP-designated products; Johnson Space Center plans a similar approach through issuance of a Common Work Instruction via International Standards Organization 9000, and Langley Research Center's Office of Procurement ensures purchases comply.
- Several Centers updated local operating instructions and technical reference standards to ensure purchase of energy efficient products.
- Kennedy Space Center's base operations contractor purchased 300 LCD energy efficient computer monitors.
- Marshall Space Flight Center is implementing a network-based Verdiem software system to monitor and initiate a sleep mode for computers during times when not in use.

ENERGY STAR Buildings

Two NASA buildings have received the ENERGY STAR label. No new ENERGY STAR buildings were designated in FY 2005, but NASA plans to review actual energy consumption of newly constructed or significantly renovated facilities to determine if they qualify. Buildings under consideration include Kennedy Space Center's Operations Support Building 2 and future Life Support Facility, and Marshall Space Flight Center's new Building 4600.

Sustainable Building Design

NASA continued implementing an integrated sustainable design policy that combines the traditional sustainability concepts of the Whole Building Design Guide with building commissioning, design for maintainability, safety, and security. Detailed implementation procedures and guidelines have been developed and integrated into the Agency's facilities project implementation process. A companion in-house training course has also been continued in FY 2005. The Centers continued work on several facility project designs that incorporate sustainable design features. Some examples include:

- Marshall Space Flight Center was previously recognized by the design and construction industry journal, *The Construction Specifier*, for its work to obtain Leadership in Energy and Environmental Design (LEED) certification for the MSFC Replacement Office Building 4600 (described in Section I.B.4 Showcase Facilities). Construction is

complete, and the facility is expected to be NASA's first LEED-certified building.

- Johnson Space Center completed construction of the replacement Astronaut Crew Quarters in FY 2005, and is pursuing LEED certification. Sustainable features include designing the landscape & exterior to reduce roof heat islands, reducing energy consumption over ASHRAE minimum performance building, using 100 percent Green-e electrical power - twice the LEED minimum required to achieve the Green Power Credit, storing and collecting recyclables during occupancy, using low VOC adhesives, paints and carpets, installing ultraviolet lights in air supply ducts to improve indoor air quality by reducing mold and bacteria, using 100 percent recycled steel in the structure and concrete reinforcing and flooring material made from used tires, and installing a Pre-treated Outside Air System that cools down and/or warms up incoming air using building exhaust.

Energy Efficiency in Lease Provisions

This strategy is of only minor importance to NASA since leased space represents about 1.5 percent of NASA's total building inventory.

Industrial Facility Efficiency Improvements

NASA completed a number of projects in FY 2005 to improve the energy efficiency of standard and energy-intensive industrial facilities. The majority of projects fall into the following categories:

- HVAC system modernization including replacement of inefficient chillers, installation of variable air volume systems and removal of constant volume, terminal reheat systems.
- EMCS upgrades and expansions to monitor and control heating and cooling apparatus startup and shutdown, fluid temperatures and pumping rates, use of outside air for cooling and ventilation, electrical demand limiting, and optimization of equipment operation.
- Lighting and electrical system efficiency improvements including lighting upgrades, re-lamping projects, power factor correction, and installation of metering equipment.
- Weatherization and other energy conservation measures involving the building envelope, including repair and upgrade of roof and wall insulation.
- Improved operations and maintenance programs focusing on low-and no-cost operational changes, reliability-centered maintenance, and computerized maintenance management systems.
- Metering and monitoring system improvements.

Specific project examples undertaken in FY 2005 are listed below:

- Dryden Flight Research Center completed decommissioning a boiler plant and installed high-efficiency localized flash boilers.
- Glenn Research Center is repairing aging natural gas distribution infrastructure and replaced windows in a facility.
- Goddard Space Flight Center utilized Johnson Controls to study HVAC optimizations, which might lead to a 5 percent reduction in HVAC energy consumption.
- Jet Propulsion Laboratory implemented lighting retrofits.
- Kennedy Space Center implemented lighting upgrades, programmable thermostats and interlocked damper controls, HVAC pre-treatment upgrades, air handling unit replacements, securing unnecessary HVAC equipment, and damper replacement.
- Langley Research Center installed an integrated boiler control system to improve communication and coordination between the Refuse-Fired Steam Generating Facility and the main steam plant. The control system will allow more efficient operation of the two plants.
- Marshall Space Flight Center improved a building's chilled water system efficiency by programming setback space temperatures, installing direct digital controls for the chiller plant, and optimizing chiller plant operation. This Center also installed a steam trap monitoring system connected to the Utility Control System, which monitors steam trap failures and provides an early warning of which traps need replacement.
- Many Centers continue to upgrade utility metering and information systems. Ames Research Center installed electrical metering at 24 buildings. Johnson Space Center upgraded electricity and natural gas metering at the physical plant for increased plant efficiency and cost effectiveness. Kennedy Space Center is upgrading hot and chilled water monitoring, palm computer meter data collection devices, and utility data reporting systems. Langley Research Center upgraded 8 meters and associated communication capability. Marshall Space

Flight Center installed two water meters and tied them into the Utility Control System for remote monitoring.

Electrical Load Reduction Measures

NASA completed the following actions in FY 2005 to reduce peak demand for electricity, particularly in areas experiencing short-term electricity shortages:

- Several Centers actively utilize load shedding plans to reduce demand, including Ames Research Center, Goddard Space Flight Center, Kennedy Space Center, Langley Research Center, and Michoud Assembly Facility.
- Goddard Space Flight Center, Kennedy Space Center, and Wallops Flight Facility utilize automated control system load rolling algorithms to reduce demand peaks.
- In addition to automated mechanisms, Goddard Space Flight Center and Kennedy Space Center utilize messages to all-hands during load control events to obtain reductions by users.
- Ames Research Center, Glenn Research Center, and Kennedy Space Center are reviewing building energy profiles in stand-alone and networked controls systems, and are taking actions to increase conservation profiles.
- Many Centers utilize Reliability Centered Maintenance practices to keep equipment such as chillers, boilers, pumps/motors, electrical switchgear, etc. operating safely and efficiently.

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R. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

Management and Administration

The Senior Energy Official for the National Archives and Records Administration (NARA) is the Assistant Archivist for Administration, who provides senior management level direction and guidance of overall strategic energy goals and incentives and ensures that the agency energy plan goals are incorporated into the budget process. The agency energy team will continue to refine the agency energy plan and to identify opportunities for improvement. Additionally, the team will keep senior management apprised of the status of agency Executive Order 13123 implementation and make recommendations as necessary. All modifications/renovations to the facilities will be reviews for possible energy savings opportunities.

Management Tools

Awards

In concert with the overall agency awards plan, employees may be granted awards (monetary and time off) for exceptional performance in implementing Executive Order 13123. Outstanding achievements will be recognized during the annual Archivist's Special Achievement awards ceremony.

Training and Education

Several members of the agency energy team attended the Energy 2005 Workshop in Long Beach, California. Several members followed the alternative financing track.

Energy Efficiency Performance

Exempt Facilities

The Archives I (AI), Archives II (AII), 11 Presidential Libraries, Southeast Record Center and Ford Museum are designated as exempt facilities because conventional performance measures are rendered meaningless by an overwhelming proportion of process-dedicated energy. This criteria is met due to the large percentage of gross square footage of NARA's holdings dedicated to "stack" space. These spaces have extremely strict 24/7 environmental (temperature & humidity) standards.

Water Conservation

Strong water conservation measures continue at NARA. A pilot waterless urinal program is currently underway. Waterless urinals have several published pros and cons and NARA is evaluating them for more extensive use after the test period. Low flow shower heads were installed in all locker rooms at AI and AII.

Several water conservation measures have been included in the Detailed Energy Study performed on AII and under consideration.

Implementation Strategies

Life-Cycle Cost Analysis

With the ongoing renovation of the AI building, the design engineers have specified energy efficient (ENERGY STAR-compliant) equipment to replace any equipment removed. In the other buildings, NARA continues to look for ways to reduce energy consumption and any major pieces of equipment that are replaced are updated with the latest energy efficient equipment.

Facility Energy Audits

AII was audited in FY 2005 and NARA is evaluating the Detailed Energy Study in anticipation of awarding a Super ESPC.

Financing Mechanisms

Most improvements at NARA buildings are financed through appropriated funds for specific projects (such as the Southeast Regional Archives). The DOE Super ESPC contract was used in the past to perform some energy savings projects at NARA facilities (Eisenhower and Reagan Libraries) and review of other opportunities is forthcoming to save energy utilizing these contracts. A new ESPC financed project is beginning construction at the Johnson library and Ford library.

ENERGY STAR and Other Energy Efficient Products

All equipment and products specified in the AI building renovation are ENERGY STAR or energy efficient products. All new computer hardware purchased by the agency must have an ENERGY STAR designation.

Sustainable Building Design

Sustainable building design criteria and principles were used during the design of the Regional Archives and Record Center in Anchorage, Alaska.

Energy Efficiency in Lease Provisions

In the past, NARA has leased space through the General Services Administration, relying on their expertise in leasing energy efficient space. NARA has leased new space in Atlanta and California for Regional Records Centers to be compliant with 36CFR1228. NARA has begun a new lease for the Southwest Region Federal Record Center. Most of the facilities will house temporary records which will have the minimal

conditioned space requirements. Pre-archival materials will have to be maintained in space that will assure its preservation. That space will be conditioned in a manner similar to that of AI or AII.

Distributed Generation

NARA is in the process of installing a new emergency generator at the Gerald R. Ford Museum. This generator is sized larger than the one being replaced due to increased demand from the addition being constructed to the museum and the additional demand required by the current building codes. The generator is sized only large enough to meet the emergency requirements of the museum and is not eligible for grid connection.

Electrical Load Reduction Measures

NARA is a voluntary member of the PEPCO load reduction program during high demand situations.

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T. NUCLEAR REGULATORY COMMISSION (NRC)

Management and Administration

In the Nuclear Regulatory Commission (NRC) the Senior Energy Official's responsibilities consist of developing policies and procedures for the Implementation of Executive Order (EO) 13123. An agency energy team was established in FY 2000 consisting of procurement, legal, budget, management, and technical representatives. The team is responsible for expediting and encouraging the use of appropriations, energy savings performance contracts, and other alternative financing mechanisms necessary to meet the goals and requirements of Executive Order 13123.

Management Tools

Awards

NRC's award program will be used to reward exceptional performance in implementing Executive Order 13123.

Energy Efficiency Performance

Standard Buildings

In FY 2005, NRC reported a 3.9 percent decrease in energy consumption for its One White Flint North (OWFN) facility compared to its FY 1989 baseline year, and a 6.8 decrease for its Two White Flint North (TWFN) facility as compared to its FY 1996 base year.

Renewable Energy

Self-Generated Renewable Energy

Energy audits conducted in FY 2000 concluded that self-generated renewable energy production at OWFN and TWFN is not economically feasible.

Water Conservation

In FY 2005, water consumption at OWFN was 9.5 million gallons, at a cost of more than \$87,700. At TWFN, consumption was over 11.9 million gallons, costing \$105,800.

Implementation Strategies

Life-Cycle Cost Analysis

In FY 2005, GSA identified the need to install a direct digital control (DDC) system at the OWFN building. The DDC will manage, monitor, and control HVAC equipment to ensure optimum operation and energy reduction. As part of its funding justification and design requirements, GSA will conduct a life-cycle cost analysis to determine the expected useful life of a DDC system and the projected payback period.

ENERGY STAR and Other Energy Efficient Products

NRC is not responsible for the construction of buildings. However, all specifications for renovation projects performed by NRC are developed to ensure that, when applicable, energy efficient equipment and systems are incorporated into the renovation design. Additionally, the building operation and maintenance contract specifications for OWFN and TWFN have been updated to ensure that all building support replacement products and components are energy efficient. The NRC's Affirmative Procurement Program for Recovered Materials provides Internet links to online training for Federal purchase card users on ENERGY STAR and other energy efficient acquisitions.

Energy Efficiency in Lease Provisions

NRC is not responsible for the formulation or negotiation of leases. GSA serves as the leasing agent for all NRC facilities. However prior to the execution of the new lease at the NRC's Warehouse, located in Rockville, Maryland, NRC reviewed the lease documents and recommended the lease be in compliance with the Model Lease Provision of Executive Order 13123.

Distributed Generation

During a preliminary energy audit in FY 2003 by PEPCO Energy Services and an independent contractor, distributed generation systems were considered economically unfeasible.

Electrical Load Reduction Measures

NRC participates in the PEPCO Load Curtailment Program. During high demand periods, NRC, at the request of PEPCO, reduces its energy load by securing non-critical building support equipment. Additionally, an employee awareness program is in place which encourages to secure extraneous appliances at work stations during high demand periods.

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U. RAILROAD RETIREMENT BOARD (RRB)

Management and Administration

The Railroad Retirement Board (RRB) has made extensive efforts in reducing energy consumption and establishing an energy policy that will ensure compliance with the energy reduction goals established by Executive Order 13123 and National Energy Conservation Act and Energy Policy Act of 1992 (NECPA/EPACT). The agency strictly enforces the energy guide established by the energy conservation plan which was developed in March of 1993. This report demonstrates that RRB has made tremendous progress in meeting the energy goals established by the 1985 baseline, and it will continue in its efforts to meet or exceed the goals established for 2010.

The present Board Orders issued by the RRB specify the responsibilities and involvement of management in the direction of the energy conservation program. The Director of Administration is designated as the energy conservation coordinator and is responsible for overseeing and supervising the RRB's conservation practices. The Director of Administration is also the designated senior energy official and is responsible for administering the RRB's energy program to ensure all aspects of RRB's energy conservation plan are effectively implemented. The Facility Manager is designated the responsibility to carry out the implementation of the energy program as directed by the senior energy official.

Bureau Heads, Managers, and Supervisors are responsible for ensuring that established energy conservation procedures to conserve energy in their work areas are consistently followed by the personnel they supervise. This includes ensuring that appropriate efforts are made. This includes, but is not limited to, the reduction of unnecessary lighting, abiding by established air temperatures, and the judicious use of motor vehicles for official business.

Management Tools

Training and Education

In accordance with the energy management training provision of the EPACT, personnel responsible for energy management will receive the additional training that is to be provided by the General Services Administration (GSA) under the EPACT requirements. This training includes FEMP sponsored seminars. Seminars offered this year included a workshop on utility acquisitions sponsored by GSA.

Energy Efficiency Performance

Standard Buildings

In FY 2005, RRB reported a 22.8 percent decrease in energy consumption from FY 1985 for its standard buildings when measured in Btu per gross square foot. The decrease of almost 3.2 percent from FY 2004 to FY 2005 was a significant accomplishment considering that increased building operating hours were continued as part of an expanded flexible time program. Operating hours have increased 18.2 percent since establishment of the original 1985 baseline.

The RRB headquarters in Chicago, Illinois is the only building over which the RRB has operational control. The RRB operates and maintains the building under a delegation of authority agreement established April 1, 1986 with GSA. This agreement is currently being updated and a newly signed agreement is anticipated in FY 2005.

Renewable Energy

Self-Generated Renewable Energy

GSA, as the government owner of the RRB building, has the responsibility to fund all projects and facility improvements over \$50,000. As part of the GSA inventory, all self-generated renewable projects and solar roof projects of this type would fall under the jurisdiction of GSA based on this delegation of authority agreement.

Purchased Renewable Energy

In FY 2005 RRB participated in partnership efforts with GSA Region 5 in an Illinois Electric Solicitation. This solicitation had a component which included a portion of the power to be electricity generated from renewable energy sources. This contract began May 1, 2002 and was awarded to Exelon Energy Corporation. RRB purchased 46.0 megawatthours of renewable power in FY 2005 and expects to purchase the same in FY 2006.

Water Conservation

The RRB consumed 500,000 gallons of water in FY 2005 at a cost of \$12,929. As required by Executive Order 13123, RRB has reduced its water consumption by 42.5 percent from the established base year. Independent water meters are installed for the first floor commercial tenant spaces which were not included in RRB's consumption total. Total consumption increased from the previous fiscal year due to construction projects. These three projects involved flushing and filling

the chilled water system several times throughout the year.

The RRB has taken great steps toward improving water conservation in its headquarters facility. In all bathrooms and lavatories, 100 percent of the sinks and urinals have automatic faucets and flush valves with reduced consumption type diaphragms. In FY 2003 the RRB received approval from the Metropolitan Sanitary District of Chicago for a reduction in sewer charges for plant water losses from the cooling tower. In FY 2005 the RRB installed automatic flush valves with reduced consumption type diaphragms on several toilets. The trial installation will be expanded to various floors in FY 2006.

Implementation Strategies

Life-Cycle Cost Analysis

RRB uses life-cycle cost analysis techniques in order to determine which projects should be considered in meeting its energy goals. Much of this analysis is done in conjunction with GSA, which is responsible for the implementation of all projects over \$50,000 in value under the current delegation of authority agreement. However, even projects under \$50,000 are only considered after careful cost analysis and determination of no more than 10-year simple pay backs. Analysis is conducted utilizing a DOE2.1E building energy simulation model as provided by DOE/FEMP. An example of how life-cycle cost analysis was used for initiating effective energy reducing construction projects was a SAV-Energy Audit performed by Architectural Energy Corporation (AEC). This audit provided various alternatives and provided a complete life-cycle cost analysis on various energy projects utilizing this DOE2.1E building energy simulation model.

Facility Energy Audits

The RRB is included as part of the GSA inventory of property. GSA schedules the energy audits for the building. In FY 2003, the RRB in conjunction with GSA and FEMP completed a SAVEnergy Audit. This Energy and Water Conservation Action Plan was performed by AEC.

Financing Mechanisms

The RRB has not entered into any ESPC contracts. The comparatively small size of potential contracts available to RRB, because of the delegation of authority agreement with GSA, is not practical for this type of procurement. However, the RRB was contacted by the Super ESPC contractor who was granted permission by the Facility Manager through FEMP to proceed with obtaining an initial proposal under the Super ESPC contract. This initial proposal is on hold pending the

active involvement and support for the project from GSA.

The RRB has successfully worked with GSA on utility energy service contracts. RRB participated in partnership efforts with GSA Region 5 in the development of an Illinois Electric Solicitation to procure electricity under a single Government contract. This resulted in procurement of electricity through Exelon Energy Corporation beginning May 1, 2002. In FY 2005 the RRB purchased all of its electric power under this contract agreement. This amounted to 4.6 gigawatthours of electricity.

ENERGY STAR and Other Energy Efficient Products

The RRB supports procurement of energy efficient products and mandates the purchase of ENERGY STAR computers and office equipment. RRB is a signatory to, and an active participant in, Planet GSA. Planet GSA includes four pillars: Buy Green, Build Green, Drive Green, and Save green. Buy Green includes purchasing products that have recycled content, are energy and/or water efficient, are bio-based, and have other attributes that make these products environmentally preferable. Buy Green also encompasses the re-use or recycling of these products. With support from DOE and the Environmental Protection Agency (EPA), RRB, through GSA, will encourage the purchase and use of ENERGY STAR products and other products that rank in the upper 25 percent in terms of energy efficiency. These same energy efficient criteria have been incorporated into all RRB/GSA guide specifications and product specifications for new construction and renovation projects, as well as all new product specification language.

Sustainable Building Design

One of the pillars of Planet GSA is Build Green. It employs sustainable design principles in all phases of Federal facilities initial design, construction, remodeling, renovation and construction waste management. Sustainable principles apply to all elements of building and landscape design; maintenance and operation activities using water, energy, and pesticides; and those activities that impact indoor environmental quality and the recycling infrastructure. RRB/GSA, in collaboration with DOE and EPA, will promote the use of energy efficiency and renewable energy technologies. In FY 2005, the RRB procured a new energy efficient HVAC system for three floors of the RRB. This new HVAC system consists of frequency drives and an automated variable air volume control system which helped to significantly reduce the electrical consumption from the previous constant volume air system. It also included providing a primary and sec-

ondary chilled water system with variable frequency drives on the chilled water pumps in lieu of previous constant volume chilled water pumping configuration. In addition, RRB recently completed installation of new micro-processor based lighting controls on several floors. These improvements will provide greater building comfort as well as help reduce electrical consumption.

Energy Efficiency In Lease Provisions

RRB regional and field locations are located in Government owned or leased commercial space. These offices comply with existing energy conservation measures specified by GSA. All leasing arrangements are made through GSA, which assures the energy efficiency in the facilities leased.

Highly Efficient Systems

GSA completed a prospectus development study for the RRB headquarters facility in FY 2002. This study included the complete renovation of the HVAC systems. It looked at the potential for a combined heat and power system for the RRB facility. RRB also had a preliminary cost analysis and feasibility study completed which looked at potential savings per year in overall utility costs from the installation of this equipment. Further analysis is planned in consideration of this project in future years.

Distributed Generation

There is presently no off-grid equipment installed at the RRB headquarters facility. In FY 2002, a preliminary feasibility study was completed by the local utility provider that looked at the feasibility of providing co-generation equipment to generate electricity for the critical loads at the RRB facility. Further analysis is needed before proceeding with this project. GSA has this project under consideration for future years.

Electrical Load Reduction Measures

The RRB signed an agreement with Commonwealth Edison, the local utility provider to participate in a load curtailment program called Voluntary Load Reduction Program (VLR). This curtailment program will enable RRB to save on electrical costs and actively help to reduce electrical load for the area. The RRB reviewed its current energy emergency plan of action. This plan will be initiated when emergency electricity load reductions are required. As part of this VLR program an energy tracking system is currently installed on all electrical meters to monitor electrical consumption and control electrical loads.

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V. SOCIAL SECURITY ADMINISTRATION (SSA)

Management and Administration

SSA's senior energy official is the Deputy Commissioner for Finance, Assessment and Management (DCFAM). The DCFAM's responsibilities are to ensure agency compliance with the goals and requirements of Executive Order 13123.

Members of the SSA energy team are responsible for identifying and implementing strategies and approaches to achieve the goals of the Executive Order and to facilitate and encourage agency usage of appropriations, energy savings performance contracts (ESPCs), and other financing mechanisms necessary in the execution of approved energy efficient activities. SSA's Agency Support Team includes members who work with the General Services Administration (GSA) to include energy efficient technologies in SSA's leased building space nationwide.

Management Tools

Awards

SSA recognizes employees nationwide whose job descriptions require energy management skills and whose overall performance or individual acts are exceptional. Many of SSA's energy and building managers received performance awards for their contributions to the energy program. SSA also recognizes individual contributions to energy savings through the employee suggestion and performance award programs.

SSA received the Department of Energy (DOE) Federal Energy Management Program's (FEMP's) 2004 Federal Energy and Water Management Award for the Annex Building for exceptional accomplishments in energy efficiency.

Training and Education

Twenty-four members of SSA's nationwide energy/support team attended the Energy 2005 Workshop. Other training attended this year included: Basic training on Super-ESPC's, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Conference and National Facilities Management and Technology Conference and Exposition. SSA staff also attend monthly and periodic meetings with GSA, DOE, and ASHRAE, and are active participants on numerous committees such as DOE's "You Have the Power" awareness campaign, ASHRAE's Standard 9.9 (Total Facilities Management), the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) implementation com-

mittee, and the Federal Environmental Stewardship and Sustainable Executive Steering Work Group.

SSA educates its employees nationwide on the need for, and benefits of, energy conservation through an awareness program via e-mail, SSA's Office of Facilities Management, Office of Realty Management's web-site and newsletters. All of SSA's delegated facilities nationwide sponsored exhibits for "Energy Awareness Month," "Earth Day" and "America Recycles Day" to promote energy conservation and publicize energy projects underway or completed. Federal purchase card users and SSA's procurement staffs have been instructed to buy only ENERGY STAR products.

Showcase Facilities

The SSA's 412,220-square foot Annex Building continues to be the agency's Showcase facility. In keeping with sustainable design practices, SSA and GSA opted to reuse the existing Annex structure rather than build a new one. In doing so, over \$25 million in new construction costs were saved and 76 percent of the building's interior was reused.

The building was designed as an open office plan to allow natural lighting to diffuse through the floor plate and to reduce the need for internal partitions. Skylights were also used to bring lighting to the interior spaces on the third and fourth floors, and efficient lights and low wattage electronic ballasts were installed throughout the building. These lighting upgrades led to a 32 percent reduction in lighting energy use.

Other building upgrades included the installation of thermal ice storage, economizers, energy efficient HVAC equipment, and auto shut-off and low flow bathroom fixtures. The building facade was replaced with new, well-insulated wall construction and the roof was significantly upgraded with a highly reflective roofing surface. These shell performance upgrades resulted in a 50 percent reduction of heating energy costs for the building.

The Annex building exceeds the requirements of ASHRAE 90.1-1999 by a total of 12.8 percent. Technologies from this LEED-rated building have been implemented in SSA's Child Care Facility and will be incorporated in the Operations Buildings Renovation Project now underway.

Energy Efficiency Performance

Standard Buildings

SSA became an independent agency in 1995; since 1996 was the first full reporting year; it serves as the base year by directive from DOE. In FY 2005, SSA reported an 11.5 percent increase in energy consumption from FY 1996, for standard buildings when measured in Btu per gross square foot. SSA received credit for purchases of 5.5 billion Btu of renewable energy. This lowered the energy intensity of its standard buildings from 99,406 Btu per square foot to 98,775 Btu per square foot.

SSA is committed to reducing energy consumption and costs in accordance with the Energy Policy Act, Executive Order 12902 and Executive Order 13123. Even though SSA has taken many steps to reduce energy, FY 2005 consumption increased by 3.3 percent from last year and increased 13 percent as compared to the baseline year. SSA's data indicates that SSA is already functioning at an extremely efficient rate with energy intensity of 98,793 Btu per gross square foot, significantly lower than other agencies that have met reduction goals.

Substantive changes in the way SSA does business continue to affect the use of its facilities and related energy costs:

- Significant and continuing increases in automation. Prior to 1995, SSA had fewer personal computers or associated equipment. SSA now has extensive national and local area networks, integrated workstations, scanners, printers and other peripherals for programmatic and operational activities. SSA continues to introduce e-business Internet applications.
- Constantly expanding hours of operation. To maintain the world-class public service for which SSA is known, and to provide a worker-friendly workplace, SSA offers its employees a flexible work schedule which now includes a 10-hour workday for employees. This requires additional hours of operation. Workloads often provide for weekend overtime for both Saturdays and Sundays. This level of service to the public and commitment to flexibility for employees increases energy consumption and affects energy reduction efforts. However, SSA is striving to meet both the energy reduction goals and the agency's needs.
- Extensive ongoing building renovations. There are substantial renovations occurring at SSA's headquarters in Baltimore, Maryland. Work continues on a one million square foot building (Operations Building). Renovations include energy efficient motors, better insulation, a new automated build-

ing management system, and numerous energy savings devices and elements that will help mitigate the increased energy usage due to automation and increased hours of operation.

- Consolidating employees into Government-owned space. SSA has improved space utilization in its larger buildings. SSA's population has increased in several facilities due to the Medicare Modernization Act and the SSA 800 telephone service initiative. For example, the Wilkes-Barre, Pennsylvania site increased by approximately 300 employees. SSA has reconfigured space to include these additional employees without leasing additional space. Although this is cost effective for the agency it does slightly increase energy consumption in delegated buildings.

SSA is evaluating a number of options to reduce energy consumption and costs by installing lighting control devices, updating energy management systems and replacing inefficient equipment and systems.

Industrial and Laboratory Facilities

SSA has designated the National Computer Center (NCC) at the headquarters complex in Baltimore, Maryland, as an energy intensive building because it contains the main database and query servers for SSA's initiative to automate offices nationwide. SSA's mainframe computers operate 24 hours a day, 365 days a year. Approximately 60 percent of the space in the NCC has supplemental environmental support that operates to meet the needs of the information technology equipment on the same 24/7 schedule. The NCC also interfaces with other government agencies (Treasury, Census and the Centers for Medicare and Medicaid Services (CMS)).

In FY 2005, SSA reported a 14.8 percent decrease in energy consumption from FY 1990 for its energy intensive facilities when measured in Btu per gross square foot. SSA used an estimated 300,362 Btu per gross square foot in its energy intensive facilities during the year.

The NCC saw an energy increase of one percent from FY 2004, but an overall decrease of 14.8 percent from the base year in energy use.

Renewable Energy

SSA has completed a 100-kilowatt photovoltaic rooftop array solar system in its Chicago site. This system ties directly into the power system. By avoiding the purchase of fossil fuel-generated electricity, this solar electric system spares the environment from thousands of tons of polluting emissions, such as nitrogen oxides, sulfur dioxide and carbon dioxide. It is estimated that

over the next 30 years, the solar-generated electricity will reduce emissions of carbon dioxide by 1,900 tons. These emissions reductions are equivalent to planting 545 acres of trees or not driving 4.8 million miles on the Chicago area roadways.

SSA also awarded a Super-ESPC in late FY 2005 at the Western Program Service Center in Richmond, California. This Super-ESPC includes the purchase and installation of a 17-kilowatt photovoltaic system and a 248-kilowatt combined heat and power system.

SSA continues to work with FEMP to identify possible solar applications for its Wilkes-Barre, Pennsylvania, facility.

Self-generated Renewable Energy

SSA has installed a photovoltaic 100-kilowatt rooftop solar system in Chicago, Illinois. During the first two and a half months of use SSA generated approximately 29.0 megawatthours of electricity.

SSA and DOE continue to monitor the unique solar hot water system in the Mid-Atlantic Social Security Center (MATSSC) in Philadelphia, Pennsylvania, which came on line in late 2003. During FY 2005, this system saved 10.0 megawatthours of electricity. SSA placed solar/wind lighting on the parking lot at MATSSC as well as solar lighting for the salt shed at the Wilkes-Barre Facility in FY 2005.

Purchased Renewable Energy

SSA is purchasing 10 percent of its power from renewable energy sources for its Jamaica, New York facility (Joseph P. Addabbo Federal Building). SSA purchased a total of 1.5 gigawatts of renewable power.

SSA continues to purchase competitive power in four facilities located in deregulated states. Approximately three percent, or 4.1 gigawatthours of SSA's competitive power purchases under contract are from renewable sources.

Petroleum

The only petroleum product SSA reports on is fuel oil. In FY 2005, SSA (Wilkes-Barre\Data Operations Center, Mid-Atlantic Social Security Center, and Northeastern Program Service Center) used approximately 93,000 gallons of fuel oil. SSA continues to take advantage of price fluctuations in energy markets and the ability to heat certain sites with dual fuel. Consequently, consumption increased only slightly over FY 2004 due to significant price increases in natural gas.

Water Conservation

SSA continues to look for ways to improve water efficiency. The main complex site, part of the headquarters buildings located in Baltimore, Maryland, has major restroom renovations in process which include energy efficient fixtures and technology. Chicago, Illinois and Philadelphia, Pennsylvania completed major restroom renovations in late FY 2005.

Implementation Strategies

Life-Cycle Cost Analysis

SSA uses life cycle cost (LCC) analysis for energy audits, conservation projects, and prospectus projects. This mechanism has been effective in identifying projects that save both energy and money.

SSA initiated and completed energy audits in all of its Government-owned delegated buildings. These audits identified projects and completed a LCC analysis for each project. As a result of LCC analysis, SSA obligated FY 2005 energy budget funds to:

- Install energy efficient fixtures in the Philadelphia location;
- Install solar lighting at the salt shed in Wilkes-Barre and a trial solar parking lot lighting project at the headquarters location in Baltimore,
- Re-commission the building automated system;
- Remove an outdated air-condition system at the Chicago facility;
- Install a new energy efficient boiler;
- Perform repairs to chilled water regulating valves; and
- Install new garage lighting at the Frank Hagel Federal Building in Richmond, California.

Facility Energy Audits

Prior to FY 2005, SSA completed audits of 100 percent of its delegated spaces. SSA is currently working with a Super-ESPC contractor who is performing an energy audit at one of the Program Service Centers, as well as reviewing all of the previous audits to determine new energy savings projects. SSA will continue to implement projects from existing energy audits that meet the criteria (10-year or less simple payback) for implementation as energy projects, depending on the availability of funding.

Financing Mechanisms

SSA awarded a Super-ESPC for its Richmond, California facility. SSA has also initiated a Super-ESPC in its Chicago facility and is currently having a detailed energy audit performed. SSA has also been contacted by a Super-ESPC contractor for its Wilkes-Barre site and is planning an initial meeting in early FY 2006.

The availability of funds in FY 2006 will dictate whether these projects can be advanced.

SSA directly funded \$885,000 in FY 2005 to complete energy efficient projects in its delegated facilities nationwide. These projects included:

- Solar lighting at the Philadelphia, Wilkes-Barre, and Baltimore Headquarters;
- Reduction in air-conditioning equipment in Chicago;
- Purchase of a smaller energy efficient boiler, repair of chilled water regulating valves, and energy efficient garage lighting in Richmond, California;
- Re-commissioning and detailed energy audit in Chicago;
- Installation of energy efficient stairwell lighting in Philadelphia.

SSA has requested \$250,000 in FY 2006 to perform energy projects.

ENERGY STAR and Other Energy-Efficient Products

SSA purchases energy efficient and ENERGY STAR products for installation in its buildings. The types of energy efficient equipment installed include: ENERGY STAR office equipment (computers, monitors, copiers, and printers), and energy efficient lamps, ballasts, motors and building systems. Energy efficient specifications have been incorporated into construction criteria for prospectus level renovation projects as well.

SSA policy requires language to be incorporated in contracts to purchase energy efficient computers, motors, equipment, building systems, etc. Government credit cards for micro-purchases have empowered many employees, and SSA continues to train employees and micro-purchasers to ensure they are purchasing energy efficient products.

ENERGY STAR Buildings

SSA is gathering the data required to determine its buildings' compliance with the ENERGY STAR criteria. The SSA Child Care Center and Annex Building located in Baltimore have received a LEED 2.0 certification. SSA continues to implement energy conservation measures in the Child Care Center. The object of this effort is to attain an ENERGY STAR rating for this site.

Sustainable Building Design

In conjunction with GSA, SSA is renovating its headquarters complex. The renovations are prospectus level projects. Sustainable building design guidelines are used to the maximum extent possible. In FY 2003 the renovations of the Operations Building began and continued into FY 2005.

This project, while not exclusively an energy project, will significantly affect our energy consumption by installing:

- Energy efficient windows and doors;
- A new central computer-based energy management system;
- Natural daylight;
- Efficient lighting and lighting controls; and
- A highly insulated façade and reflective roof.

SSA's new Headquarters child care facility incorporated sustainable design features and received a LEED 2.0 certification. The Annex Building also received LEED 2.0 certification. Renovations currently underway at SSA headquarters Operations Building include energy conservation and demand management features. This project's primary sustainable design feature is natural day light atriums.

Energy Efficiency in Lease Provisions

SSA added an energy efficiency provision into its national Solicitation for Offers for leased space. SSA will continue to work with GSA to identify the most energy efficient buildings for the leased field offices.

Industrial Facility Efficiency Improvements

SSA has designated the NCC at the Headquarters Complex in Baltimore as an energy intensive building. The NCC has increased electric consumption by one percent from last year. The NCC currently has a prospectus project for the installation of new generators. These generators allow SSA to provide generation to NCC during peak demand and in the event of a power outage.

Highly Efficient Systems

GSA has primary responsibility for construction; however, SSA engineers and energy management staff actively participate in the design and construction of buildings for SSA employees. The Operations Building at SSA headquarters includes energy conserving and demand management features, such as natural day lighting atriums.

The SSA Richmond, California location Super-ESPC includes the use of a combined heating and power system. SSA is also exploring the use of combined heating and power applications in the Chicago facility.

Distributed Generation

SSA produces off grid power intermittently at the NCC. During peak electrical demand periods, SSA receives stipulated credits on its utility bill, providing a cost saving for the agency.

Electrical Load Reduction Measures

For electrical power emergencies in the Baltimore area, SSA has the ability to take its energy intensive building (National Computer Center) off line and support the facility with on site generation.

SSA has implemented building curtailment plans in all Government-owned delegated buildings nationwide. These plans include procedures for cycling air handling units, elevator sequencing, and turning off non-essential lighting.

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W. TENNESSEE VALLEY AUTHORITY (TVA)

Management and Administration

In the Tennessee Valley Authority (TVA), the designated Senior Energy Official is the Executive Vice President of Administrative Services. The Chief Energy Manager manages the TVA Internal Energy Management Program (IEMP) under Administrative Services.

TVA formed the Agency Energy Management Committee (AEMC) to facilitate compliance with Federal statutes, Executive Orders, Federal regulations, TVA energy and related environmental management objectives, and obligations under the Environmental Protection Agency's (EPA) Green Lights Program (GL), EPA's ENERGY STAR Buildings Program (ESB) and EPA's ENERGY STAR Program. The AEMC serves as the agency energy team. This committee is comprised of representatives from each TVA organization responsible for energy management and associated environmental considerations in facility and general operations inside the agency. The AEMC provides an avenue for sharing lessons learned and replicating success.

Management Tools

Awards

TVA uses a "Winning Performance" process as a method to reward employees' efforts toward meeting agency goals. Examples of pay for performance goals include reduction in cost per square foot for building operations. Energy efficiency and sustainable improvements are contributors to reduced cost per square foot goals.

Training and Education

TVA utilizes various methods of training to educate employees on the objectives of the IEMP which includes energy management requirements. Staff is educated on energy and environmental related topics through the TVA Employee Technical Training and Organizational Effectiveness group. The TVA Intranet and employee awareness programs are also used as tools to educate employees on how they impact energy use and efficiency both at work and home. Energy efficiency and information updates are provided on current Federal requirements and regulations to employees, managers, and TVA customers upon request. Energy management and associated environmental training is provided to managers and employees as needed.

Showcase Facilities

The TVA Chattanooga Office Complex (COC) continued to be TVA's designated Showcase facility for FY

2005. The COC, completed in 1986, encloses approximately 1.2 million square feet of floor area, and is made up of five interconnected buildings. It integrates the use of passive energy strategies, energy management practices, and environmental programs and activities. Occupants' daily activities have been recognized as a major component in facility performance. Energy and environmental awareness programs have been established to inform the occupants of the impacts their actions have on this performance. The combinations of original design elements, energy and environmental activities, and aggressive energy reduction operation and maintenance efforts have resulted in the COC becoming a model facility.

During FY 2005, TVA continued to consolidate space to reduce cost. This resulted in an increase in the occupancy density of the COC. To offset the increased energy demand from this increased density, TVA continues to investigate and implement energy efficiency measures.

Energy Efficiency Performance

Standard Buildings

In FY 2005, TVA reported a 30.0 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. TVA used an estimated 57,618 Btu per gross square foot in its standard buildings during the year. TVA received credit for purchases of 4.0 billion Btu of renewable energy. This lowered the energy intensity of its standard buildings from 58,046 Btu per square foot to 57,618 Btu per square foot.

Industrial and Laboratory Facilities

In FY 2005, TVA reported a 33.0 percent decrease in energy consumption from FY 1990 for its energy intensive facilities when measured in Btu per gross square foot. TVA used an estimated 185,799 Btu per gross square foot in its energy intensive facilities during the year.

Exempt Facilities

TVA's facility inventory and the type of activities for which these facilities are used continue to evolve as the agency faces new challenges. Facility information is updated through the AEMC. The AEMC remains the focal point for disseminating energy and related environmental information to TVA organizations and employees and implementing TVA's Energy Plan. The AEMC is also responsible for the development of TVA's Implementation Plan. To benchmark success,

the AEMC utilizes many tools including the Energy Scorecard. The AEMC allows representatives to voice problems in meeting regulations and goals and share success stories which can then be applied throughout TVA. To benchmark success, the AEMC uses many tools including:

- TVA new building design;
- TVA facility improvements;
- Operations and Maintenance activities for buildings;
- Power system operations efficiency; and
- Fossil efficiency.

Non-Fleet Vehicle and Equipment Fuel Use

TVA's fleet strategy is to examine current vehicle use and replacement and where feasible, choose replacement vehicles that are most efficient. TVA, as a major provider of electricity, will continue to make use of alternative fueled vehicles (AFVs), including those that use electric power, and acquire additional vehicles to meet requirements under the Energy Policy Act of 1992. TVA has recognized the value of hybrid electric vehicle technology in reducing fuel consumption, increasing versatility, and promoting electric propulsion and has included these vehicles in its fleet. TVA created a hybrid-fleet program in FY 2002 which is a partnership effort between TVA's Energy Management and Fleet Management organizations. In FY 2005, TVA added five hybrid gas/electric vehicles and 20 AFVs to its fleet bringing the total number of hybrid vehicles to 25 and AFVs to 54.

During FY 2005, TVA gasoline fuel usage was reduced by nine percent compared to FY 2004 while diesel fuel use decreased by 15 percent compared to FY 2004.

TVA encourages employees to use mass transit systems, vans for group travel, and car pools, when available and feasible. The use of coordinated TVA and vendor delivery, pickup routing schedules, and just-in-time delivery is utilized throughout TVA. This coordinated effort reduces deadheading and avoids double handling and, multiple trips to the same sites.

The TVA service area covers all of Tennessee and portions of six other states; therefore, employees are widely dispersed and often travel significant distances to attend meetings and presentations. TVA continues to install technologies which enable employees to travel less and conduct more meetings from their remote work sites. The reduction of required travel realized through telecommunication improvements has resulted in a savings of fuel and related expenses.

For its heavy equipment, TVA continued the utilization of the Total Base Number (TBN - measure of oil's alkalinity) value as an oil indicator. This effort has resulted in a reduction in TVA's oil consumption due to

extended oil drain intervals. Accordingly, the oil change interval in some of the smaller diesel engines has changed to 320 hours or 10,000 miles to protect TVA's equipment. Turbo pre-cleaners are being used on tractor scrapers and dozers to lengthen air filter life and extend oil change intervals. Air filter indicators used on TVA's equipment have reduced filter changes (especially oil bath type), and have additionally provided better engine protection. TVA also used turbo pre-cleaners to reduce contaminants entering the engines along with air filter indicators to insure dirty filters are identified and changed resulting in increased engine efficiency.

TVA continued using Fuel Mag with small compressors to kill bacteria and spores that grow in fuel that is stored for long periods of time. Its use should decrease the amount of contaminated fuel that has to be disposed. These units can also eliminate down time due to filter and fuel injector plugging.

TVA's maintenance shops use filter crushers to get all possible oil out of filters before disposal. Three maintenance facilities are using oil burners to heat their facilities using TVA's generated used oil.

These projects provide TVA with the benefits of reduced potential of adverse environmental impacts from spillage of waste oil and fuel, increased operational efficiency, increased availability of units, and decreased cost due to reduction in oil consumption.

TVA incorporates EPA emission standards in specifications for both on-road and off-road trucks. TVA also is in constant communication with equipment providers on their emission standards and latest engine components to insure the best and most economical equipment is used.

As a major supplier of electricity, TVA is particularly interested in supporting the use of electric vehicles (EVs). TVA has incorporated EVs into its fleet operations and supports power distributors and local communities with EV technology demonstrations. TVA is also utilizing electric vehicles at its plant sites to reduce fuel consumption and emissions.

TVA currently has the following EVs:

- 1 U.S. Electricar Prism sedan;
- 1 Solectria Ford sedan;
- 5 GEM electric cars; and
- 44 EZGOs electric vehicles.

Renewable Energy

TVA and 12 public power companies launched Green Power Switch (GPS) on Earth Day, April 22, 2000. GPS was the first program of its kind offered in the Southeast and provided consumers with an economical opportunity to participate in TVA's development of renewable energy resources. The program originally included supply from wind and solar energy sources. The program was expanded in FY 2001 to include electricity generated from methane gas at a waste water treatment plant in Memphis, Tennessee.

Sixteen solar generating facilities are presently operating in Tennessee, Kentucky, Alabama, Virginia and Mississippi. One commercial scale wind power generation site has been operational since November 2000. TVA has agreed to purchase, from a new project developer, Invenergy TN LLC, 27 megawatts of new wind energy for the next 20 years. Fifteen 1.8-megawatt wind turbines were added to the existing three wind turbines currently located on Buffalo Mountain in Anderson County, Tennessee. These units became operational December 2004. GPS also benefits from generation produced from an eight megawatt waste water treatment methane gas project located at TVA's Allen Fossil plant near Memphis, Tennessee. The GPS program is managed through TVA's Marketing Organization.

Under the GPS program, residential customers can purchase green power blocks of 150 kilowatthours each, at a cost of \$4.00 per block. These blocks represent approximately 12 percent of a typical home's monthly energy use. Commercial and industrial customers can sign up for the 150-kilowatthour blocks based on the amount of energy they use each month. When two blocks of GPS are purchased each month for one year, the associated reduction of atmospheric carbon dioxide is equivalent to planting an acre of trees in the Tennessee Valley. As of September 30, 2005, there were 8,318 residential customers purchasing 14,860 blocks and 433 business customers purchasing 15,301 blocks for a total of 30,161 purchased blocks of green power.

Today there are 90 TVA power distributors and one direct-served customer participating in the GPS program throughout the Tennessee Valley. TVA plans to continue expanding the GPS program by offering it to additional power distributors as renewable energy supplies allow.

TVA launched the Generation Partners Program in support of Green Power Switch. The Generation Partners program pays participants for 100 percent of their

green power output at a rate of 15 cents per kilowatthour for the generation produced from solar and wind installations on participants' home or small business. The energy from Generation Partners is used to supply renewable energy for GPS.

TVA's GPS and Generation Partners programs were awarded the State of Tennessee Energy Leadership Award in 2005.

TVA identifies and evaluates emerging renewable energy technologies in support of its strategic needs. The renewable energy program provides data to support debate on renewable energy policy; monitors advancements in renewable energy to keep TVA organizations and customers informed on technology issues; and demonstrates and develops the most viable technologies in the areas of bio-energy, waste-to-energy, wind, solar, and other renewable resources.

TVA's Green Power Switch program is the primary driver for renewable energy technologies at TVA. However the potential for national Renewable Portfolio Standards (RPS) and carbon constraint legislation still exists and could become drivers in the future. Renewable energy portfolios are currently mandated in 18 states and although it was defeated, an amendment for a national RPS was proposed during the 2005 energy bill conference hearings. In anticipation of renewable portfolio mandates and in response to customer needs, TVA continues to assess and evaluate new and advanced renewable technologies. Project plans include developing and demonstrating large scale biomass gasification for production of electricity and value-added products from regional biomass, and evaluating other advanced renewable energy supply options in wind and solar.

Self-Generated Renewable Energy

Through TVA's GPS program, TVA utilizes photovoltaics, wind, and methane as part of its mix to provide renewable energy to its customers.

Purchased Renewable Energy

Through the TVA GPS program, TVA purchased 1.2 gigawatthours for use in its Knoxville Office Complex, Chattanooga Office Complex, and Huntsville office.

TVA committed to a 20 year Power Purchase Agreement with Invenergy TN, LLC, for 27 additional megawatts of large scale wind power. The expansion consists of 15, 1.8-megawatt wind turbines at the existing Buffalo Mountain wind site in east Tennessee.

The GPS Generation Partners demonstration continued to allow residential and small commercial customers to

install solar/wind generation and sell their power to TVA's GPS program. In FY 2004, GPS Generation Partners was expanded to allow larger, demand-metered customers to participate with solar generation only. More information on the demonstration may be found at www.gpsgenpartners.com.

Petroleum

TVA consumed 10,700 gallons of petroleum in building operations in FY 2005, which is a decrease of 51 percent from the FY 1985 baseline of 21,920 gallons.

Water Conservation

During FY 2005, energy surveys including water were conducted at multiple TVA sites. TVA consumed 158.1 million gallons of potable water in FY 2005 with an estimated cost of \$331,600. These numbers exclude the water consumption of the exempt buildings. TVA considers water management plans as part of its operation and maintenance activities. As part of these activities, more than 271 facilities have been covered, representing over 4.3 million gross square feet. To date, TVA has implemented the Best Management Practices in more than 11 percent of its gross square footage.

Implementation Strategies

Life-Cycle Cost Analysis

TVA's Energy Plan provides that life-cycle analysis will be used in making investment decisions regarding energy/water efficiency and sustainable practices.

Facility Energy Audits

TVA has evaluated building inventory for potential energy conservation measures. These facilities are being re-evaluated in accordance with Executive Order 13123 and TVA's Memorandum of Understanding with the EPA. During FY 2005, TVA surveyed its facilities located at 28 hydro plant sites.

Financing Mechanisms

Projects for facilities are primarily funded through renovation, operation, maintenance, and modernization efforts. Projects covered under general operations are ranked for economic benefit compared to other TVA projects to determine funding availability and implementation status and are funded mainly through the capital budgeting process. TVA considers the use of energy savings performance contracts and utility energy services contracts where cost effective and in the best interest of the agency and its customers. During FY 2005, TVA did not utilize these financing mechanisms.

ENERGY STAR and Other Energy-Efficient Products

TVA's Energy Plan provides that TVA will strive, where cost-effective, to meet the ENERGY STAR Building criteria for energy performance and indoor environmental quality in eligible facilities to the maximum extent practicable as described by Section 403(c) of Executive Order 13123. This includes purchasing ENERGY STAR and other energy efficient products when feasible.

TVA continues its efforts to buy materials that have positive environmental qualities including soy ink, rechargeable batteries, low mercury lamps, and non-toxic supplies. TVA also purchases materials that meet sustainable architecture criteria. These are non-toxic building materials that have recycled content, and their creation, use, and disposal does not damage the environment.

ENERGY STAR Buildings

TVA currently has two facilities that meet the ENERGY STAR Buildings criteria. These are the Chattanooga Office Complex and the Edney building, which represent 11 percent of TVA's overall corporate square footage.

Sustainable Building Design

TVA is incorporating sustainable design criteria into renovation and new construction efforts. TVA is in the process of reviewing its building inventory in an effort to reduce inefficient, high cost, underutilized space. This consolidation effort provides an opportunity to further practice sustainable efforts such as:

- Renovate space using removable, reusable wall systems;
- Recycle and recondition office furniture and panel systems;
- Install recyclable carpet tiles and low VOC finishes; and
- Upgrade lighting systems using T-5 and T-8 lamps, room and personal work station occupancy sensors, and internet based digital lighting control systems.

All of these efforts are being done as part of an agency sustainable program under TVA's IEMP.

TVA continues to buy materials that have positive environmental qualities and include those that meet EPA's Resource Conservation and Recovery Act requirements and other recycled content materials. Examples of environmental products purchased include soy ink, rechargeable batteries, low mercury lamps, and non-toxic supplies and movable/reusable wall sys-

tems in place of drywall. TVA also purchases materials that meet sustainable architecture criteria. These non-toxic building materials have recycled content, and their creation, use, and disposal minimize environmental impacts.

Energy Efficiency in Lease Provisions

Where applicable, TVA uses model lease provisions based on those recommended by the General Services Administration and such provisions will be incorporated into new and renewed leases provided they are cost-effective. The model lease provisions address energy, sustainability and water efficiency.

Industrial Facility Efficiency Improvements

TVA looks for opportunities to improve energy efficiency in its industrial facilities. Energy savings opportunities include lighting, HVAC, motor, and building control.

Highly Efficient Systems

TVA considers the implementation of high efficiency systems as mentioned above when it is life-cycle cost effective.

Distributed Generation

TVA is a utility; however, the use of distributed generation, where applicable, is considered.

Electrical Load Reduction Measures

As part of its operation and maintenance function, TVA has an emergency curtailment procedure which reduces energy use in its buildings during energy emergencies.

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X. UNITED STATES POSTAL SERVICE (USPS)

Management and Administration

In the United States Postal Service (USPS), the Acting Manager of USPS's Environmental Management Policy (EMP) is the senior energy executive and is the Director of the National Energy Management Program. In this role, he leads efforts in nationwide energy planning, developing USPS's energy management policies and supporting implementation of energy management, efficiency and conservation strategies across the U.S. Postal Service. USPS also maintains a national level, energy management work group that consists of representatives from appropriate USPS departments such as Facilities Design and Construction, Maintenance/Engineering, Operations and others.

Work group members provide technical guidance, support program development and implementation, and perform program effectiveness reviews.

Management Tools

Awards

USPS employees who help to reduce operating costs are recognized with monetary incentives. The USPS strongly encourages facility managers to reduce energy costs for purposes of reducing operating costs. In FY 2005, members of the national energy management workgroup received Letters of Accommodation and cash awards for their voluntary contributions to the national energy program. In FY 2006, the Energy Program will continue to seek recognition for key contributors to the Energy Management Program.

USPS takes advantage of other venues to recognize the accomplishments of employees. In FY2005, USPS's Energy Management Program submitted several nominations for DOE FEMP individual and group awards. In addition, the USPS Shared Energy Savings (SES) Program received an Energy Planning Network Excellence Award for Best Initiative in Demand Management at a national chain for their work to reduce USPS energy demand across the nation. USPS winners of external awards are announced through internal publications.

Training and Education

In its 2006-2010 Strategic Transformation Plan, the USPS outlines several transformation strategies to engage employees and develop and manage talent. Through its Voice of the Employee survey, USPS also gauges employees' perspectives on their specific work environment and key workplace factors that affect their job performance.

Individual training, education planning, and implementation are decentralized to the facility and supervisor-subordinate level. However, USPS employees are encouraged to participate in the various educational and training opportunities presented by the Department of Energy's (DOE's) Federal Energy Management Program (FEMP). Also, energy training is integrated into broader training provided to employees with facility operations and maintenance responsibilities. For example, HVAC systems training covers energy efficiency aspects of such systems. These training programs are conducted at the USPS National Training Center. USPS will add more specific energy management training elements in FY2006.

Showcase Facilities

Five USPS facilities have received Showcase Facility awards from DOE since 2001. USPS did not receive any additional DOE showcase awards during FY2005. In FY 2005, USPS's Energy Management program identified several additional USPS facilities as showcase facility candidates. These facilities, which will be targeted for multi-year, whole-building energy efficiency upgrade and renewable energy projects, include:

- USPS Headquarters Facility at L'Enfant Plaza, Washington, D.C.;
- Northern Virginia Processing & Distribution Center (P&DC), Fairfax, Virginia;
- Bolger Training & Conference Center, Potomac, Maryland; and
- Engineering Facility, Fairfax, Virginia.

Energy Efficiency Performance

Standard Buildings

In FY 2005, USPS reported a 24.2 percent decrease in energy consumption from FY 1985 when measured in Btu per gross square foot. USPS used an estimated 64,978 Btu per gross square foot in its standard buildings during the year. All USPS buildings are classified as standard.

Estimated energy use increased in FY 2005 by about 0.15% compared to FY 2004. This estimate is based on expenditure data and average price data by State, provided by the Energy Information Administration (EIA). When prices for a given energy source was not available in a particular State, national or regional averages were used.

Exempt Facilities

The USPS does not have any exempt facilities. However, USPS assumes that at least eight percent of its total facility energy use is used for process energy purposes. For energy reporting purposes, the process energy amount is subtracted from the standard buildings amount and is reported under exempt facilities.

Renewable Energy

Self-Generated Renewable Energy

The USPS has working solar photovoltaic systems at Postal facilities in California and Rhode Island. Postal facilities in Oklahoma and Maryland are using geothermal heat pump technology to provide heating and cooling. In FY 2005, USPS identified several other candidate facilities for solar photovoltaic projects. The Energy Management Program is currently evaluating the potential for photovoltaic systems at these facilities. The USPS continues to seek opportunities to expand the use of these and other renewable energy technologies in FY 2006.

Purchased Renewable Energy

In FY 2005, USPS began working with the Environmental Protection Agency's landfill methane outreach program to identify USPS facilities that may be able to purchase and utilize nearby landfill gas resources. The USPS continues to seek opportunities to purchase renewable energy and encourages suppliers to do so whenever possible.

Petroleum

Petroleum use increased by 9.6 percent, from 4.9 million gallons in FY 2004 to 5.3 million gallons in FY 2005. Petroleum use is estimated based on USPS expenditures and price data provided by the Energy Information Administration.

Water Conservation

In FY 2005, USPS used 4.74 billion gallons of water at a cost of \$23.4 million, versus FY 2004 usage of 4.72 billion gallons. Water usage is also estimated from expenditure and average price data. USPS' advanced metering initiative, which started in FY 2005, may include water meters at USPS's highest water consuming facilities. Total water use remained virtually constant from FY 2004 to FY 2005 and expenditures increased by 8 percent during that period. In FY 2005, USPS has been focusing on water conservation programs, setting benchmark standards and comparing actual use to the benchmark for each USPS Performance Cluster. The number of Districts reaching the standard has been rising through time, and USPS will continue its efforts to provide guidance and support for water conservation efforts.

Implementation Strategies

The mission of the USPS Energy Management Program is to integrate energy management principles into USPS business functions, and to optimize USPS energy decisions to the benefit of our employees, business and communities. In FY 2005, USPS revised its National Strategic Energy Management Plan, which outlines five strategic target areas for the program over the next several years. As one of its core implementation strategies, USPS's Energy Program initiated its first national Call for Energy Projects and successfully identified over 100 energy efficiency and renewable energy projects across the nation. This process facilitates project identification and implementation on an annual basis by providing USPS Areas with guidance and allocating capital funding to high impact energy projects. For example, USPS's Energy Program tracks State and utility co-funding and technical assistance programs and disseminates its findings through the Call for Projects. The Call for Energy Projects process improves both energy awareness and outreach while helping USPS personnel identify and fund energy projects.

The USPS Energy Program targets the following areas:

- **Energy Conservation.** Improve energy efficiency, reduce the impacts of USPS operations on environmental resources, and reduce dependence on non-renewable fuel sources.
- **Energy Cost Reduction.** Reduce USPS utility costs through utility optimization and facility, system, and equipment efficiency improvements. Implementation strategies include:
- **Reliability.** Improve the reliability of facilities, equipment and systems through energy strategies that will improve operational continuity and effective energy management.
- **Integrate sustainable energy management principles into corporate business processes.** Maximize the benefits of the Energy Management Program by incorporating energy conservation and cost considerations into decision-making processes.
- **Energy data management.** Enable a robust and thorough Energy Management Program by ensuring the availability of necessary information and analysis results to influence and guide decision-making.

Life-Cycle Cost Analysis

Within the USPS, all capital improvement projects including energy projects are subject to rate of return analysis, and require at least a 20 percent return on

investment. The amount of energy saved, the cost of that energy, and changes in maintenance or other activities are taken into account. The USPS seeks outside sources of capital investment (through the SES program and other state and utility co-funding programs) whenever possible.

Facility Energy Audits

Energy audits are performed within USPS in connection with broader project analyses. The SES program, the USPS alternative finance mechanism, uses energy service companies to audit USPS facilities in several Postal Areas. USPS also encourages internal audits of its facilities and helps to finance identified energy conservation measures through its annual call for energy projects process.

USPS's national advanced metering program will enhance the ability for facility and maintenance managers to perform internal facility audits and identify and monitor energy conservation measures at USPS's large facilities across the country.

Financing Mechanisms

USPS makes extensive use of SES contracts. SES projects have provided an extremely efficient means to reduce energy use while preserving capital funding for other purposes. In FY 2005, the SES program continued to capitalize on the program's success to date and to encourage increased demand-side management at USPS facilities in the future. USPS awarded 14 SES task orders in FY 2005 with a total award value of \$48.1 million. These tasks are expected to reduce annual USPS energy consumption by 43.6 gigawatthours and save the USPS about \$5.6 million annually in energy costs. Along with the Utilities Category Management Center, the National Energy Program continued to work to standardize the national program and streamline SES processes across all USPS Areas.

ENERGY STAR and Other Energy-Efficient Products

USPS has issued an Environmental Products Directory, which aids personnel in locating energy-efficient products and services.

ENERGY STAR Buildings

In FY 2002 USPS carried out a nation-wide survey of energy use and operating characteristics of its stations and branches. The data were given to EPA for analysis and review. In FY 2005, USPS continued to work with the EPA to develop ENERGY STAR criteria for certain Postal facilities.

Sustainable Building Design

USPS updated its Building Design Standards in FY 2005 to include improved energy efficiency requirements for Postal new construction and major renovation projects. These design standards, which also contain a green design addendum, are contained in USPS Master Specifications for facilities and are applied to all new construction projects and major renovations. USPS reviews these standards periodically to ensure that the sustainable design standards remain current and are consistent with new technology.

USPS facilities may qualify for the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification at the bronze or silver level. Due to the time, effort, and data required to complete the LEED certification process, these facilities have not been evaluated using current LEED criteria.

In the past, USPS has constructed 500-700 new facilities a year. However, due to funding constraints and the Postal Service's commitment to staying in downtown areas, USPS is now more focused on renovation and alteration than on new construction.

Energy Efficiency in Lease Provisions

In leased facilities where USPS pays for utilities, USPS energy policy and standards are applied. These facilities are included in national energy program initiatives, and in some instances USPS may retrofit the facility to comply with energy standards. When the owner pays utility costs, lease provisions are negotiated on a case-by-case basis. Where USPS leases space to third parties within its facilities, there is a requirement that occupants adhere to USPS standards for building energy management.

Highly Efficient Systems

USPS facilities are seeking to improve their energy efficiency with new technologies. In addition to several innovative facility projects in the past, USPS has been active during FY 2005 to deploy current and highly efficient systems at Postal facilities. For example:

- The Postal Service installed a 403-kilowatt peak photovoltaic parking shade structure at the Sacramento, California Processing and Distribution facility during FY 2005. This project included several additional efficiency measures as well, namely: a compressed air system upgrade, variable volume air handlers, variable speed chilled and heated water pumps, energy management system re-commissioning, air curtains, high efficiency chillers, light-emitting diode exit signs, compact fluorescent lighting, T-8 lighting, electronic ballasts, and occupancy sensors. The overall project is expected to save 5.5 gigawatthours per year.

- In FY 2005, USPS planned and designed a turnkey combined heat and power (CHP) system for the Margaret L. Sellers P&DC in San Diego, California. As part of a SES contract, USPS will install a 1.5-megawatt natural gas-fired, reciprocating engine coupled to a 300-ton absorption chiller. This system is expected to supply approximately 85 percent of the electric demand at the facility and reduce natural gas demand by 165,000 therms annually.
- USPS began planning a CHP project at the San Bernadino, California P&DC in FY 2005. The project will include a 1.2-megawatt natural gas fired reciprocating engine coupled to an absorption chiller. This project is expected to go online in FY 2007.
- USPS is implementing a combined heat and power project at the Mid-Florida Processing and Distribution Center in Orlando FL. In FY 2005, USPS completed the design phase for the project, which consists of four 60-kilowatt, natural gas fired, micro-turbine generators coupled to an absorption chiller. The generators will run during the utility company peak hours, and during brownouts and blackouts. The system will have the capacity to power most of the automated mail processing equipment. The absorption chiller will provide building cooling during all but the hottest summer afternoons and building heating whenever needed (between 165 and 250 tons of cooling capacity). The project goal is to demonstrate a CHP project in partnership with the state Public Service Commission and the serving investor-owned utility companies, then document and disseminate the resulting CHP success story to encourage others across USPS.

Distributed Generation

Solar photovoltaic projects are in operation at postal facilities in Sacramento, California, Rancho Mirage, California, Marina Del Ray, California and at Block Island, Rhode Island. In FY 2005, USPS installed a large photovoltaic parking shade system at the Sacramento P&DC, as described above, and began planning a project at the San Francisco Processing & Distribution Center. The San Francisco P&DC project will include a 250-kilowatt fuel cell and two solar photovoltaic technologies: thin-film roof-integrated panels; and a tracking parking shade structure, totaling 309 kilowatts. These efficiency upgrades and on-site generation are expected to lower the facility's total annual electricity purchases by about 10 million kilowatt-hours - a 46 percent reduction - saving \$1.2 million in energy costs annually. USPS will fund the project using a combination of energy savings, contributions from the USPS CFC/HCFC refrigerant replacement

program, and more than \$2.6 million in grants and incentives from the U.S. Department of Defense and the State of California. The Postal Service expects the fuel cell and photovoltaic systems to become operational in FY 2006.

USPS has also begun identifying viable photovoltaic projects at several facilities on the east coast in FY 2005 and hopes to begin planning and funding these distributed generation project in FY 2006. USPS's operating distributed generation projects produce a total 541 kilowatts:

- Marina Del Ray P&DC, Marina Del Ray, California, solar photovoltaic, 127 kilowatts capacity;
- Sacramento P&DC, West Sacramento, California, solar photovoltaic, 403 kilowatts capacity;
- Block Island Post Office, Shoreham, Rhode Island, solar photovoltaic, 6 kilowatts capacity; and
- Rancho Mirage Post Office, Rancho Mirage, California, solar photovoltaic, 5 kilowatts capacity.

These distributed generation activities will continue and new ones will be investigated as financing and opportunities become available.

Electrical Load Reduction Measures

The USPS has installed telemeters at 24 of its largest facilities in California to measure electricity usage on a real time basis and to allow rapid response to high electricity prices at peak demand times. In FY 2004 and continuing in FY 2005, USPS began an initiative to install advanced metering systems at its highest cost facilities across the country. USPS completed 40 facility surveys during FY 2005 to determine what new equipment (e.g., meters and sub-meters) is required at these sites before the advanced metering systems can be installed effectively. The USPS National Energy Program has worked closely during FY 2005 with USPS's information technology organization to determine how advanced metering systems can be integrated into the existing information technology network.

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APPENDIX A

ENERGY CONSUMPTION AND COST DETAIL TABLES

TABLE A-1
TOTAL PRIMARY ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985...	FY 1990...	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
USPS	51,668.1	59,961.0	72,178.0	74,083.1	78,333.1	78,883.0	80,083.3	89,381.4	86,142.5	85,320.9	83,069.4	84,553.5	85,649.8	65.8	1.3
DOE	98,876.9	90,859.5	88,840.8	89,070.0	86,928.2	71,555.2	57,999.7	72,041.6	72,338.7	72,682.0	73,732.1	73,854.2	72,256.8	-26.9	-2.2
VA	43,456.9	44,918.6	47,827.9	49,377.1	50,286.4	50,957.9	51,217.7	50,557.0	52,945.1	53,074.2	55,014.6	55,729.1	56,429.1	29.9	1.3
GSA	47,235.8	40,780.8	36,626.3	37,490.0	37,680.0	37,437.4	38,433.2	42,409.1	42,969.5	42,297.8	43,413.3	43,057.0	43,512.6	-7.9	1.1
DOJ	11,112.5	11,610.3	17,193.4	20,845.6	20,307.8	24,960.3	24,961.1	30,431.8	30,338.1	28,515.1	29,679.1	29,118.2	31,161.5	180.4	7.0
DHS ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24,340.6	29,351.8	25,290.6	NA	-13.8
NASA	23,771.3	28,741.6	29,434.4	27,159.0	28,814.8	27,936.2	27,275.8	26,087.4	25,210.0	24,726.7	24,152.1	23,302.1	24,016.9	1.0	3.1
HHS	10,501.4	13,188.5	12,189.6	12,825.4	14,965.7	14,626.4	14,148.6	15,255.5	16,078.3	15,903.6	16,712.4	17,033.8	18,763.1	78.7	10.2
DOI	11,596.7	10,969.3	10,552.2	7,622.1	10,255.0	10,213.7	11,292.7	12,041.4	14,497.5	12,999.8	12,222.4	14,206.3	14,058.3	21.2	-1.0
USDA	12,266.6	14,620.4	14,324.3	14,249.7	12,419.1	13,124.4	12,590.1	12,365.5	12,096.6	11,622.1	13,079.6	12,056.6	12,700.7	3.5	5.3
DOT ¹	28,959.2	28,666.3	28,971.2	32,612.7	30,842.9	32,001.4	41,881.8	41,018.6	32,503.7	30,707.3	13,522.5	12,897.4	12,291.8	-57.6	-4.7
TRSY ¹	3,878.3	7,015.4	7,783.1	7,238.9	9,164.5	8,951.7	9,145.7	9,651.3	9,550.3	9,910.8	7,878.2	6,193.5	8,196.6	111.3	32.3
TVA	8,856.0	8,214.3	7,913.9	7,591.5	7,425.7	7,183.6	7,998.4	8,325.7	8,392.7	7,945.1	7,517.8	7,332.2	7,323.5	-17.3	-0.1
DOC	4,085.5	6,383.7	5,667.2	5,370.1	5,328.8	5,008.6	5,227.3	4,117.5	5,489.0	4,760.0	4,918.2	4,935.5	5,654.6	38.4	14.6
DOL	3,966.3	4,155.2	4,336.2	4,438.2	4,473.4	4,517.7	3,614.8	4,761.1	5,024.8	5,177.0	5,466.3	5,395.0	5,253.1	32.4	-2.6
EPA	1,776.4	1,643.0	2,264.7	2,205.5	2,245.1	2,212.6	2,455.1	2,057.7	2,407.0	2,204.4	2,455.3	2,577.8	2,582.7	45.4	0.2
ST	717.3	868.5	1,342.3	1,903.8	7,363.5	7,361.5	6,898.4	7,631.9	6,503.0	1,669.3	2,047.1	2,130.9	2,398.3	234.3	12.5
HUD	356.2	435.0	347.7	364.7	355.0	339.9	347.5	362.0	370.1	365.8	356.1	345.5	338.6	-4.9	-2.0
OTHER*	2,250.4	5,591.2	8,649.2	11,254.4	12,044.4	9,919.1	9,683.4	9,454.3	9,353.3	11,388.7	10,830.5	6,747.9	5,465.4	142.9	-19.0
CIVILIAN AGENCIES															
SUBTOTAL	365,331.7	417,307.9	396,442.6	405,701.8	419,233.4	407,190.8	405,254.6	437,950.8	432,210.4	421,270.7	430,407.5	430,818.5	433,344.0	18.6	0.6
ALL AGENCIES															
DOD	1,502,111.8	1,545,014.4	1,197,891.7	1,166,540.8	1,134,674.9	1,087,225.4	1,059,455.0	1,042,511.1	1,043,757.4	1,097,163.4	1,159,365.8	1,223,168.6	1,185,635.5	-21.1	-3.1
TOTAL	1,867,443.5	1,962,322.3	1,594,334.3	1,572,242.6	1,553,908.4	1,494,416.2	1,464,709.6	1,480,462.0	1,475,967.9	1,518,434.1	1,589,773.2	1,653,987.1	1,618,979.6	-13.3	-2.1
MBOE	320.6	336.9	273.7	269.9	266.8	256.6	251.5	254.2	253.4	260.7	272.9	283.9	277.9		
PETAJoule	1,970.1	2,070.2	1,682.0	1,658.7	1,639.3	1,576.6	1,545.2	1,561.8	1,557.1	1,601.9	1,677.2	1,744.9	1,708.0		

Data as of 7 June 2006

¹FY 2003 was the first year for reporting by the Department of Homeland Security. Significant declines in energy use were also evident in that year for agencies such as the Departments of Transportation and the Treasury which transferred functions to the new Department.

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, BBG/IBB, and FERC.

Note: This table uses a conversion factor for electricity of 11,850 Btu per kilowatt hour and 1,390 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-2
TOTAL SITE-DELIVERED ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985...	FY 1990...	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
USPS	27,762.5	30,616.2	36,220.9	36,427.1	40,760.0	39,487.3	39,774.0	43,284.2	43,397.4	41,617.4	42,606.2	40,664.4	40,734.0	46.7	0.2
DOE	52,201.6	43,454.6	47,255.4	44,609.3	43,070.4	31,520.2	26,998.3	30,492.9	31,065.5	30,668.3	30,701.1	31,398.5	30,428.3	-41.7	-3.1
VA	25,144.7	24,898.4	25,428.9	26,832.9	27,261.1	27,597.2	27,472.4	27,043.9	27,661.9	27,722.6	29,644.5	29,888.5	29,801.5	18.5	-0.3
DHS ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18,333.3	23,527.9	19,351.0	NA	-17.8
DOJ	8,176.0	6,961.6	10,193.3	12,127.7	11,999.9	15,805.1	15,366.2	19,693.0	19,681.9	17,692.4	18,028.3	17,544.4	18,487.1	126.1	5.4
GSA	20,721.1	16,995.5	13,671.8	14,499.2	14,364.3	14,095.0	14,359.9	17,632.3	18,415.8	17,473.9	18,591.3	18,291.6	18,407.7	-11.2	0.6
NASA	10,855.1	12,399.0	12,394.7	11,459.7	11,996.1	11,731.4	11,433.4	11,120.8	10,934.5	10,677.0	10,075.5	9,858.1	10,236.9	-5.7	3.8
HHS	5,953.5	7,119.0	6,129.7	6,628.9	7,852.7	7,400.8	7,131.2	7,952.5	8,541.0	7,999.8	8,659.9	8,761.5	9,626.1	61.7	9.9
DOI	7,816.3	7,391.9	6,378.4	4,326.6	6,612.2	6,427.3	7,456.0	7,845.9	9,504.5	8,224.9	7,559.4	8,742.6	8,617.8	10.3	-1.4
USDA	8,358.7	9,573.4	9,045.8	9,056.9	7,370.7	7,917.0	7,828.6	7,446.7	7,373.6	7,170.5	7,216.9	6,978.5	7,336.3	-12.2	5.1
DOT ¹	19,568.0	18,965.2	18,688.7	19,564.1	19,125.9	18,509.8	22,570.8	21,215.6	17,810.2	18,256.8	5,618.1	5,159.4	5,044.3	-74.2	-2.2
TRSY ¹	2,868.3	3,643.0	4,132.6	3,764.1	4,597.6	4,816.3	4,899.4	5,337.0	5,355.6	5,506.3	4,144.4	2,585.3	4,564.5	59.1	76.6
DOC	2,489.1	4,476.3	2,882.8	2,883.1	2,721.4	2,470.3	2,684.3	1,907.1	2,521.9	2,197.3	2,333.9	2,216.8	2,930.8	17.7	32.2
TVA	2,975.9	2,717.7	2,687.9	2,627.8	2,483.3	2,379.3	2,609.2	3,006.6	3,005.8	2,824.0	2,838.2	2,717.7	2,683.2	-9.8	-1.3
DOL	2,385.2	2,376.0	2,385.7	2,491.5	2,490.2	2,540.4	2,048.1	2,480.7	2,671.4	2,775.1	2,964.3	2,896.2	2,658.6	11.5	-8.2
EPA	904.5	747.0	1,120.5	1,100.0	1,149.3	1,120.4	1,290.8	1,038.1	1,228.3	1,094.5	1,388.4	1,421.3	1,417.2	56.7	-0.3
ST	246.9	302.7	437.3	653.3	2,938.8	2,934.2	3,053.1	3,379.1	2,700.7	626.6	1,033.3	1,032.5	1,114.6	351.4	8.0
HUD	116.9	140.3	131.3	140.8	137.6	126.4	129.6	144.1	149.0	148.0	144.3	142.8	139.2	19.0	-2.5
OTHER*	1,156.1	3,072.0	4,108.4	4,814.5	5,040.5	3,889.4	3,865.9	3,731.3	3,727.1	4,606.6	4,293.7	2,694.5	2,348.0	103.1	-12.9
CIVILIAN AGENCIES															
SUBTOTAL	199,700.5	195,849.7	203,294.2	204,007.7	211,971.9	200,767.7	200,971.4	214,752.0	215,746.1	207,281.9	216,175.1	216,522.4	215,926.9	8.1	-0.3
ALL AGENCIES															
DOD	1,250,613.8	1,241,655.8	926,022.9	904,456.2	880,007.7	837,115.8	810,663.0	779,055.2	787,216.4	837,525.4	904,356.1	960,668.6	932,097.4	-25.5	-3.0
TOTAL	1,450,314.3	1,437,505.5	1,129,317.1	1,108,463.9	1,091,979.6	1,037,883.5	1,011,634.4	993,807.2	1,002,962.5	1,044,807.3	1,120,531.1	1,177,191.0	1,148,024.3	-20.8	-2.5
MBOE	249.0	246.8	193.9	190.3	187.5	178.2	173.7	170.6	172.2	179.4	192.4	202.1	197.1		
PETAJOULE	1,530.0	1,516.5	1,191.4	1,169.4	1,152.0	1,094.9	1,067.2	1,048.4	1,058.1	1,102.2	1,182.1	1,241.9	1,211.1		

Data as of 7 June 2006

¹FY 2003 was the first year for reporting by the Department of Homeland Security. Significant declines in energy use were also evident in that year for agencies such as the Departments of Transportation and the Treasury which transferred functions to the new Department.

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, BBG/IBB, and FERC.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour and 1,000 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year.

Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-3
PRIMARY ENERGY CONSUMPTION IN FEDERAL STANDARD BUILDINGS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985 . . .	FY 1990 . . .	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
USPS	40,143.9	47,824.8	57,606.8	59,866.0	54,696.6	57,068.7	58,333.5	66,217.4	62,202.1	62,145.5	60,810.9	63,678.4	64,656.4	61.1	1.5
VA	42,864.1	44,400.3	47,474.3	48,716.5	49,087.3	49,577.6	49,880.1	49,633.7	52,031.5	52,217.8	53,840.6	54,694.9	55,320.2	29.1	1.1
DOE	48,300.5	47,636.0	44,231.2	44,087.6	41,373.4	40,680.7	39,588.4	37,938.9	39,238.3	36,880.6	37,300.2	35,758.2	34,003.8	-29.6	-4.9
GSA	40,134.3	32,651.2	33,523.9	34,903.9	35,121.4	35,106.2	35,413.0	31,717.6	31,683.3	31,076.1	31,500.2	30,953.2	30,934.2	-22.9	-0.1
NASA	8,899.9	10,764.0	11,435.9	11,671.5	11,524.9	11,532.2	11,174.5	10,970.3	11,259.8	10,838.8	10,650.5	10,109.5	10,793.8	21.3	6.8
DOI	8,542.8	7,616.8	7,770.1	6,274.6	7,311.3	7,533.8	7,631.3	8,202.1	9,685.2	9,690.9	9,071.2	11,428.7	10,675.2	25.0	-6.6
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10,300.9	9,489.4	9,307.4	NA	-1.9
USDA	4,156.4	5,203.3	5,210.4	5,369.7	4,782.6	5,054.8	4,501.0	4,919.6	4,902.2	5,182.3	6,286.0	5,628.3	5,897.4	41.9	4.8
DOL	3,734.1	3,916.2	3,979.2	4,100.5	4,137.2	4,167.4	3,264.6	4,392.2	4,666.0	4,813.7	5,068.9	4,997.8	4,855.8	30.0	-2.8
DOJ	9,048.5	9,512.4	12,004.2	14,600.8	14,881.7	15,488.4	16,117.8	18,612.5	18,967.3	18,806.1	20,676.7	21,442.6	2,777.0	-69.3	-87.0
DOT	8,746.5	7,217.0	8,472.5	9,647.7	10,021.9	9,062.4	8,996.8	8,810.5	8,849.0	9,326.2	1,979.3	1,969.9	1,881.9	-78.5	-4.5
TVA	1,349.0	1,440.3	2,517.7	2,438.5	2,298.7	2,267.9	2,243.5	2,131.2	2,161.6	1,949.3	1,956.4	1,918.6	1,866.4	38.4	-2.7
DOC	1,208.3	953.1	1,387.8	1,338.3	1,328.8	1,231.2	1,268.2	1,232.5	1,379.3	1,331.9	1,415.2	1,398.6	1,404.8	16.3	0.4
ST	702.6	833.6	260.3	795.4	299.9	301.7	306.3	389.6	324.4	738.6	840.9	975.1	1,040.4	48.1	6.7
TRSY	1,094.9	719.9	3,822.9	3,670.7	4,890.2	4,638.7	4,680.0	1,456.8	1,504.6	1,398.9	824.6	875.5	867.4	-20.8	-0.9
HHS	677.7	734.4	593.9	586.8	573.9	538.6	524.5	582.7	590.1	576.1	614.9	608.6	546.0	-19.4	-10.3
HUD	356.2	435.0	322.3	339.2	326.7	316.5	324.2	324.2	336.7	327.8	324.8	312.8	305.9	-14.1	-2.2
OTHER*	1,087.7	1,703.8	3,261.6	5,266.4	5,542.7	5,172.1	5,446.6	5,309.5	5,283.5	6,900.6	6,432.4	2,647.3	2,783.6	155.9	5.1
CIVILIAN AGENCIES															
SUBTOTAL	221,047.4	255,661.8	243,875.0	253,674.1	248,199.0	249,738.9	249,694.1	252,841.2	255,064.7	254,201.2	259,894.5	258,887.3	239,917.7	8.5	-7.3
DOD	512,581.0	587,974.8	483,052.7	459,175.5	443,225.4	434,713.1	433,321.6	426,630.8	425,948.7	423,330.2	414,841.3	408,273.9	407,258.1	-20.5	-0.2
ALL AGENCIES															
TOTAL	733,628.3	843,636.6	726,927.7	712,849.6	691,424.4	684,451.9	683,015.6	679,472.0	681,013.4	677,531.4	674,735.8	667,161.1	647,175.8	-11.8	-3.0
MBOE	125.9	144.8	124.8	122.4	118.7	117.5	117.3	116.6	116.9	116.3	115.8	114.5	111.1		
PETAJoule	774.0	890.0	766.9	752.0	729.4	722.1	720.6	716.8	718.4	714.8	711.8	703.8	682.7		

Data as of 7 June 2006

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, BBG/IBB, and FERC.

Note: This table uses a conversion factor for electricity of 11,850 Btu per kilowatt hour and 1,390 Btu per pound of steam.

Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-4
SITE-DELIVERED ENERGY CONSUMPTION IN FEDERAL STANDARD BUILDINGS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985 . .	FY 1990 . .	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
VA	24,552.0	24,380.1	25,075.4	26,172.3	26,062.0	26,216.9	26,134.8	26,120.6	26,748.3	26,866.2	28,470.5	28,854.2	28,692.6	16.9	-0.6
USPS	16,238.3	18,480.0	21,649.7	22,210.0	22,006.4	22,683.9	23,127.0	25,238.3	24,974.3	23,671.1	23,968.6	23,388.2	23,423.7	44.2	0.2
DOE	28,603.8	25,610.7	23,740.0	21,456.5	19,818.3	19,363.7	18,533.5	17,350.2	18,356.4	17,021.6	16,991.9	16,202.0	15,366.0	-46.3	-5.2
GSA	15,865.6	12,513.4	12,366.7	13,439.4	13,353.7	13,123.7	13,083.9	11,728.0	12,024.9	11,436.9	11,940.5	11,638.4	11,539.1	-27.3	-0.9
DOI	4,762.4	4,039.4	3,596.3	2,979.1	3,668.5	3,747.4	3,794.6	4,006.6	4,692.2	4,916.0	4,408.3	5,965.0	5,234.7	9.9	-12.2
NASA	3,760.1	4,381.0	4,381.2	4,436.1	4,350.7	4,404.8	4,303.3	4,263.7	4,418.3	4,231.6	4,153.0	3,926.2	4,270.2	13.6	8.8
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,508.6	4,146.5	3,858.0	NA	-7.0
USDA	1,953.6	2,204.9	2,083.1	2,261.3	1,996.0	2,111.1	1,901.8	2,052.5	2,070.8	2,410.8	2,631.2	2,384.9	2,551.8	30.6	7.0
DOL	2,153.0	2,137.1	2,028.8	2,153.9	2,153.9	2,190.2	1,697.9	2,111.8	2,312.5	2,411.8	2,566.9	2,499.0	2,261.3	5.0	-9.5
DOJ	6,112.0	4,863.8	6,303.9	7,490.6	8,003.7	7,783.0	8,047.1	9,374.6	9,798.9	9,547.8	10,790.6	11,773.8	1,102.3	-82.0	-90.6
DOT	4,614.5	3,750.4	3,669.1	4,058.0	3,959.6	3,779.5	3,828.1	3,716.4	3,913.8	3,971.4	721.6	713.8	676.8	-85.3	-5.2
TVA	402.4	427.8	748.5	728.4	665.6	658.4	650.8	617.7	626.2	565.0	565.9	557.0	541.7	34.6	-2.7
DOC	540.3	399.4	494.9	490.1	457.2	429.9	449.4	437.0	471.4	442.0	509.9	492.7	484.0	-10.4	-1.8
ST	232.2	267.8	92.9	289.2	114.0	113.2	114.7	152.9	123.2	245.5	300.8	323.8	337.5	45.4	4.2
TRSY	426.0	396.0	1,418.3	1,484.9	1,904.4	1,741.2	1,815.0	530.0	573.0	498.0	295.5	309.1	303.0	-28.9	-2.0
HHS	253.0	273.1	201.7	204.7	200.1	188.8	184.8	212.3	219.6	200.9	236.8	225.0	206.5	-18.4	-8.2
HUD	116.9	140.3	105.9	115.4	109.3	103.1	106.3	106.3	115.6	109.9	112.9	110.2	106.6	-8.9	-3.3
OTHER*	406.8	660.0	1,235.8	1,929.8	2,035.7	1,911.5	1,982.6	1,946.3	1,944.9	2,592.1	2,437.9	946.1	986.2	142.4	4.2
CIVILIAN AGENCIES															
SUBTOTAL	110,993.1	116,099.6	109,191.8	111,899.6	110,859.1	110,550.2	109,755.6	109,965.3	113,384.3	111,138.6	115,611.3	114,455.6	101,941.9	-8.2	-10.9
DOD	304,190.0	321,101.6	247,166.9	235,994.1	227,070.0	220,567.6	217,958.2	210,965.0	211,528.2	206,315.2	204,435.4	196,654.0	198,078.2	-34.9	0.7
ALL AGENCIES															
TOTAL	415,183.1	437,201.2	356,358.8	347,893.7	337,929.1	331,117.8	327,713.8	320,930.3	324,912.5	317,453.7	320,046.7	311,109.6	300,020.1	-27.7	-3.6
MBOE	71.3	75.1	61.2	59.7	58.0	56.8	56.3	55.1	55.8	54.5	54.9	53.4	51.5		
PETAJOULE	438.0	461.2	375.9	367.0	356.5	349.3	345.7	338.6	342.8	334.9	337.6	328.2	316.5		

Data as of 7 June 2006

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, BBG/IBB, and FERC.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.

Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-5
CONSUMPTION AND COSTS OF FEDERAL STANDARD BUILDINGS ENERGY
BY FUEL TYPE IN FY 2005, FY 2004, AND FY 1985
(Constant 2005 Dollars)

ENERGY TYPE	BILLION BTU	COST (MILLION \$)	COST/ MILLION BTU	COST PER PHYSICAL UNIT
2005				
ELECTRICITY	138,427.3	\$2,887.842	\$20.86	\$71.18 /MWH
FUEL OIL	28,241.5	\$263.890	\$9.34	\$1.30 /Gallon
NATURAL GAS	99,598.4	\$823.690	\$8.27	\$8.53 /Thou. Cubic. Ft.
LPG/PROPANE	3,044.3	\$36.728	\$12.06	\$1.15 /Gallon
COAL	12,914.6	\$38.934	\$3.01	\$74.10 /Short Ton
PURCHASED STEAM	12,358.7	\$130.057	\$10.52	\$10.52 /MMBtu
OTHER	5,435.3	\$77.112	\$14.19	\$14.19 /MMBtu
TOTAL	300,020.1	\$4,258.254		

AVERAGE COST PER MMBTU = \$14.193

2004				
ELECTRICITY	141,876.9	\$2,860.776	\$20.16	\$68.80 /MWH
FUEL OIL	31,174.7	\$218.286	\$7.00	\$0.97 /Gallon
NATURAL GAS	105,418.8	\$748.707	\$7.10	\$7.32 /Thou. Cubic. Ft.
LPG/PROPANE	2,736.0	\$30.858	\$11.28	\$1.08 /Gallon
COAL	12,782.7	\$36.960	\$2.89	\$71.07 /Short Ton
PURCHASED STEAM	13,294.1	\$188.454	\$14.18	\$14.18 /MMBtu
OTHER	3,826.3	\$42.011	\$10.98	\$10.98 /MMBtu
TOTAL	311,109.6	\$4,126.053		

AVERAGE COST PER MMBTU = \$13.262

1985				
ELECTRICITY	127,649.0	\$3,925.075	\$30.75	\$104.92 /MWH
FUEL OIL	92,947.1	\$1,020.079	\$10.97	\$1.52 /Gallon
NATURAL GAS	127,690.3	\$1,082.746	\$8.48	\$8.74 /Thou. Cubic. Ft.
LPG/PROPANE	3,162.1	\$40.224	\$12.72	\$1.21 /Gallon
COAL	52,380.1	\$223.647	\$4.27	\$104.95 /Short Ton
PURCHASED STEAM	7,171.4	\$154.862	\$21.59	\$21.59 /MMBtu
OTHER	4,215.1	\$37.667	\$8.94	\$8.94 /MMBtu
TOTAL	415,215.2	\$6,484.301		

AVERAGE COST PER MMBTU = \$15.617

Data as of 7 June 2006

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-6
SITE-DELIVERED ENERGY CONSUMPTION IN FEDERAL ENERGY-INTENSIVE FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985 . .	FY 1990 . .	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 90-05	% CHANGE 04-05
DOJ	0.0	0.0	707.8	944.1	846.9	850.7	862.8	862.2	845.1	838.7	961.3	1,208.9	12,916.5	NA	968.5
HHS	5,327.2	6,845.9	5,822.6	6,405.6	7,217.7	6,764.3	6,498.6	7,138.8	7,597.8	7,612.2	7,842.5	8,193.8	8,861.8	29.4	8.2
DOE	6,991.4	7,507.9	6,939.1	7,262.5	7,429.3	6,415.8	2,431.6	6,663.3	5,090.0	7,242.2	7,403.5	7,412.1	7,269.6	-3.2	-1.9
GSA ¹	4,146.9	4,354.0	1,213.8	961.0	890.7	849.2	1,150.8	5,093.8	5,799.4	5,453.3	5,997.6	5,948.5	5,959.8	36.9	0.2
NASA	3,496.3	4,142.9	3,900.6	3,535.9	3,835.6	3,897.9	3,794.5	3,585.5	3,413.9	3,382.0	3,294.7	3,211.9	3,469.3	-16.3	8.0
USDA	2,085.5	2,416.2	2,141.0	2,140.8	2,221.6	2,416.5	2,589.0	2,368.5	2,826.7	2,216.1	2,209.1	2,085.6	2,183.1	-9.6	4.7
TRSY	287.3	1,773.8	941.0	928.3	1,131.8	996.5	964.2	2,303.7	2,204.8	2,130.1	1,992.7	1,965.6	1,891.7	6.6	-3.8
DOC	938.6	976.6	1,627.4	1,823.0	1,335.2	1,332.0	1,400.4	1,315.8	1,454.6	1,395.3	1,464.1	1,593.0	1,552.0	58.9	-2.6
EPA	772.3	747.0	1,020.9	1,023.5	1,012.1	1,022.7	1,170.2	940.3	1,118.3	979.7	1,255.3	1,311.2	1,310.3	75.4	-0.1
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	239.0	534.3	549.2	NA	2.8
USIA	0.0	1,406.9	878.2	936.2	1,092.2	1,020.4	951.4	951.4	951.4	1,229.6	1,033.2	943.9	433.9	-69.2	-54.0
SSA	0.0	0.0	0.0	215.5	204.7	211.4	199.1	237.5	201.9	190.6	186.1	181.8	183.5	NA	1.0
TVA	124.0	112.2	80.6	80.0	86.4	83.4	99.1	85.1	76.5	75.1	76.1	77.6	75.2	-33.0	-3.1
FCC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.3	6.3	6.3	0.0	1.1	NA	NA
PCC	167.2	190.8	209.4	218.6	221.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA
CIVILIAN AGENCIES															
SUBTOTAL	24,336.6	30,474.0	25,482.2	26,475.1	27,525.1	25,860.8	22,111.9	31,551.9	31,586.7	32,751.4	33,961.4	34,668.1	46,656.8	53.1	34.6
DOD	55,743.9	39,209.1	37,962.6	37,260.1	35,702.3	36,588.4	32,919.0	32,280.9	28,649.8	28,459.4	28,614.5	30,196.8	27,554.6	-29.7	-8.8
ALL AGENCIES															
TOTAL	80,080.5	69,683.2	63,444.8	63,735.2	63,227.4	62,449.2	55,030.9	63,832.8	60,236.4	61,210.8	62,575.8	64,864.9	74,211.4	6.5	14.4
MBOE	13.7	12.0	10.9	10.9	10.9	10.7	9.4	11.0	10.3	10.5	10.7	11.1	12.7		
PETAJOULE	84.5	73.5	66.9	67.2	66.7	65.9	58.1	67.3	63.5	64.6	66.0	68.4	78.3		

Data as of 7 June 2006

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Sum of components may not equal total due to independent rounding.

¹GSA's large increase in energy reported under this category beginning in FY 2000 is a result of the agency reclassifying buildings from the standard buildings inventory for FY 1990 and FY 2000 and subsequent years without adjusting data for the intervening years.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-7
CONSUMPTION AND COSTS OF FEDERAL ENERGY INTENSIVE FACILITIES
ENERGY BY FUEL TYPE IN FY 2005

ENERGY TYPE	BILLION BTU	COST (MILLION \$)	COST PER MILLION BTU	COST PER PHYSICAL UNIT
ELECTRICITY	32,377.0	\$591.867	\$18.28	\$62.37 /MWH
FUEL OIL	4,125.4	\$36.763	\$8.91	\$1.24 /Gallon
NATURAL GAS	29,015.2	\$239.181	\$8.24	\$8.50 /Thou. Cubic. Ft.
LPG/PROPANE	251.5	\$2.838	\$11.28	\$1.08 /Gallon
COAL	4,085.1	\$10.006	\$2.45	\$60.21 /Short Ton
PURCHASED STEAM	3,656.9	\$36.693	\$10.03	\$10.03 /MMBtu
OTHER	700.2	\$9.722	\$13.89	\$13.89 /MMBtu
TOTAL	74,211.4	\$927.070		

AVERAGE COST PER MMBTU = \$12.492

Data as of 7 June 2006

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE A-8
ENERGY CONSUMPTION, COSTS, AND GROSS SQUARE FOOTAGE OF
FEDERAL EXEMPT FACILITIES, FY 2005**

Agency	Energy Consumption		Energy Costs		Facility Gross Square Feet	
	Billion Btu	% of Agency's Total Facility Use	(\$ Million)	% of Agency's Total Facility Costs	(Thou. Sq. Ft.)	% of Agency's Total Facility Space
DOD	8,981.7	3.8%	\$151.206	1.4%	0.0	0.0%
DOE	4,978.1	18.0%	\$70.681	18.9%	11,393.1	11.1%
DOT	3,177.9	82.4%	\$80.828	71.4%	20,205.4	73.7%
USPS	1,489.3	6.0%	\$37.145	4.7%	0.0	0.0%
NASA	1,439.3	15.7%	\$21.412	14.6%	5,211.7	13.1%
TVA	1,265.5	67.2%	\$18.545	44.6%	18,646.7	65.7%
GSA	859.7	4.7%	\$18.218	5.3%	16,817.7	7.9%
NARA	685.2	100.0%	\$10.208	100.0%	3,945.9	100.0%
ST	325.5	49.1%	\$7.074	36.0%	2,598.8	44.9%
HHS	26.8	0.3%	\$0.632	0.5%	892.8	3.2%
DHS	7.8	0.2%	\$0.221	0.1%	30.5	0.1%
TRSY	0.1	0.0%	\$0.002	0.0%	332.0	2.6%
Total	23,236.8	NA	\$416.173	NA	80,074.6	NA

Data as of 7 June 2006

Source: Federal Agency Annual Energy Management Data Reports

**TABLE A-9
CONSUMPTION AND COSTS OF FEDERAL EXEMPT FACILITY ENERGY
BY FUEL TYPE IN FY 2005**

ENERGY TYPE	BILLION BTU	COST (MILLION \$)	COST/ MILLION BTU	COST PER PHYSICAL UNIT
ELECTRICITY	16,975.4	\$357.323	\$21.05	\$71.82 /MWH
FUEL OIL	2,073.0	\$15.795	\$7.62	\$1.06 /Gallon
NATURAL GAS	2,489.6	\$20.193	\$8.11	\$8.36 /Thou. Cubic. Ft.
LPG/PROPANE	25.6	\$0.339	\$13.26	\$1.26 /Gallon
COAL	132.6	\$0.354	\$2.67	\$65.62 /Short Ton
PURCHASED STEAM	828.2	\$11.052	\$13.34	\$13.34 /MMBtu
OTHER	712.3	\$11.117	\$15.61	\$15.61 /MMBtu
TOTAL	23,236.8	\$416.173		

AVERAGE COST PER MMBTU = \$17.910

Data as of 7 June 2006

This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE A-10
FEDERAL ENERGY CONSUMPTION IN VEHICLE AND EQUIPMENT OPERATIONS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985 . .	FY 1990 . .	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	% CHANGE 85-05	% CHANGE 04-05
USPS	11,524.2	12,136.2	14,571.2	14,217.1	16,779.2	14,777.2	14,583.7	15,976.3	16,192.1	15,831.8	17,173.5	15,821.0	15,821.0	37.3	0.0
DHS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13,583.9	18,837.1	14,936.0	NA	-20.7
DOJ	2,064.0	2,097.9	3,181.6	3,693.0	3,149.3	7,171.4	6,456.3	9,456.3	9,037.9	7,305.9	6,276.4	4,561.7	4,468.3	116.5	-2.0
DOI	3,053.9	3,352.5	2,782.2	1,347.5	2,943.7	2,679.9	3,661.4	3,839.3	4,812.3	3,308.9	3,151.2	2,777.6	3,383.1	10.8	21.8
DOE	2,882.0	2,520.4	1,841.9	1,561.0	1,971.0	1,955.6	1,444.6	1,803.4	1,714.4	1,587.0	1,417.1	2,736.6	2,814.5	-2.3	2.8
USDA	4,319.6	4,952.3	4,821.7	4,654.8	3,153.0	3,389.4	3,337.9	3,025.7	2,476.2	2,543.5	2,376.6	2,508.0	2,601.5	-39.8	3.7
TRSY	2,155.0	1,473.2	1,773.4	1,350.9	1,561.4	2,078.6	2,120.2	2,503.3	2,577.8	2,878.3	1,856.3	310.5	2,369.8	10.0	663.3
DOT	11,957.0	12,150.8	12,193.7	12,222.9	12,347.9	10,145.0	10,870.5	11,122.9	8,739.3	10,865.9	1,476.4	1,146.8	1,189.6	-90.1	3.7
VA	592.8	518.3	353.6	660.7	1,199.1	1,380.3	1,337.6	923.4	913.6	856.4	1,174.0	1,034.2	1,108.9	87.1	7.2
NASA	1,972.7	1,736.7	1,750.9	1,539.3	1,622.1	1,428.3	1,412.8	1,490.1	1,455.1	1,372.2	982.8	1,263.1	1,058.1	-46.4	-16.2
DOC	1,010.2	3,100.3	760.6	570.1	929.1	708.4	834.5	154.3	595.8	360.0	360.0	131.1	894.8	-11.4	582.7
TVA	578.5	476.6	541.7	583.8	479.5	429.1	423.3	850.1	822.3	747.9	942.3	845.3	800.7	38.4	-5.3
HHS	373.3	0.0	105.5	18.6	435.0	447.7	447.7	593.2	715.2	178.5	572.4	335.1	531.0	42.3	58.5
ST	14.8	34.9	0.0	0.0	44.7	40.9	40.9	486.4	37.1	49.4	444.2	451.7	451.7	NA	0.0
DOL	232.2	239.0	356.9	337.7	336.2	350.2	350.2	368.9	358.9	363.3	397.4	397.2	397.2	71.1	0.0
EPA	132.3	0.0	99.6	76.5	137.2	97.7	120.6	97.9	110.0	114.8	133.1	110.1	106.9	-19.1	-2.8
GSA	144.1	128.1	91.3	98.8	119.9	122.2	125.2	127.0	112.7	74.9	80.3	49.2	49.2	-65.9	0.0
HUD	0.0	0.0	25.4	25.4	28.3	23.3	23.3	37.8	33.4	38.0	31.4	32.6	32.6	NA	0.0
OTHER*	582.1	732.4	992.9	951.4	914.0	154.2	150.6	45.3	48.8	58.8	51.7	57.3	58.1	-90.0	1.4
CIVILIAN AGENCIES															
SUBTOTAL	43,588.5	45,649.7	46,244.1	43,909.5	48,150.6	47,379.4	47,741.4	52,901.5	50,753.0	48,535.5	52,480.9	53,406.1	53,073.1	21.8	-0.6
DOD															
	890,679.9	881,345.1	640,893.4	631,202.0	617,235.4	579,959.8	559,785.8	526,234.1	537,168.4	593,506.3	662,116.2	723,008.8	697,482.9	-21.7	-3.5
ALL AGENCIES															
TOTAL	934,268.4	926,994.8	687,137.4	675,111.5	665,386.0	627,339.2	607,527.2	579,135.6	587,921.5	642,041.8	714,597.1	776,414.9	750,556.0	-19.7	-3.3
MBOE	160.4	159.1	118.0	115.9	114.2	107.7	104.3	99.4	100.9	110.2	122.7	133.3	128.9		
PETAJOULE	985.6	977.9	724.9	712.2	702.0	661.8	640.9	611.0	620.2	677.3	753.9	819.1	791.8		

Data as of 7 June 2006

*Other includes for certain years the CFTC, CIA, FEMA, NSF, NRC, OPM, and BBG/IBB.

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE A-11
CONSUMPTION AND COSTS OF VEHICLE AND EQUIPMENT
ENERGY BY FUEL TYPE IN FY 2005**

ENERGY TYPE	BILLION BTU	COST (MILLION \$)	COST/ MILLION BTU	COST PER PHYSICAL UNIT
AUTO GASOLINE	47,192.9	\$708.156	\$18.07	\$1.88 /Gallon
DIST/DIESEL	33,743.3	\$377.164	\$8.85	\$1.55 /Gallon
LPG/PROPANE	52.5	\$0.610	\$8.69	\$1.11 /Gallon
AVIATION GASOLINE	385.7	\$10.079	\$12.35	\$3.27 /Gallon
JET FUEL	492,219.8	\$6,449.088	\$2.45	\$1.70 /Gallon
NAVY SPECIAL	171,719.4	\$1,278.839	\$12.19	\$1.03 /Gallon
OTHER	5,242.4	\$31.798	\$13.89	\$13.89 /MMBtu
TOTAL	750,556.0	\$8,855.734		

AVERAGE COST PER MMBTU = \$11.799

Data as of 7 June 2006

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE A-12
FEDERAL ENERGY EXPENDITURES, FY 1985–FY 2005
(Constant 2005 Dollars)**

Sector/ Fiscal Year	Annual Energy Use (BBtu)	Annual Energy Cost (\$ Million)	Annual Energy Cost (\$/MMBtu)	Change in Energy Costs from 1985 (\$ Million) ¹
Standard Buildings				
1985	415,183.1	\$6,484.300	\$15.618	\$0.000
1986	443,667.3	\$6,564.140	\$14.795	\$79.841
1987	465,393.9	\$6,530.684	\$14.033	\$46.384
1988	440,381.3	\$5,904.158	\$13.407	-\$580.141
1989	437,487.3	\$5,499.332	\$12.570	-\$984.968
1990	437,201.2	\$5,988.094	\$13.696	-\$496.206
1991	394,459.0	\$5,749.973	\$14.577	-\$734.326
1992	401,667.6	\$5,408.153	\$13.464	-\$1,076.146
1993	391,492.2	\$5,636.090	\$14.396	-\$848.210
1994	373,532.2	\$5,298.614	\$14.185	-\$1,185.686
1995	356,358.8	\$4,928.827	\$13.831	-\$1,555.473
1996	347,893.7	\$4,736.422	\$13.615	-\$1,747.877
1997	337,929.1	\$4,416.352	\$13.069	-\$2,067.948
1998	331,117.8	\$4,168.237	\$12.588	-\$2,316.063
1999	327,713.8	\$3,902.798	\$11.909	-\$2,581.502
2000	320,930.3	\$3,768.978	\$11.744	-\$2,715.321
2001	324,912.5	\$4,377.708	\$13.473	-\$2,106.592
2002	317,453.7	\$4,072.708	\$12.829	-\$2,411.592
2003	320,046.7	\$3,997.401	\$12.490	-\$2,486.898
2004	311,109.6	\$4,126.053	\$13.262	-\$2,358.247
2005	300,020.1	\$4,258.254	\$14.193	-\$2,226.046
Energy Intensive Facilities				
1985	80,080.5	\$1,279.814	\$15.982	\$0.000
1986	20,321.6	\$474.002	\$23.325	-\$805.813
1987	24,827.5	\$441.278	\$17.774	-\$838.536
1988	55,666.3	\$875.310	\$15.724	-\$404.504
1989	52,355.4	\$682.781	\$13.041	-\$597.033
1990	69,683.2	\$1,018.152	\$14.611	-\$261.663
1991	78,976.9	\$1,106.339	\$14.008	-\$173.476
1992	92,335.0	\$1,237.681	\$13.404	-\$42.133
1993	65,689.6	\$810.468	\$12.338	-\$469.346
1994	65,725.8	\$767.365	\$11.675	-\$512.449
1995	63,444.8	\$697.524	\$10.994	-\$582.290
1996	63,735.2	\$720.738	\$11.308	-\$559.076
1997	63,227.4	\$704.625	\$11.144	-\$575.189
1998	62,449.2	\$617.036	\$9.881	-\$662.779
1999	55,030.9	\$564.532	\$10.258	-\$715.282
2000	63,832.8	\$626.332	\$9.812	-\$653.482
2001	60,236.4	\$711.776	\$11.816	-\$568.038
2002	61,210.8	\$653.451	\$10.675	-\$626.364
2003	62,575.8	\$700.174	\$11.189	-\$579.641
2004	64,864.9	\$735.898	\$11.345	-\$543.917
2005	74,211.4	\$927.070	\$12.492	-\$352.745

Sector/ Fiscal Year	Annual Energy Use (BBtu)	Annual Energy Cost (\$ Million)	Annual Energy Cost (\$/MMBtu)	Change in Energy Costs from 1985 (\$ Million) ¹
Exempt Facilities				
1985	20,782.4	\$357.351	\$17.195	\$0.000
1986	17,878.5	\$286.536	\$16.027	-\$70.815
1987	17,195.9	\$270.682	\$15.741	-\$86.669
1988	17,367.6	\$261.767	\$15.072	-\$95.584
1989	14,840.0	\$249.781	\$16.832	-\$107.570
1990	14,800.8	\$288.588	\$19.498	-\$68.763
1991	17,851.3	\$344.574	\$19.302	-\$12.777
1992	17,677.5	\$279.976	\$15.838	-\$77.375
1993	16,981.0	\$266.592	\$15.699	-\$90.759
1994	16,172.3	\$274.253	\$16.958	-\$83.098
1995	22,376.0	\$247.197	\$11.047	-\$110.154
1996	21,723.5	\$254.134	\$11.699	-\$103.217
1997	25,437.2	\$353.075	\$13.880	-\$4.276
1998	16,977.4	\$300.861	\$17.721	-\$56.490
1999	21,362.5	\$288.804	\$13.519	-\$68.547
2000	29,908.5	\$445.660	\$14.901	\$88.309
2001	29,892.1	\$521.438	\$17.444	\$164.086
2002	24,101.0	\$458.151	\$19.010	\$100.800
2003	23,311.5	\$416.681	\$17.874	\$59.330
2004	24,801.7	\$408.749	\$16.481	\$51.398
2005	23,236.8	\$416.173	\$17.910	\$58.821
Vehicles & Equipment				
1985	934,268.4	\$11,146.121	\$11.930	\$0.000
1986	924,833.7	\$6,673.362	\$7.216	-\$4,472.759
1987	958,904.3	\$7,042.390	\$7.344	-\$4,103.731
1988	846,896.2	\$6,631.023	\$7.830	-\$4,515.098
1989	959,994.6	\$7,477.648	\$7.789	-\$3,668.474
1990	926,994.8	\$8,245.429	\$8.895	-\$2,900.693
1991	970,454.3	\$10,570.533	\$10.892	-\$575.588
1992	783,122.4	\$6,235.522	\$7.962	-\$4,910.599
1993	772,633.8	\$6,542.811	\$8.468	-\$4,603.310
1994	722,790.5	\$4,618.459	\$6.390	-\$6,527.663
1995	687,137.4	\$4,753.110	\$6.917	-\$6,393.012
1996	675,111.5	\$4,583.424	\$6.789	-\$6,562.698
1997	665,386.0	\$5,155.047	\$7.747	-\$5,991.074
1998	627,339.2	\$5,327.204	\$8.492	-\$5,818.918
1999	607,527.2	\$4,590.891	\$7.557	-\$6,555.231
2000	579,135.6	\$3,640.866	\$6.287	-\$7,505.255
2001	587,921.5	\$5,227.001	\$8.891	-\$5,919.120
2002	642,041.8	\$5,564.753	\$8.667	-\$5,581.368
2003	714,597.1	\$5,259.926	\$7.361	-\$5,886.196
2004	776,414.9	\$6,383.032	\$8.221	-\$4,763.089
2005	750,556.0	\$8,855.734	\$11.799	-\$2,290.387

Sector/ Fiscal Year	Annual Energy Use (BBtu)	Annual Energy Cost (\$ Million)	Annual Energy Cost (\$/MMBtu)	Change in Energy Costs from 1985 (\$ Million) ¹
Total Energy - All Sectors				
1985	1,450,314.4	\$19,267.586	\$13.285	\$0.000
1986	1,406,701.1	\$13,998.041	\$9.951	-\$5,269.546
1987	1,466,321.6	\$14,285.034	\$9.742	-\$4,982.552
1988	1,360,311.4	\$13,672.259	\$10.051	-\$5,595.327
1989	1,464,677.3	\$13,909.542	\$9.497	-\$5,358.044
1990	1,448,680.0	\$15,540.263	\$10.727	-\$3,727.323
1991	1,461,741.5	\$17,771.418	\$12.158	-\$1,496.168
1992	1,294,802.5	\$13,161.332	\$10.165	-\$6,106.254
1993	1,246,796.6	\$13,255.962	\$10.632	-\$6,011.625
1994	1,178,220.8	\$10,958.690	\$9.301	-\$8,308.896
1995	1,129,317.0	\$10,626.657	\$9.410	-\$8,640.929
1996	1,108,463.9	\$10,294.718	\$9.287	-\$8,972.868
1997	1,091,979.7	\$10,629.100	\$9.734	-\$8,638.487
1998	1,037,883.6	\$10,413.337	\$10.033	-\$8,854.249
1999	1,011,634.4	\$9,347.025	\$9.240	-\$9,920.562
2000	993,807.2	\$8,481.837	\$8.535	-\$10,785.750
2001	1,002,962.5	\$10,837.922	\$10.806	-\$8,429.664
2002	1,044,807.3	\$10,749.062	\$10.288	-\$8,518.524
2003	1,120,531.1	\$10,374.181	\$9.258	-\$8,893.405
2004	1,177,191.1	\$11,653.732	\$9.900	-\$7,613.855
2005	1,148,024.3	\$14,457.230	\$12.593	-\$4,810.356

¹Changes in energy costs from 1985 should not be construed as savings resulting from Federal energy management activities. Many variables contribute to fluctuations in annual energy costs, including changes in square footage, building stock, weather, energy efficiency investments, service level, fuel mix, fuel prices, and vehicle, naval, and aircraft fleet composition. This table incorporates revisions to previously published energy consumption and cost data submitted to DOE by Federal agencies.

Source: Federal Agency Annual Energy Management Data Reports

APPENDIX B
DATA COLLECTION AND CARBON CALCULATIONS

APPENDIX B

DATA COLLECTION

Standard Buildings, Energy Intensive Facilities, and Exempt Facilities

The Federal agencies that own or control buildings are required to report the energy consumption in these buildings to FEMP by January 1 after the end of each fiscal year. The General Services Administration (GSA) reports the energy of buildings it owns and operates, including usage by other Federal agency occupants. For agencies which have been delegated authority by GSA to enter into contracts for energy and utility services, the individual agencies are responsible for reporting the energy consumption and square footage figures.

The data shown in this report do not include leased space in buildings where the energy costs are a part of the rent and the Federal agency involved has no control over the building's energy management.

The Federal agencies submit their annual reports expressed in the following units: megawatthours of electricity; thousands of gallons of fuel oil; thousands of cubic feet of natural gas; thousands of gallons of liquefied petroleum gas (LPG) and propane; short tons of coal; billions of Btu of purchased steam; and billions of Btu of "other." DOE reviews this data for accuracy and confers with the submitting agency to clarify any apparent anomalies. The data are then entered into a computer database management program.

The tables shown in this annual report are expressed in billions of Btu derived from the following conversion factors:

Electricity	-	3,412 Btu/kilowatt hour
Fuel Oil	-	138,700 Btu/gallon
Natural Gas	-	1,031 Btu/cubic foot
LPG/Propane	-	95,500 Btu/gallon
Coal	-	24,580,000 Btu/short ton
Purchased Steam	-	1,000 Btu/pound

The above conversion factors for electricity and purchased steam refer to site-delivered energy (or heat content) and do not account for energy consumed in the production and delivery of energy products. Table 6 of this report accounts for primary energy use, which is the sum of the energy directly consumed by end users (site energy) and the source energy consumed in the production and delivery of energy products. Using 2002 data from EIA, a blended heat rate of 10,191 Btu/kWh was calculated for fossil and nuclear steam-electric plants. In addition to conversion losses, transmission and distribution losses (9 percent) and power plant use (5 percent) are also factored into the delivered heat content, resulting in a total source energy input for electricity of 11,850 Btu/kWh. DOE uses this conversion factor to calculate primary energy use for electricity and 1,390 Btu per pound for purchased steam.

In addition, the Federal agencies annually report to FEMP the gross square footage of their buildings and the cost of their buildings' energy.

Vehicles and Equipment

Federal agencies are required to report the energy consumption of their fleet vehicles through DOE's Federal Automotive Statistical Tool (FAST) no later than November 1 after the end of each fiscal year. Energy consumption in other types of equipment not reported through FAST is required to be reported to FEMP by January 1 after the end of each fiscal year.

The fuels used in vehicles and equipment are automotive gasoline, diesel and petroleum distillate fuels, aviation gasoline, jet fuel, navy special, liquefied petroleum gas/propane, and "other." All the fuels in this category with the exception of "other" are reported in thousands of gallons. "Other" is reported in billions of Btu.

The conversion factors for these fuels are:

Gasoline	-	125,000 Btu/gallon
Diesel-Distillate	-	138,700 Btu/gallon
Aviation Gasoline	-	125,000 Btu/gallon
Jet Fuel	-	130,000 Btu/gallon
Navy Special	-	138,700 Btu/gallon
LPG/Propane	-	95,500 Btu/gallon

This report excludes those agencies that have been unable to provide complete fiscal year consumption data prior to the publication date. All agency omissions, as well as any anomalies in the data, are indicated by footnotes on the tables or in the text of the report

CALCULATION OF ESTIMATED CARBON EMISSIONS

In the past, DOE tracked and reported aggregate energy use for all Federal agencies and estimated carbon emissions using national fuel-specific emission factors. This approach, however, resulted in less accurate emission estimates for electricity use because carbon emission factors for electricity vary significantly by utility and State depending on the resource used to generate the electricity (e.g., coal, gas, nuclear, hydro).

To obtain a greater level of accuracy in estimating emissions from electricity use, DOE developed a new approach that places little or no additional reporting burden on the agencies. Agencies continue to report their aggregated national-level electricity consumption data as they have in the past. DOE then takes that total consumption figure and apportions it across the States in which the agency has facility locations. DOE will then multiply the apportioned electricity usage by the appropriate regional-level carbon emission factor assigned to each State. Once emissions from electricity use are calculated, these will be added to the emissions estimated from the other fuels used by the agency to determine total carbon emissions. (National factors may be appropriately used for fuel oil, natural gas, LPG/propane, coal, and purchased steam.)

DOE estimated State electricity usage by determining the percentage of facility floor area for the agency and apportioning the reported total electricity use according to that percentage. For the purposes of estimating changes in greenhouse gas emissions over time, DOE is assuming that floor area can be used as a reasonable proxy to represent the State-level usage pattern for electricity consumption for an agency. DOE uses historical square footage data for Government-owned buildings from the GSA's Office of Governmentwide Policy, Office of Real Property to determine each agency's percentage floor area for each State.

DOE uses factors derived from data from EIA for estimating carbon emissions from non-electric fuels on a nationwide basis. The regional emissions factors for electricity were calculated by summing the annual EIA data on electricity sales and carbon emissions for each State in a given region. These sums were then used to calculate the regional emissions/kWh (which were then converted to MMTCE/Quad). This value will be used for each State in a particular region.

Non-Electric Fuel National Coefficients Million Metric Tons of Carbon Equivalent (MMTCE) per Site-Delivered Quad (or Metric Tons of Carbon Equivalent [MTCE] per Site-Delivered Billion Btu)

Fuel	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fuel Oil	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95	19.95
Natural Gas	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47	14.47
LPG/Propane	16.99	16.98	16.99	16.97	17.01	17.00	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99
Coal	25.82	25.89	25.87	25.77	25.77	25.80	25.75	25.76	25.79	25.80	25.74	25.74	25.74	25.74	25.74	25.74
Purchased Steam	35.12	35.21	35.18	35.05	35.05	35.09	35.02	35.03	35.07	35.09	35.01	35.01	35.01	35.01	35.01	35.01

Source: EIA's Emissions of Greenhouse Gases in the United States 2001. Table B1, DOE/EIA-0573, December 2002. The factor for purchased steam is derived from the coefficient for coal adding associated losses for generation and transportation (using a factor of 1.39 to convert site-delivered to primary energy).

Electricity Regional Coefficients
Million Metric Tons of Carbon Equivalent (MMTCE) per Site-Delivered Quad
(or Metric Tons of Carbon Equivalent [MTCE] per Site-Delivered Billion Btu)

State/Region	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AK	66.63	63.51	59.34	59.42	58.42	59.33	59.53	63.33	56.48	55.52	57.68	59.47	64.99	57.20	57.20	57.20
AL, GA, MS, NC, SC, TN, VA	45.42	43.91	44.90	47.94	44.94	45.99	47.00	48.15	46.64	46.73	47.80	48.15	49.18	48.37	48.37	48.37
AR, KS, LA, MO, OK	64.43	65.26	65.55	61.92	64.06	65.35	64.73	65.15	64.69	65.36	64.75	65.52	68.22	69.80	69.80	69.80
AZ, CO, NM	83.70	78.50	82.03	82.02	80.49	72.87	70.30	70.98	71.79	72.15	74.32	74.68	71.64	71.92	71.92	71.92
CA	16.82	16.06	18.76	17.71	20.19	15.59	13.99	14.12	14.74	16.15	18.71	20.90	19.68	18.07	18.07	18.07
CT, MA, ME, NH, RI, VT	35.25	35.56	33.08	29.90	29.62	29.32	30.05	37.13	36.52	33.46	30.92	31.68	34.18	33.58	33.58	33.58
DC, DE, MD, NJ, PA	49.94	48.19	48.45	48.86	47.41	47.17	47.65	48.17	48.32	47.11	49.11	45.36	45.66	44.64	44.64	44.64
FL	48.33	50.80	49.50	49.92	48.59	47.10	48.03	48.86	50.52	48.91	47.68	46.97	45.96	46.29	46.29	46.29
HI	73.27	60.60	67.70	67.24	66.51	66.83	67.65	66.80	65.92	65.57	65.47	64.60	64.90	61.67	61.67	61.67
IA, MN, NE, ND, SD	75.96	74.11	75.58	76.43	73.77	72.44	71.63	71.15	74.52	72.61	73.27	72.05	73.79	74.62	74.62	74.62
ID, MT, NV, OR, UT, WA, WY	43.15	43.34	47.79	45.02	48.67	42.95	42.23	41.74	46.31	44.31	46.31	54.26	50.30	52.30	52.30	52.30
IL, WI	46.10	45.26	43.76	47.48	47.74	47.13	51.24	54.17	51.56	51.45	54.06	53.34	56.26	56.33	56.33	56.33
IN, KY, MI, OH, WV	85.54	82.63	82.08	82.38	81.04	79.17	81.54	82.48	83.18	80.85	82.29	80.69	81.42	82.82	82.82	82.82
NY	40.23	37.64	35.03	30.84	30.29	32.49	29.39	32.26	34.10	33.03	31.69	31.46	30.49	30.73	30.73	30.73
TX	66.89	65.88	65.39	67.42	63.49	62.54	62.14	61.73	60.64	62.36	61.37	58.42	64.70	63.16	63.16	63.16

Note: Regions match those defined in the Energy Information Administration's (EIA's) Electricity Market Module of the National Energy Modeling System. 2004 and 2005 use coefficients developed from 2003 data.

Source data for developing these coefficients:

- For generation: EIA, Electric Power Annual 2003. 1990-2003 Retail Sales of Electricity by State by Sector by Provider, Form-861, "Annual Electric Power Industry Report."
- For carbon emissions: EIA, Electric Power Annual 2003. 1990-2001 Emissions SO₂, NO_x, and CO₂ by State: Form-767, "Steam Electric Plant Operation and Design Report;" Form-759, "Monthly Power Plant Report;" Form-867, "Annual Nonutility Power Producer Report;" Form-860B, "Annual Electric Generator Report - Nonutility;" EIA Form-906, "Power Plant Report;" and Federal Energy Regulatory Commission Form 423, "Monthly Cost and Quality of Fuels for Electric Plants Report."

APPENDIX C ACRONYMS

Agency Acronyms

Broadcasting Board of Governors/ International Broadcasting Bureau	BBG/IBB
Commodity Futures Trading Commission	CFTC
Central Intelligence Agency	CIA
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	DOI
Department of Justice	DOJ
Department of Labor	DOL
Department of State	ST
Department of Transportation	DOT
Department of the Treasury	TRSY
Department of Veterans Affairs	VA
Environmental Protection Agency	EPA
Equal Employment Opportunity Commission	EEOC
Federal Communications Commission	FCC
Federal Emergency Management Agency	FEMA
Federal Energy Regulatory Commission	FERC
Federal Trade Commission	FTC
General Services Administration	GSA
International Broadcasting Bureau	IBB
National Aeronautics and Space Administration	NASA
National Archives and Records Administration	NARA
National Science Foundation	NSF
Nuclear Regulatory Commission	NRC
Office of Personnel Management	OPM
Panama Canal Commission	PCC
Railroad Retirement Board	RRB
Social Security Administration	SSA
Tennessee Valley Authority	TVA
United States Postal Service	USPS

Other Acronyms

Assessment of Load and Energy Reduction Techniques	ALERT
Building Life-Cycle Cost	BLCC
British Thermal Unit(s)	Btu
Energy Citations Database	ECD
Energy Information Administration	EIA
Office of Energy Efficiency and Renewable Energy	EERE
Energy Management Control Systems	EMCS
Energy Policy Act of 1992	EPACT
Energy Efficiency and Renewable Energy Clearinghouse	EREC
Energy Service Company	ESCO
Energy Savings Performance Contract	ESPC
Facility Energy Decision System	FEDS
Federal Automotive Statistical Tool	FAST
Federal Energy Management Program	FEMP
Fiscal Year	FY
Gross Square Foot	GSF
Industrial Assessment Center	IAC
Indefinite-Delivery, Indefinite Quantity Contract	IDIQ
Life-Cycle Cost	LCC
Liquefied Petroleum Gas	LPG
Megawatthours	MWH
Military Construction	MILCON
Million Barrels of Oil Equivalent	MBOE
Million British Thermal Units	MMBtu
National Energy Conservation Policy Act	NECPA
National Energy Information Center	NEIC
National Institute of Standards and Technology	NIST
Office of Industrial Technologies	OIT
Office of Scientific and Technical Information	OSTI
Quadrillion British Thermal Units	Quad
Research and Development	R&D
State Energy Program	SEP
Utility Energy Service Contract	UESC