

**Annual Report to Congress  
on Federal Government  
Energy Management and  
Conservation Programs  
Fiscal Year 1999**

**January 11, 2001**

**U.S. Department of Energy  
Assistant Secretary, Energy Efficiency and Renewable Energy  
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## AGENCY ACRONYMS

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 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
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 Information Agency	USIA
United States Postal Service	USPS

## INTERNET WEB SITES CITED IN THIS REPORT

Federal Energy Management Program	<a href="http://www.eren.doe.gov/femp">www.eren.doe.gov/femp</a>
Energy Efficiency and Renewable Energy Clearinghouse	<a href="http://www.eren.doe.gov">www.eren.doe.gov</a>
National Energy Information Center	<a href="http://www.eia.doe.gov">www.eia.doe.gov</a>
Alternative Fuels Data Center	<a href="http://www.afdc.nrel.gov">www.afdc.nrel.gov</a>
Clean Cities Program	<a href="http://www.cities.doe.gov">www.cities.doe.gov</a>

## EXECUTIVE SUMMARY

This report on Federal Energy Management for Fiscal Year (FY) 1999 provides information on energy consumption in Federal buildings, operations, and vehicles and equipment, 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. Implementation activities undertaken during FY 1999 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also discussed in this report. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government through Efficient Energy Management. Initial activities undertaken to meet the requirements of this Order are discussed in this report, however, FY 2000 will be first full reporting year for Executive Order 13123.

Based on reports submitted to the Department of Energy (DOE) by 29 Federal agencies, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.39 quadrillion British Thermal Units (quads) during FY 1999.<sup>1</sup> These 1.39 quads consumed by the Government in buildings and operations to provide essential services to its citizens, including the defense of the Nation, represent approximately 1.5 percent of the total 93.03 quads<sup>2</sup> 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.

The Government consumed 1.01 quads during FY 1999 when measured in terms of energy actually delivered to the point of use (net energy consumption). 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 net energy consumption in FY 1999 decreased 30.1 percent from the FY 1985 base year. This reduction of 435.7 trillion Btu could satisfy the energy needs of the State of Idaho for more than one year.<sup>3</sup> The total cost of the 1.01 quads was almost \$8.0 billion in FY 1999.<sup>4</sup> This is \$2.9 billion less than the \$10.8 billion reported in

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<sup>1</sup>Primary energy consumption considers all energy resources used to generate and transport electricity and steam. Tables 1-A, 4-A, and 7-B show primary energy consumption for comparison with net consumption shown in Tables 1-B, 4-B, and 7-A respectively. Conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate gross energy consumption.

<sup>2</sup>DOE/EIA-0035(2000/12), *Monthly Energy Review*, December 2000.

<sup>3</sup>Based on net energy consumption estimates for 1994 in the residential, commercial, industrial, and transportation sectors (362.4 trillion Btu). Source: DOE/EIA-0214(96), *State Energy Data Report, 1996*, Tables 1 and 8; February 1998.

<sup>4</sup>Unless otherwise noted, all costs cited in this report are in constant 1999 dollars, calculated using Gross Domestic Product implicit price deflators. See DOE/EIA-0384(99), *Annual Energy Review 1999*, Table E 1; July 2000). 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.

FY 1985, a 26.5 percent<sup>5</sup> decrease in nominal costs. In constant 1999 dollars, this equates to a decrease of 47.8 percent from \$15.2 billion in FY 1985 to \$8.0 billion in FY 1999, which reflects the reduced energy use and a 25.3 percent reduction in the inflation-adjusted cost of energy per quad. The Federal energy bill for FY 1999 decreased 7.5 percent from the previous year.

Federal agencies report energy consumption under three categories: buildings and facilities, energy intensive operations, and vehicles and equipment.

### **Buildings and Facilities**

In FY 1999, the Federal Government used 336.2 trillion British Thermal Units (Btu) to provide energy to approximately 500,000 buildings and facilities. This consumption represents a 28.4 percent decrease compared to FY 1985 and a 1.1 percent decrease relative to FY 1998. The cost of energy for buildings and facilities in FY 1999 was \$3.4 billion, a decrease of approximately \$124.4 million from FY 1998 expenditures, and a decrease of 39.5 percent from the FY 1985 expenditure of \$5.6 billion.<sup>6</sup>

During FY 1999, 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-sponsored demand side management (DSM) incentives. Known funding from the three sources totaled approximately \$338 million in FY 1999. Direct appropriations accounted for approximately \$205 million. ESPC contracts awarded in FY 1999 resulted in more than \$130 million in estimated contractor investment (at least \$87 million from conventional, site-specific ESPCs and \$44 million from Super ESPC delivery orders), and agencies reported more than \$2.6 million in utility incentives received.

In FY 1999, direct funding identified by agencies for energy conservation retrofits and capital equipment decreased 22.5 percent to \$205.2 million from \$264.7 million dollars in FY 1998.

### **Energy Intensive Operations**

The energy intensive operations category covers energy used in buildings excluded from the 10 and 20 percent reduction goals for buildings and facilities under section 543 of NECPA, 42 U.S.C. §§ 8253(a)(2) and 8253(c). This category includes the energy consumed in industrial operations, certain research and development activities, and electronics-intensive facilities.

In FY 1999, the Federal Government used 68.1 trillion Btu of energy in energy intensive operations, approximately 6.7 percent of the total 1.01 quads consumed. Total energy consumption in this category increased 56.0 percent relative to FY 1985 and decreased 2.5

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<sup>5</sup>Calculation of percent changes in this report do not account for rounding of numbers in text.

<sup>6</sup>Cost 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.

percent relative to FY 1998. These increases are the result of changes in reporting procedures by individual agencies as well as changes in agency missions.

The Federal Government spent \$639.7 million on energy intensive operations energy in FY 1999, \$28.2 million less than the FY 1998 expenditure of \$667.9 million constant dollars.

### **Vehicles and Equipment**

The vehicles and equipment category 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 1999, the Federal Government used approximately 607.5 trillion Btu of energy in vehicles and equipment, nearly 60.0 percent of the total 1.01 quads consumed. Total energy consumption in vehicles and equipment decreased 35.0 percent relative to FY 1985 and was 3.2 percent less than the FY 1998 consumption of 627.3 trillion Btu. The Department of Defense consumed 559.8 trillion Btu or 92.1 percent of all vehicles and equipment energy used by the Federal Government.

The Federal Government spent \$3.9 billion on vehicles and equipment energy in FY 1999, \$492.4 million less than the FY 1998 expenditure.

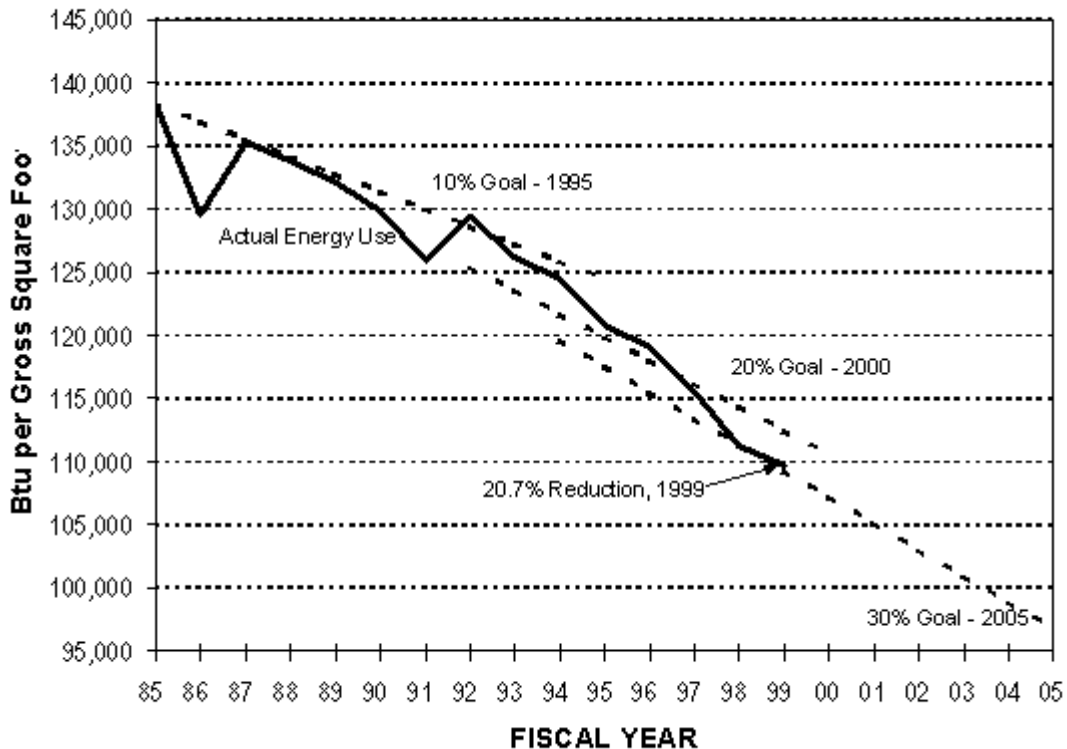
### **Agency Progress in Meeting Energy Reduction Goals**

NECPA, as amended by EPACT, requires agencies to take the steps necessary to reduce energy consumption in Federal buildings by 10 percent by 1995 compared to 1985 consumption levels, based on Btu per gross square foot, and requires a 20 percent reduction by 2000 compared to 1985 consumption levels. The 10 percent goal was met by the Government in FY 1995 with a 12.7 percent reduction from FY 1985. Executive Order 12902 added a goal of reducing energy consumption by 30 percent by the year 2005 relative to 1985 consumption levels. Executive Order 13123 adds an additional goal of a 35 percent reduction by 2010, compared to FY 1985. During FY 1999 agencies provided data to DOE that indicated a decrease in energy consumption per gross square foot of 20.7 percent relative to FY 1985. The Government's performance for each year since FY 1985 is illustrated in Figure ES-1. This reduction was the result of significant decreases in the consumption of fuel oil, natural gas, and coal. The use of non-electric fuels in Federal buildings has declined 41.9 percent since 1985, while the consumption of electricity has increased by only 0.8 percent. The installation and increased use of electricity-driven electronic equipment contributed to increases in electricity through the years, peaking in FY 1990 at 12.5 percent above FY 1985. Since FY 1990, electricity consumption has declined 10.4 percent. Electricity now represents about 73.2 percent of the total energy costs of Federal buildings and accounts for 43.3 percent of total net energy consumption in buildings. This is compared to 30.7 percent of the total net energy consumption in buildings in FY 1985.

Agency efforts undertaken in FY 1999 to increase energy efficiency in buildings included:



**FIGURE ES-1  
Decrease in Btu per Gross Square Foot  
in Federal Buildings and Facilities from FY 1985**



- improvement of operations and maintenance procedures;
- implementation of no-cost, low-cost efficiency measures;
- energy-efficient building retrofits and capital improvements;
- energy awareness activities and employee training programs; and
- procurement of energy-efficient goods and products.

Executive Order 13123 expands the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial, laboratory, and other energy-intensive facilities. Section 203 of Executive Order 13123 requires agencies, through life-cycle cost-effective measures, 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.

### **Procurement of Energy-Efficient Products**

Section 507 of Executive Order 12902 requires all Federal agencies to buy “best practice” products when practicable, when they meet the agency’s specific performance requirements, and are cost-effective. Best practice products are those which are in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets Federal standards. During FY 1999, DOE continued its program to assist agencies in implementing the EPACT and Executive Order requirements for energy

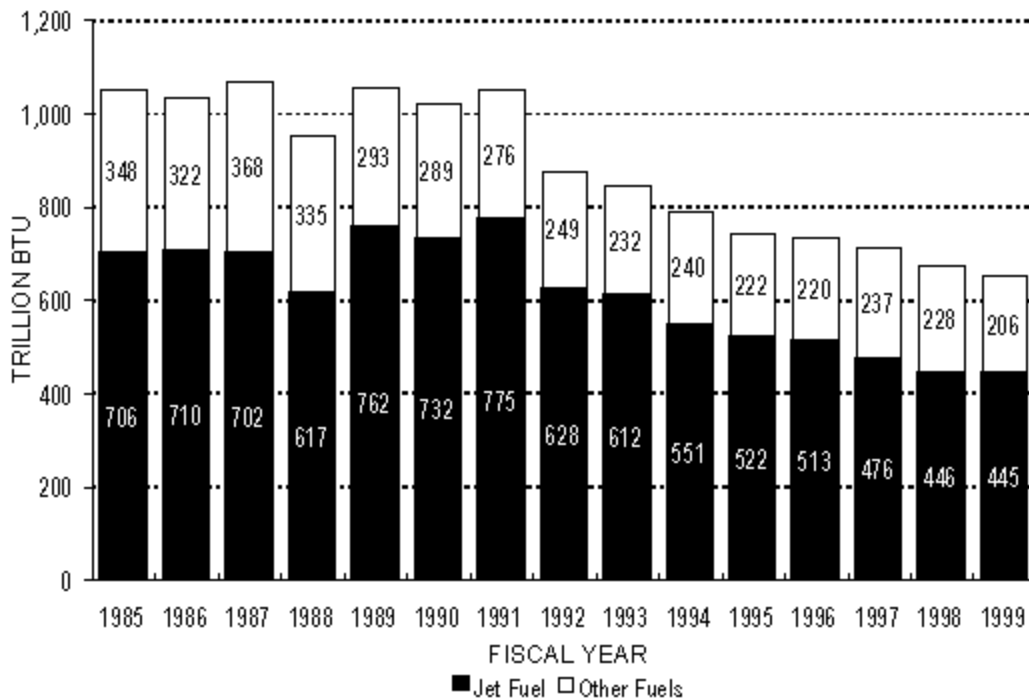
efficient procurement. In 1999, DOE's Federal Energy Management Program (FEMP) produced and distributed seven additional product energy efficiency recommendations to be added to the one-stop shopping guide, *Buying Energy Efficient Products*, to help Federal purchasers identify products which meet the energy efficiency requirements of Executive Order 12902. Since 1996, over 30 product energy efficiency recommendations have been issued.

### Reducing Petroleum-Based Fuel Consumption

Effective management of energy resources is of strategic importance to the Federal Government as well as the Nation. In FY 1999, petroleum-based fuels accounted for 0.65 quads of the total 1.01 quads consumed by the Federal Government, with 0.60 quads used by the Department of Defense, primarily for jet fuel and distillate/diesel for vehicles and equipment. The Federal Government consumed 38.3 percent less petroleum-based fuel in FY 1999 than in FY 1985. Figure ES-2 illustrates the trend in the Federal Government's use of petroleum fuels.

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 petroleum-based fuels in their buildings and facilities. For example, Federal agencies report that in FY 1999, 36.7 trillion Btu of petroleum-based fuels were used for buildings and facilities energy, a 66.8 percent decrease from FY 1985 and a 6.7 percent decrease from FY 1998. This represents 10.9 percent of total buildings and facilities energy consumption.

**FIGURE ES-2**  
**Federal Consumption of Petroleum-Based Fuels**  
**FY 1985 through FY 1999**



## Federal Energy Management Highlights

Progress is being made in increasing Federal energy efficiency, although there remain opportunities for greater efficiency and cost reduction. Several of the most important findings of this report are listed below:

- The overall real cost of energy consumption in the Federal Government measured in constant 1999 dollars has fallen from \$15.2 billion in FY 1985 to \$8.0 billion in FY 1999.
- Total net energy consumption in FY 1999 decreased 30.1 percent from FY 1985.
- Energy consumption in buildings in FY 1999 decreased 28.4 percent from FY 1985.
- On a Btu-per-gross-square-foot basis, the 20.7 percent reduction in buildings energy puts the Federal Government past the 20 percent reduction goal for 2000, one year early.
- Eight agencies, the Departments of Agriculture, Commerce, Energy, Justice, Labor, Transportation, the National Aeronautics and Space Administration, and the Tennessee Valley Authority have surpassed a 20 percent reduction in buildings energy use per gross square foot from 1985.
- Energy consumption in FY 1999 was used for the following purposes:

<i>End Use</i>	<i>Percentage</i>	<i>Cost</i>
Buildings & Facilities	33.3 percent	\$3.4 billion
Energy Intensive Operations	6.7 percent	\$0.6 billion
Vehicles & Equipment	60.0 percent	\$3.9 billion

## **I. OVERVIEW OF FEDERAL ENERGY MANAGEMENT ACTIVITIES**

### **A. Overview of Federal Energy Management Policy and Legislative Mandates**

This report on Federal Energy Management for Fiscal Year (FY) 1999 provides information on energy consumption in Federal buildings and operations 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. Implementation activities undertaken during FY 1999 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also described in this report. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government through Efficient Energy Management. Initial activities undertaken to meet the requirements of this Order are discussed in this report, however, FY 2000 will be first full reporting year for Executive Order 13123. In compliance with section 381(c) of the Energy Policy and Conservation Act (EPCA), as amended, 42 U.S.C. § 6361c, this report also describes the energy conservation and management activities of the Federal Government under the authorization of section 381 of EPCA, 42 U.S.C. § 6361.

#### **Requirements of National Energy Conservation Policy Act (NECPA) and Energy Policy Act of 1992 (EPACT)**

NECPA provides major policy guidance to Federal agencies to improve energy management in their facilities and operations. Amendments to NECPA made by the Federal Energy Management Improvement Act of 1988, 42 U.S.C. § 8253 (a)(1), 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 basis. It also directed DOE to establish life-cycle costing methods and coordinate Federal conservation activities through the Interagency Energy Management Task Force. Section 152 of Subtitle F of EPACT, Federal Agency Energy Management, further amends NECPA and contains provisions regarding energy management requirements, 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.

#### **Requirements of Executive Orders 12902 and 13123**

During the majority of FY 1999, Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities was in effect for Federal agencies. This Executive Order, signed by President Clinton on March 8, 1994, superseded Executive Order 12759 but left in effect sections 3, 9, and 10 of that Order. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government Through Efficient Energy Management, superseding Executive Order 12902. This new Executive Order addresses greenhouse gas emissions from Federal facilities, as well as making energy-efficiency targets more stringent.

The key requirements of the legislation and Executive Order authorities are outlined in the exhibit below along with current findings.

## KEY REQUIREMENTS OF LEGISLATIVE AND EXECUTIVE ORDER AUTHORITIES

Statute/Directive	Requirement	FY 1999 Findings	Annual Report Discussion
Section 543, NECPA, 42 U.S.C., § 8253(a)(1)  Executive Order 13123 (increasing requirement from E.O. 12902)	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 20.7 percent decrease in energy consumption in buildings in FY 1999, compared to FY 1985.	Section II (B), page 51
Section 545, NECPA, 42 U.S.C., § 8254	DOE to establish life-cycle cost methods to determine cost-effectiveness of proposed energy efficiency projects.	The 1999 edition of the energy price indices and discount factors for life-cycle cost analysis was published and distributed to Federal energy managers.	Section I (F), page 37
Section 545, NECPA, 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 \$204.2 million was appropriated and spent on energy efficiency projects in Federal facilities.	Section I (E), page 26
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 1999, 13 conventional ESPC contracts were awarded by agencies and 16 delivery orders were issued under DOE and DOD Super ESPCs.	Section I (E), page 32
Section 546, NECPA, 42 U.S.C., § 8256(b)	DOE to establish a Federal Energy Efficiency Fund to provide grants to agencies.	There were no appropriations for the Fund in FY 1999; FY 1995 funds were allocated and progress of the few remaining projects is being monitored.	Section I (E), page 30
Section 157, EPACT, 42 U.S.C., § 8262(c)	Federal agencies to establish and maintain programs to train energy managers and to increase the number of trained energy managers within each agency.	DOE's FEMP conducted 54 training workshops and symposia for more than 4,700 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.	Section I (D), page 19; Section V, Agency Reports, page 75

Statute/Directive	Requirement	FY 1999 Findings	Annual Report Discussion
Executive Order 13123 (increasing requirement from E.O. 12902)	20 percent reduction for Federal industrial/laboratory facilities by 2005 from 1990. 25 percent reduction by 2010 from 1990.	Findings are specific to individual agencies.	Section III (B), page 64
Executive Order 13123	30 percent reduction in greenhouse gas emissions attributed to Federal facilities by 2010 from 1990.	Carbon emissions from energy used in standard and excluded/industrial buildings declined 15.7 percent in FY 1999 compared to FY 1990.	Section I(B), page 16
Executive Order 13123	Expand use of renewable energy by implementing renewable energy projects and by purchasing electricity from renewable sources. The Federal Government will strive to install 20,000 solar roofs by 2010.	Findings are specific to individual agencies. A Government-wide discussion will be included in the FY 2000 annual report.	Section V, Agency Reports, page 75
Executive Order 12902 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 buildings during FY 1999 decreased 66.8 percent compared to FY 1985 and 6.7 percent from FY 1998.	Section II(A), page 47
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 buildings and facilities in FY 1999 decreased 16.7 percent from FY 1985 and 0.4 percent from FY 1998.  Measured in terms of source energy, Federal buildings show a reduction of 7.8 percent in Btu/GSF during FY 1999 compared to FY 1985.	Section II(A), page 43, 46, and 52
Executive Order 13123	Reduce water consumption and associated energy use.	Findings are specific to individual agencies. A Government-wide discussion will be included in the FY 2000 annual report.	Section V, Agency Reports, page 75

## B. Overall Federal Energy Consumption, Costs, and Carbon Emissions

As shown in Table 1-A, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.39 quadrillion British Thermal Units (quads) or 1,394,450.9 billion Btu during FY 1999. Primary energy consumption considers all resources used to generate and transport electricity and steam. (The source conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors used to calculate net energy consumption.) These 1.39 quads represent approximately 1.5 percent of the total 93.03 quads<sup>7</sup> used in the United States, and reflect Government energy consumption in buildings and operations to provide essential services to its citizens, including the defense of the Nation. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

Based on reports submitted to DOE by 29 Federal agencies, the Government consumed 1.01 quads during FY 1999 when measured in terms of energy actually delivered to the point of use (net consumption). As shown in Table 1-B, Federal agencies reported a 30.1 percent decrease in total net energy consumption compared to FY 1985, and a 2.4 percent decrease from FY 1998. The cost of this energy was \$8.0 billion and represented approximately 0.5 percent of the total Federal expenditures of \$1.727 trillion<sup>8</sup> for all purposes in FY 1999. The Federal energy bill for FY 1999 fell 7.5 percent from the previous year, decreasing \$650.0 million in constant dollars compared to FY 1998.<sup>9</sup>

In FY 1999, the Department of Defense spent \$5.8 billion for energy of the total Federal energy expenditure of \$8.0 billion. Overall, the Department of Defense used 35.2 percent less net energy in FY 1999 than in FY 1985.

Figures 1 and 2 depict the percentage of total energy used by the Federal Government in FY 1999 and its cost. As illustrated, jet fuel and electricity account for approximately 62.1 percent of the total energy consumption represented in Figure 1 and approximately 74.0 percent of the total energy costs in Figure 2.

Petroleum-based fuels used by the Federal Government are shown in Table 2. In FY 1999, petroleum-based fuels accounted for 0.65 quads (650,664.6 billion Btu) of the total 1.01 quads consumed by the Federal Government. Of that, approximately 0.60 quads (595,418.4 billion Btu) were used by the Department of Defense primarily for jet fuel and distillate/diesel for vehicles and equipment energy. Only 0.04 quads (36,742.2 billion Btu) of petroleum-based fuels were used for Federal buildings and facilities energy.

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<sup>7</sup>DOE/EIA-0035(2000/12), *Monthly Energy Review*, December 2000.

<sup>8</sup>*Analytical Perspectives, Budget of the United States Government, Fiscal Year 2000*

<sup>9</sup>Appendix C indicates the annual cost of energy used in Federal buildings and facilities, vehicles and equipment, and energy intensive operations for FY 1985 through FY 1999. The combined cost per Btu for energy in each fiscal year is also shown in the table.

**TABLE 1-A**  
**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 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	47,439.3	54,767.8	56,017.0	57,697.8	61,629.9	63,646.5	65,828.1	67,412.9	71,636.0	71,861.1	72,898.5	53.7	1.4
DOE	88,660.3	82,447.3	79,395.5	82,543.2	79,546.4	78,656.3	81,131.1	80,797.6	69,893.3	64,093.9	63,910.5	-27.9	-0.3
VA	40,266.0	41,421.0	42,232.9	42,374.9	43,203.9	43,487.6	43,909.9	45,441.5	46,267.8	46,877.0	47,069.4	16.9	0.4
DOT	27,181.6	26,939.8	27,491.0	28,618.9	31,616.7	28,321.4	27,789.3	30,288.1	28,755.8	29,597.7	36,377.8	33.8	22.9
GSA	39,163.3	33,255.3	33,455.8	32,929.2	33,599.2	33,112.8	32,634.6	33,506.2	33,628.8	33,375.8	34,221.9	-12.6	2.5
NASA	21,465.6	25,779.9	26,607.0	26,874.9	26,695.9	27,242.2	26,419.2	24,457.1	25,821.7	25,055.8	24,459.8	13.9	-2.4
DOJ	10,595.9	10,790.3	13,230.3	12,139.6	13,964.4	15,664.1	15,959.9	19,309.5	18,857.8	23,353.4	23,274.6	119.7	-0.3
HHS	9,692.6	14,941.5	13,252.0	14,665.0	15,026.8	15,260.7	11,110.8	11,722.2	13,699.6	13,352.0	12,778.6	31.8	-4.3
USDA	11,576.9	13,655.1	13,830.4	13,287.1	13,650.6	13,721.9	14,072.5	13,348.3	11,534.8	12,212.2	11,764.7	1.6	-3.7
DOI	10,933.6	10,337.7	10,368.8	10,089.3	11,167.8	11,507.0	9,810.3	7,038.3	9,608.7	9,542.0	10,611.1	-3.0	11.2
TRSY	3,489.9	6,013.2	7,397.2	8,104.2	8,014.0	7,843.1	7,149.0	6,637.4	8,375.9	8,228.1	8,025.7	130.0	-2.5
ST <sup>1</sup>	6,224.6	6,358.0	6,347.8	747.0	1,060.4	1,137.8	1,184.7	1,686.9	7,486.3	7,455.3	7,114.7	14.3	-4.6
TVA <sup>2</sup>	7,432.2	6,894.8	6,845.0	6,367.7	5,866.3	6,685.6	6,737.9	6,464.1	6,282.8	6,074.4	6,737.4	-9.3	10.9
DOC	3,804.6	6,046.9	4,261.0	4,083.2	4,287.4	5,007.0	5,173.4	4,930.3	4,866.3	4,558.3	4,777.1	25.6	4.8
DOL	3,688.0	3,842.5	3,923.8	3,944.2	4,050.7	4,119.3	3,992.2	4,094.5	4,123.2	4,168.6	3,337.1	-9.5	-19.9
EPA	1,621.0	1,483.2	1,635.5	1,662.7	1,845.1	1,922.7	2,062.6	2,010.2	2,050.8	2,021.4	2,250.6	38.8	11.3
HUD	315.2	384.2	407.0	378.7	346.0	324.0	310.6	326.8	318.0	303.2	310.2	-1.6	2.3
FCC	39.2	46.1	46.5	38.1	38.9	42.2	42.2	33.5	35.9	35.4	35.4	-9.6	0.0
OTHER*	898.6	3,784.3	2,825.3	2,885.8	3,210.1	4,051.6	6,207.3	8,491.6	9,229.4	8,819.1	8,569.1	853.6	-2.8
CIVILIAN AGENCIES TOTAL	335,606.4	350,508.0	350,844.3	350,810.1	360,203.0	363,147.8	363,124.1	369,588.0	374,013.1	370,984.7	378,524.1	12.8	2.0
DOD	1,457,548.3	1,491,843.4	1,511,223.6	1,346,120.3	1,288,504.3	1,211,887.4	1,150,296.9	1,120,399.0	1,090,079.5	1,043,465.2	1,015,926.8	-30.3	-2.6
ALL AGENCIES TOTAL	1,793,154.7	1,842,351.4	1,862,067.9	1,696,930.4	1,648,707.2	1,575,035.2	1,513,421.0	1,489,987.0	1,464,092.7	1,414,449.8	1,394,450.9	-22.2	-1.4
MBOE	307.8	316.3	319.7	291.3	283.0	270.4	259.8	255.8	251.3	242.8	239.4		
Petajoules	1,891.7	1,943.6	1,964.4	1,790.2	1,739.3	1,661.6	1,596.6	1,571.9	1,544.6	1,492.2	1,471.1		

DATA AS OF 10/26/00

\*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USA, and FERC.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

<sup>2</sup>TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

Note: This table uses a conversion factor for electricity of 10,346 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 1-B**  
**TOTAL NET ENERGY CONSUMPTION BY FEDERAL AGENCIES**  
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	<b>27,762.5</b>	30,616.2	30,817.0	31,674.2	33,725.1	34,950.8	36,220.9	36,427.1	40,760.0	<b>39,487.3</b>	<b>39,774.0</b>	43.3	0.7
DOE	<b>51,527.5</b>	43,467.5	42,178.6	44,300.2	43,688.5	42,279.2	47,089.7	44,424.9	33,926.3	<b>31,450.1</b>	<b>30,363.9</b>	-41.1	-3.5
VA	<b>25,144.7</b>	24,898.4	25,050.4	25,254.9	25,741.2	25,587.8	25,428.9	26,832.9	27,261.1	<b>27,597.2</b>	<b>27,472.4</b>	9.3	-0.5
DOT	<b>19,462.3</b>	18,965.2	18,971.4	17,027.3	19,360.1	19,772.6	18,652.3	19,564.1	19,125.8	<b>18,509.9</b>	<b>20,508.1</b>	5.4	10.8
DOJ	<b>8,176.0</b>	6,961.6	8,018.3	7,544.3	9,081.7	10,263.6	10,193.3	12,127.7	11,999.9	<b>15,805.1</b>	<b>15,366.2</b>	87.9	-2.8
GSA	<b>17,330.7</b>	14,226.0	13,985.0	13,842.0	14,149.4	13,963.0	13,671.8	14,499.2	14,364.3	<b>14,096.2</b>	<b>14,337.7</b>	-17.3	1.7
NASA	<b>10,827.9</b>	12,321.8	12,455.4	12,538.8	12,358.7	12,588.3	12,395.3	11,480.6	11,980.3	<b>11,717.1</b>	<b>11,419.1</b>	5.5	-2.5
USDA	<b>8,358.7</b>	9,519.6	9,599.6	9,100.6	9,332.9	9,412.9	9,728.8	9,056.9	7,370.7	<b>7,917.0</b>	<b>7,828.6</b>	-6.3	-1.1
DOI	<b>7,816.3</b>	7,391.9	7,094.8	6,992.4	7,482.1	7,892.2	6,378.4	4,326.6	6,612.2	<b>6,427.3</b>	<b>7,456.0</b>	-4.6	16.0
HHS	<b>5,953.5</b>	7,957.0	7,107.1	7,954.7	8,146.3	8,408.3	6,129.7	6,628.9	7,852.8	<b>7,400.8</b>	<b>7,036.3</b>	18.2	-4.9
TRSY	<b>2,770.0</b>	3,391.6	4,177.1	4,628.4	4,912.7	4,558.2	4,132.6	3,764.1	4,597.6	<b>4,816.3</b>	<b>4,598.4</b>	66.0	-4.5
ST <sup>1</sup>	<b>2,771.7</b>	2,827.4	2,799.0	273.8	390.2	422.3	437.3	653.3	3,278.0	<b>3,258.4</b>	<b>3,368.6</b>	21.5	3.4
DOC	<b>2,489.1</b>	4,476.3	2,722.2	2,460.1	2,338.4	2,858.3	2,882.8	2,883.1	2,721.4	<b>2,470.3</b>	<b>2,684.3</b>	7.8	8.7
TVA <sup>2</sup>	<b>2,851.9</b>	2,605.4	2,623.2	2,380.9	2,246.2	2,534.9	2,607.3	2,547.8	2,396.9	<b>2,295.9</b>	<b>2,510.1</b>	-12.0	9.3
DOL	<b>2,385.2</b>	2,376.0	2,446.0	2,452.4	2,514.9	2,527.9	2,385.7	2,491.5	2,490.2	<b>2,540.4</b>	<b>2,048.1</b>	-14.1	-19.4
EPA	<b>904.5</b>	747.0	822.4	839.7	994.8	1,041.2	1,120.6	1,099.7	1,148.3	<b>1,120.6</b>	<b>1,290.6</b>	42.7	15.2
HUD	<b>116.9</b>	140.3	164.9	156.7	147.8	144.2	131.3	140.8	137.6	<b>126.4</b>	<b>129.6</b>	10.8	2.5
FCC	<b>23.6</b>	23.9	22.1	19.9	20.2	20.7	20.7	17.5	19.9	<b>19.4</b>	<b>19.4</b>	-17.9	0.0
OTHER*	<b>408.2</b>	2,175.0	1,382.0	1,460.4	1,604.1	1,981.0	2,979.7	3,716.2	3,998.7	<b>3,870.0</b>	<b>3,835.5</b>	839.5	-0.9
<b>CIVILIAN AGENCIES</b>													
TOTAL	<b>197,805.6</b>	195,961.3	193,244.4	191,825.1	199,150.2	202,128.4	203,695.1	203,763.8	203,063.9	<b>200,925.6</b>	<b>202,047.1</b>	2.1	0.6
DOD	<b>1,250,613.8</b>	1,241,655.8	1,269,291.5	1,103,990.1	1,048,772.9	977,040.4	926,022.9	904,150.2	880,007.7	<b>837,115.8</b>	<b>810,663.0</b>	-35.2	-3.2
<b>ALL AGENCIES</b>													
TOTAL	<b>1,448,419.4</b>	1,437,617.1	1,462,535.9	1,295,815.2	1,247,923.1	1,179,168.8	1,129,718.0	1,107,914.0	1,083,071.6	<b>1,038,041.4</b>	<b>1,012,710.1</b>	-30.1	-2.4
MBOE	<b>248.7</b>	246.8	251.1	222.5	214.2	202.4	193.9	190.2	185.9	<b>178.2</b>	<b>173.9</b>		
Petajoules	<b>1,528.0</b>	1,516.6	1,542.9	1,367.0	1,316.5	1,244.0	1,191.8	1,168.8	1,142.6	<b>1,095.1</b>	<b>1,068.4</b>		

DATA AS OF 10/26/00

\*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USA, and FERC.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

<sup>2</sup>TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

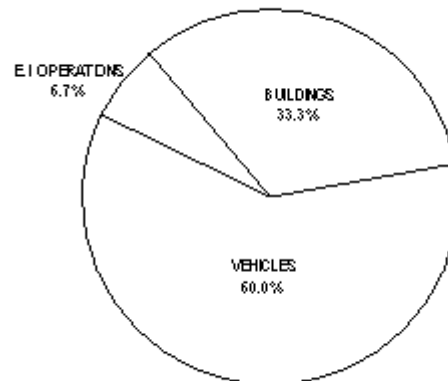
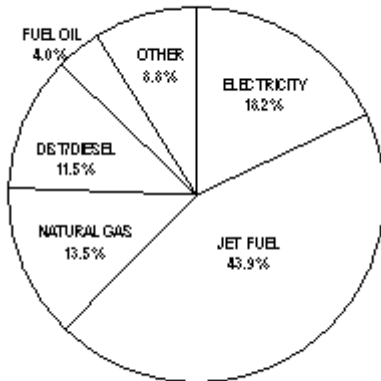
Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour and 1,000 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

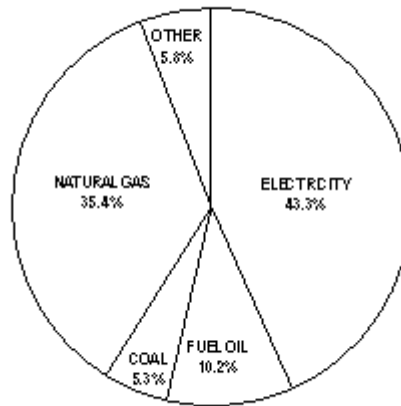
**FIGURE 1**  
**Federal Energy Consumption, FY 1999**

Total by Energy Type: 1.01 quads

Total by Sector: 1.01 quads

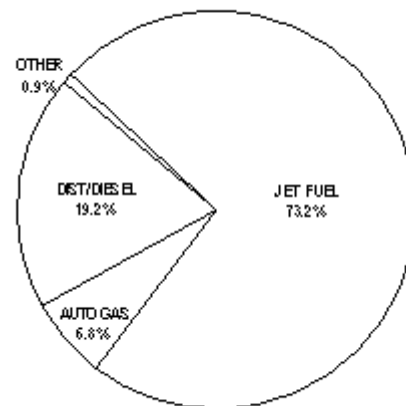
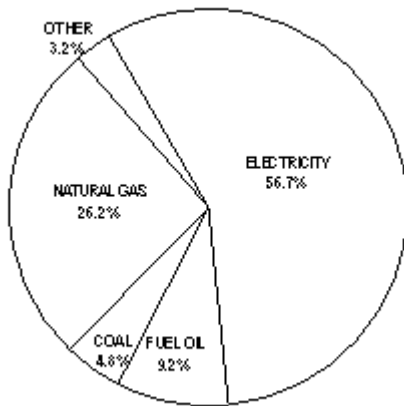


Buildings & Facilities: 0.34 quads



Energy Intensive Operations: 0.07 quads

Vehicles & Equipment: 0.61 quads



Data as of 10/26/00

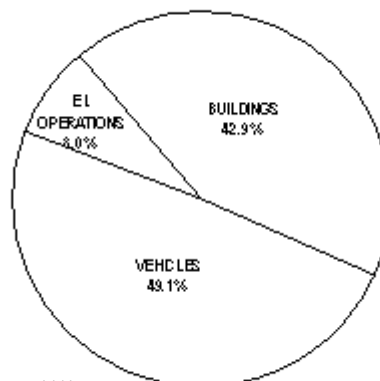
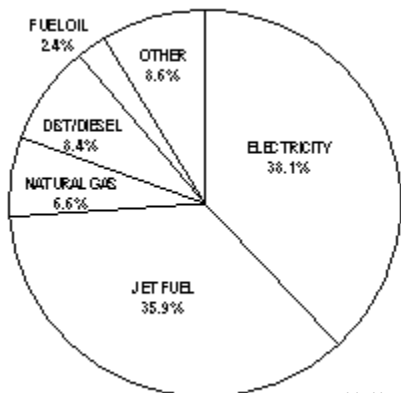
Source: Federal Agency Annual Energy Management Data Reports

Note: Sum of components may not equal 100 percent due to independent rounding.

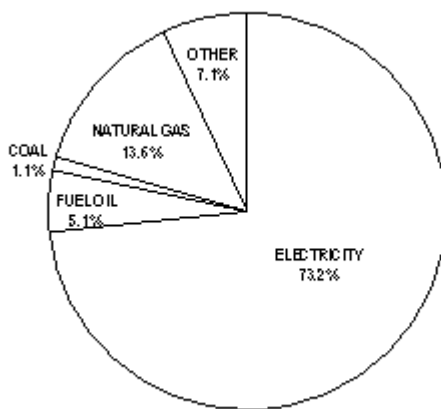
**FIGURE 2**  
**Federal Energy Costs, FY 1999**

Total by Energy Type: \$7.96 Billion

Total by Sector: \$7.96 Billion

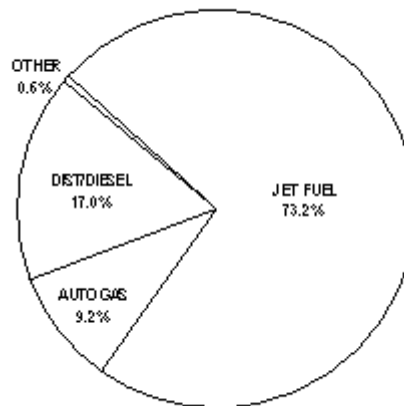
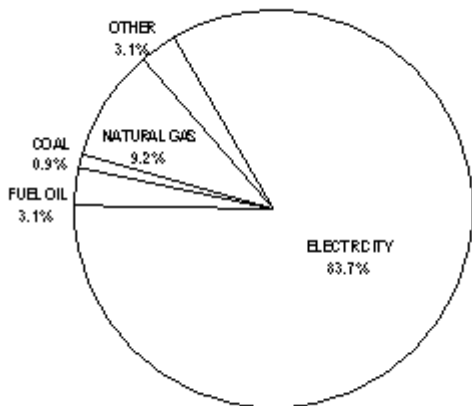


Buildings & Facilities: \$3.41 Billion



Energy Intensive Operations

ent: \$3.91 Billion



Data as of 10/26/00

Source: Federal Agency Annual Energy Management Data Reports

Note: Sum of components may not equal 100 percent due to independent rounding.

TABLE 2  
 FEDERAL PETROLEUM USAGE IN FY 1999  
 (in Thousands of Gallons, Billions of Btu,  
 and Petajoules [Joule x 10<sup>15</sup>])

	Unit Total (KGal)	BBTU* DOD	BBTU* Civilian	BBTU* Total	Petajoules* Total
<b>Buildings &amp; Facilities</b>					
Fuel Oil	248,903.9	28,980.7	5,542.2	34,523.0	36.42
LPG/Propane	23,238.4	1,525.9	693.3	2,219.3	2.34
<b>Energy Intensive Operations</b>					
Fuel Oil	45,289.9	5,029.8	1,251.9	6,281.7	6.63
LPG/Propane	1,418.3	96.1	39.4	135.4	0.14
<b>Vehicles &amp; Equipment</b>					
Motor Gas	328,523.9	13,495.7	27,569.8	41,065.5	43.32
Dist-Diesel & Petrol.	840,483.2	104,889.2	11,685.8	116,575.0	123.01
Aviation Gas	1,067.0	0.3	133.1	133.4	0.14
Jet Fuel	3,420,616.0	436,761.0	7,919.0	444,680.1	469.12
Navy Special	32,760.9	4,543.8	0.1	4,543.9	4.79
LPG/Propane	829.0	69.0	10.2	79.2	0.08
Other	428.1	26.8	401.3	428.1	0.45
<b>Total</b>		<b>595,418.4</b>	<b>55,246.2</b>	<b>650,664.6</b>	<b>686.40</b>

DATA AS OF 10/26/00

\*Uses a conversion factor of:

95,500 Btu/gallon for LPG/propane

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

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

130,000 Btu/gallon for jet fuel

947.9 Billion Btu/Petajoule

Note: FY 1999 contains estimated data for the following agencies: FEMA, FTC, and OPM.  
 Sum of components may not equal total due to independent rounding.

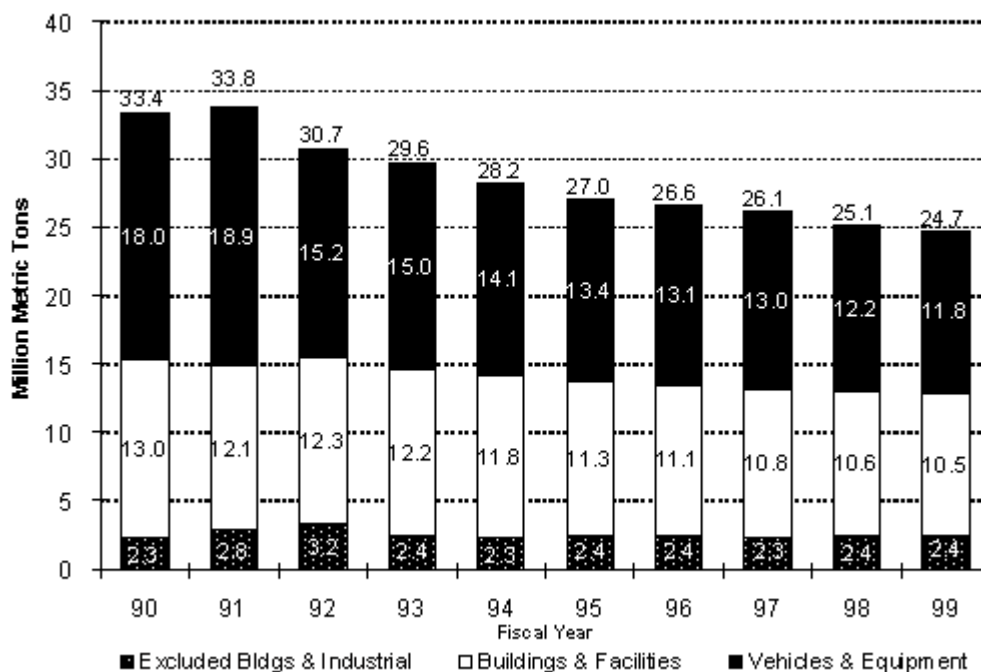
Source: Federal Agency Annual Energy Management Data Reports

Carbon emissions from Federal Government energy consumption have decreased significantly since FY 1990, the base year for the Kyoto Protocol to the United Nations Framework on Climate Change. As shown in Figure 3, the Federal Government has reduced carbon emissions across the three end-use sectors by 26.0 percent from 33.4 million metric tons in FY 1990 to 24.7 million metric tons in FY 1999.<sup>10</sup> The largest contribution to this reduction is from the vehicles and equipment sector, which has seen a decrease in carbon emissions of 34.4 percent. This is a result of a reduction of almost 5.6 million metric tons of carbon emissions from jet fuel, as well as smaller reductions from diesel, aviation gasoline, navy special, and LPG/propane.

Carbon emissions have decreased by 19.5 percent in the buildings and facilities sector since 1990. Contributing to this reduction was a 10.1 percent reduction in gross square footage since FY 1990 and a 8.2 percent decrease in primary energy intensity (245,730 Btu/GSF in FY 1990, 225,543 Btu/GSF in FY 1999). Carbon emissions from energy intensive activities in excluded buildings increased 4.6 percent (0.1 million metric tons) since FY 1990.

Section 201 of Executive Order 13123 establishes a goal for each agency to reduce greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990. When the carbon emissions from energy used in the buildings and facilities and the excluded buildings and industrial sectors are combined, a reduction of 15.7 percent is exhibited in FY 1999 compared to FY 1990.

**FIGURE 3**  
**Carbon Emissions from Federal Energy Consumption, FY 1990 to FY 1999**



<sup>10</sup>Carbon emissions were calculated by multiplying energy consumption for each fuel type by an associated carbon coefficient shown in Appendix B. These coefficients are derived from DOE/EIA-0573(98), *Emissions of Greenhouse Gases in the United States, 1998*, October 1999; Tables 11 and B1.

## **C. Federal Coordination**

### **Federal Interagency Energy Policy Committee (“656” Committee)**

The Federal Interagency Energy Policy Committee (“656” Committee) was established in accordance with Section 656 of the Department of Energy Organization Act (P.L. 95-91) to strengthen Government programs that emphasize productivity through the efficient use of energy, and concurrently, to encourage interagency cooperation in energy conservation. There were no meetings of the 656 Committee held in FY 1999. At the Committee’s January 24, 2000 meeting, the following items were discussed:

- The U.S. Army’s initiative to utilize wind power at Fort Bliss in Texas.
- Executive Order 13123 requirements pertaining to sustainable design principles to be applied by agencies when siting, designing, and constructing new facilities.
- The General Services Administration’s activities (required under Executive Order 13123) in developing model lease provisions for ensuring energy efficiency in space leased by the Federal Government.
- The Environmental Protection Agency’s efforts in green power purchasing, including the purchase of 100 percent green power for its laboratory in Richmond, California.
- The Green Energy Parks Initiative partnership between DOE and the Interior Department, which will present the 250 National Parks and wildlife reserves as models of efficiency and environmental preservation.
- FEMP’s efforts to develop a comprehensive interagency agreement that can be used to access any of FEMP’s services, including ESPC and utility financing support, energy audits, and design assistance.

### **Federal Interagency Energy Management Task Force**

The Federal Interagency Energy Management Task Force (Task Force) was established in accordance with the Federal Energy Management Improvement Act of 1988 to stimulate increased energy efficiency in the Federal sector. The Task Force serves as technical advisor to the Federal Interagency Energy Policy Committee (656 Committee) by coordinating the activities of the Federal Government in promoting energy conservation and the efficient use of energy.

The Director of FEMP serves as the Executive Director of the Task Force. The Task Force, composed of the chief energy managers of the agencies represented on the 656 Committee, addresses energy issues affecting Federal facilities and operations and provides the 656 Committee with in-depth analysis and recommendations concerning current and pending legislation, technical issues, and implementation of coordinated Federal activities.

The Task Force assesses the progress of agencies toward achieving energy savings, and collects and disseminates information on effective survey techniques, technologies that promote

conservation and efficient use of energy, and innovative programs and contracting methods. To accomplish its mission, the Task Force establishes working groups to resolve specific technical or programmatic issues, to develop new initiatives for Federal implementation, and to address legislative requirements and topics presented by the 656 Committee, the Executive Director, or member agencies.

Over the last year, the Task Force met six times: January 21, 1999; May 20, 1999; July 14, 1999; September 15, 1999; November 10, 1999; and January 12, 2000. Issues highlighted in these meetings included the following:

- The Federal Commercial Building Energy Standard (FEDCOM).
- A draft Combined Heat and Power Plan developed by FEMP.
- *You Have the Power* energy awareness campaign.
- Energy efficiency opportunities at buildings that agencies have designated exempt from energy reduction goals.
- Utility metering and billing issues and how they affect Federal agencies.
- Executive Order 13123, *Greening the Government through Efficient Energy Management*, including numerous reports from Task Force working groups implementing provisions of the Order.
- Aggregation of agency electricity purchases and green power issues.
- Federal participation in DOE's Wind Powering America program.

On June 3, 1999, President Clinton signed Executive Order 13123, *Greening the Government Through Efficient Energy Management*. FEMP has been charged with a myriad of support and analysis tasks that will help operationalize the Executive Order and achieve its goals. To this end, 10 working groups were established under the Task Force. These cover:

- Energy Efficient Product Procurement;
- Energy Intensive Facilities;
- Leasing;
- New Space;
- Project Financing;
- Renewable Energy;
- Reporting;
- Technical Tools/Training;
- Utility Markets; and
- Water Conservation

Most of the activity so far has been concentrated in the Energy Intensive Facilities, Project Financing, Reporting, Renewable, Utility Markets, and Water Conservation working groups. Each of these groups has either produced guidance, or is currently working on guidance, that will enable Federal agencies to correctly interpret and implement the Executive Order. Documents and guidance materials produced by the various working groups must be approved by the Interagency Energy Management Task Force.

#### **D. Personnel and Energy Awareness Activities**

During FY 1999, DOE's Federal Energy Management Program (FEMP) conducted 54 training workshops and symposia for more than 4,700 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.

FEMP supplemented its classroom workshops with "distance learning" training, via satellite. The Energy Management Teleworkshop, a 10-module survey of FEMP courses, attracted 1,235 viewers; the Utility Financing and the Utility Deregulation Impacts teleworkshops attracted 170 students each.

Nine workshops on energy savings performance contracting (ESPC) were conducted in FY 1999 for 242 participants. In each workshop, facility managers, contract specialists, and building engineers were instructed on the statutory provisions for this innovative contracting/financial method, and how to identify suitable projects. ESPC allows energy-efficient improvements to be installed by private contractors with no up-front capital costs.

The Designing Low Energy Buildings course was presented twice for 28 participants. The two-day course included analyses and case studies of building design using passive solar heating, natural ventilation and cooling, and day lighting, as well as glazing and overhangs. The satellite presentation of the course attracted 633 viewers.

The FEMP Lights course was conducted twice for a total of 46 participants. The objective was to provide guidance on energy-efficient lighting consistent with other facility lighting considerations, quality and cost, and whole building analysis. Topics included: basic lighting concepts; a comprehensive process for Federal relighting project development and implementation; and the use of professional lighting design services.

Two Facility Energy Decision Screening (FEDS) workshops were held during FY 1999 for 15 attendees. This is a training course for Federal facility managers on whole-site analysis of energy conservation, technical, and financial opportunities utilizing the FEDS-Level 1 project screening software and the FEDS-Level 2 project implementation software.

The Operations and Maintenance Management classroom course was presented once for 7 students; the satellite version was presented once for 250 students.

FEMP, in conjunction with the National Institute of Standards and Technology, conducted four workshops on life-cycle costing and building retrofit simulation for 81 students. The Buying Energy-Efficient Products course was presented twice for 39 students.



The Implementing Renewable Energy Projects course was presented twice for 44 students, and the Laboratories for the 21<sup>st</sup> Century course attracted 189 students.

FEMP continued to offer its Water Resource Management course with one workshop for 12 attendees in FY 1999. The course is designed to assist Federal site managers and agencies in meeting the water conservation requirements of Energy Policy Act of 1992 (EPACT) and Executive Order 12902.

During FY 1999, FEMP participated in the organization and presentation of 23 panel discussions on Federal energy efficiency, water conservation, and renewable energy topics at national energy management conferences around the country, attracting 1,602 attendees.

The Federal Energy Management Program continued to offer its Training Course Locator System to assist Federal agencies in training energy managers and in meeting the requirements of the EPACT. The Locator System connects those seeking particular training courses with the sponsoring organization for those courses by responding to numerous requests from Federal energy managers, utility managers, engineers, building operators, and facility personnel.

## **Recognition**

Outstanding accomplishments in energy efficiency and water conservation in the Federal sector were recognized with the presentation of the 1999 Federal Energy and Water Management Awards on October 28, 1999 in Washington, D.C. The Awards Program is sponsored by the 656 Committee and the Department of Energy. 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;
- Succeeded in receiving utility incentives, or awarding ESPC and other Federal-approved performance-based energy and water contracts;
- Made successful efforts to fulfill compliance with energy and water reduction mandates;
- Improved energy efficiency or reduction in energy costs for Federal mobile equipment including aircrafts, ships, and vehicles;
- Improved tracking of energy consumption, costs and energy efficient investments;
- Provided leadership in purchasing or supplying energy-efficient, renewable energy or water-conserving products to one or more Federal agencies; and
- Demonstrated cost-beneficial landscape practices which utilize techniques that seek to minimize the adverse effects of landscaping.

Recipients of the 1999 awards were selected from 180 nominees submitted by 21 Federal agencies. Award recipients totaled 51, representing 19 different Federal agencies. Distribution of awards among the Federal agencies for accomplishments in FY 1998 is indicated below. Awards were presented to agencies in the categories shown in the exhibit below:

Agency	Individual	Small Group	Organization	Total	Energy Efficiency	Alternative Financing	Renewable Energy	Mobility	Water Mgmt.	Exceptional Service
Army	3	2	1	6	4	1				1
Navy	1		2	3			1	1		1
USAF	1	1	2	4	2	1	1		1	
USMC		1		1	1					
DOE	1	1	1	3		1			1	1
Interior	1	1	1	3			2			1
DOJ	1			1	1					
State	1	1	1	3		1	1			1
DOT	2	1		3	1	1				1
EPA			1	1		1				
GSA	2	5	2	9	5	2			1	1
HHS		1		1						1
NASA		2		2				1	1	
NIMA	1			1						1
SSA	1			1	1					
Treasury			1	1						1
Agriculture			1	1					1	
USPS	1	2	1	4	2	1				1
VA	2		1	3	1	2				
<b>TOTAL</b>	<b>18</b>	<b>18</b>	<b>15</b>	<b>51</b>	<b>18</b>	<b>11</b>	<b>5</b>	<b>2</b>	<b>5</b>	<b>11</b>

Each category contained a wide variety of projects. Examples from each award category follow.

**Energy Efficiency Award to Organization:**

*United States Army Tank Automotive Center, Armament Research Center, United States Army Picatinny Arsenal, New Jersey.* The United States Army Tank-Automotive Armaments Command, Armament Research, Development and Engineering Center (TACOM-ARDEC) has exceeded the FY 1998 Army energy goal by 13 percent compared with FY 1997. Dual fuel capability for heating contributed to savings of almost \$314,000 in FY 1998 and cumulative savings of \$5.6 million since the program's inception in FY 1991. TACOM-ARDEC participated in a fuel cell project that involved the conversion of all boilers in the powerhouse to dual fuel capacity and completed a lighting retrofit in FY 1998 for 128 buildings. Estimated savings from these projects are 2,600 kilowatts, 8.2 million Btu, and yearly budget savings of \$243,000.

**Energy Efficiency Award to Small Group:**

*Larry Emmons, Carl C. Fillingame, Stuart Hammons, Mark L. Haskett, Douglas Sanford. United States Marine Corps, Barstow, California.* The team of professionals at Marine Corps Logistics Base (MCLB) Barstow avoided costs of \$2.7 million in FY 1998. To achieve this, the team installed T-8 32-watt fluorescent lighting systems with electronic ballasts, energy-efficient motors, satellite boilers, and an energy monitoring and control system through a demand side management (DSM) project with ENVEST, a division of Southern California Edison. The group renegotiated the \$4.2 million contract and reduced the interest from 14 percent to 9 percent, avoiding \$1.5 million in interest costs. Additionally, they used the Base newspaper, local newspapers and radio stations, billboards, announcements, memos, and the Internet to get the energy efficiency message out to Base personnel. The MCLB Barstow team has proven its

adeptness both at installing and demonstrating advanced technologies and using DSM third party financing and energy award funds to finance energy products. In FY 1998, MCLB Barstow saved a total of 95 billion Btu and more than \$1.2 million.

**Energy Efficiency Award to Individual:**

*Ron Jakaitis, General Services Administration, Denver, Colorado.* In a cooperative agreement with Public Service Company of Colorado (PSCO), Mr. Jakaitis made the new Dave Skaggs Research Center the first building in the General Services Administration's (GSA) Rocky Mountain Region to comply and exceed the requirements listed under the Department of Energy's Federal Energy Efficiency Requirements of Part 435, Title 10-Energy. GSA entered into agreements with PSCO to obtain energy efficiency upgrades in less than five years. The upgrades will result in estimated annual savings of \$130,000. Upgrades include the installation of occupancy sensors and dimming controls for lighting, premium efficiency motors for HVAC equipment, and a flat heat exchanger. Under the agreement, PSCO provided financing and technical expertise to assist Mr. Jakaitis in ensuring that compliance was met all the way through construction. Mr. Jakaitis also educated others by speaking at utility conferences about the unique energy and resource efficiency features of the Dave Skaggs Research Center.

**Energy Savings Performance Contracting Award:**

*Fermilab, Department of Energy, Batavia, Illinois.* The Fermilab Central Cooling Retrofit project replaced worn and inefficient CFC chillers and pumping systems installed in the 1960s. A utility service agreement was procured through the local Department of Energy (DOE) office and was competed between both the local gas utility company and the local electric company to maximize cost competitiveness. The \$3.55 million award was won by Commonwealth Edison, the local electric company. The project was completed in May 1999. Due to the success of the project, the last of the old Class 1 CFC chillers has been eliminated, making Fermilab one of the first DOE facilities to become fully compliant with the requirements of the Secretary of Energy to eliminate such units whenever possible. Discounted savings over the 25-year life of the project are projected at \$12.3 million based upon annual energy savings of 68.2 billion Btu.

**Renewable Energy Award:**

*Joshua Tree National Park, Department of the Interior, Twentynine Palms, California.* President Franklin D. Roosevelt established the Joshua Tree National Park in 1936 to protect significant examples of the Mojave and Colorado Desert ecosystems. Until 1998, diesel-powered generators were the primary source of power to sustain operations at the remote Cottonwood visitor use area and employee housing facility located in the southeast portion of the Park. In 1998, the Park replaced two 32-kilowatt diesel generators with a 21-kilowatt photovoltaic power array system and a 30-kilowatt propane backup generator that now totally support the electrical power needs of the Cottonwood area. The diesel system produced 5,770 pounds of nitrous oxide, 120 tons of carbon dioxide, and 218 pounds of suspended particulates. Total annual operating costs were estimated to be \$49,770. Annual operating costs have been lowered by 90 percent and pollution emissions have been all but eliminated.

**Mobility Energy Management Award:**

*Timothy A. Debth, Keith Gunsch, Leland Leard, Leslie A. Main, John H. Glenn Research Center at Lewis Field, National Aeronautics and Space Administration, Cleveland, Ohio.* Since the

issuance of the Alternative Motor Fuels Act of 1988 and Executive Order 12759, it was decided that natural gas would be the alternative fuel used at NASA's John H. Glenn Research Center (GRC), Cleveland, Ohio. It wasn't until FY 1997 that GRC reached an agreement with East Ohio Gas that enabled the Center to construct a twin-hose, fast-fill compressed natural gas refueling station on site. Construction was completed in September 1998. The twin hose dispenser can fuel two vehicles simultaneously in about the same time it takes to fill a single vehicle with gasoline. With 12 natural gas vehicles on-site, an annual dependence on 8,000 gallons of gasoline has been avoided annually.

**Water Management Award:**

*36<sup>th</sup> Civil Engineer Squadron, Andersen Air Force Base, United States Air Force, Guam.* The 36<sup>th</sup> Civil Engineer Squadron's Operations Flight at Andersen Air Force Base, Guam, achieved remarkable results in water conservation initiatives in FY 1998. Compared to FY 1997, more than 140 million gallons of water were saved as a result of aggressive maintenance and repair of the Base's water distribution system and implementation of water conservation measures. Andersen Air Force Base is one of the few U.S. Air Force bases that produce its own water. Given the unique challenge of living in an island environment subject to drought conditions and significant shifts in the climate, water is a most precious resource. Water main breaks and leaky valves are just two examples of problems with the water distribution system that resulted in the Base having to produce over 1.1 billion gallons of water in FY 1997. To address these problems, members of the 36<sup>th</sup> Civil Engineer Squadron Operations Flight identified and repaired leaks and replaced valves throughout the Base. Because of these aggressive repair efforts, monthly water production rates decreased 35 percent by the end of FY 1998, and sustained results in FY 1999 are expected to yield additional savings of 300 million gallons from the FY 1998 baseline. Actual savings in water production, energy, and sewage treatment costs exceeded \$490,000 in FY 1998, while projected cost savings in FY 1999 are \$789,000.

**Exceptional Service Award:**

*United States Mint, Department of Treasury, Washington, DC.* The United States Mint Energy Performance Team has taken sustained and aggressive action to reduce energy costs and consumption at its facility in Philadelphia, Pennsylvania. The team installed electric chillers at the site, then negotiated rate reduction incentives with Philadelphia Electric Power Company that will earn the Mint \$200,000 in savings over the next 10 years. Next, the team renegotiated the non-fuel portion of its steam rate with TRIGEN, another local utility, eventually achieving a 20 percent reduction in nonfuel rate charges. As a result, the Mint avoided \$87,200 in costs during 1997 and \$82,500 in 1998. As a part of the renegotiated contract, the team also persuaded TRIGEN to provide the Philadelphia Mint a back pressure steam turbine generator at no cost. Another project involved replacing the Mint's existing main electrical transformer with a larger unit. By replacing the existing transformer, the Mint was able to change from secondary service rates to primary services rates that will save \$35,000 per year in electrical costs. During 1998, the team's initiatives produced almost \$400,000 in savings and cost avoidance, reduced energy usage by 9.7 trillion Btu, and conserved more than 2.1 million gallons of water. Moreover, the Mint achieved these savings and efficiencies on the eve of minting two of the largest and longest-running coin programs in U.S. history – the introduction of a new dollar coin and 50 State commemorative quarters, five new quarters each year for a decade.

## Energy Awareness

The Federal Government, as the largest single employer in the United States, has the responsibility to set an example for the nation by conducting energy awareness programs. Most agencies have ridesharing, carpooling, and/or public transportation programs in effect. Many agencies also participate in recycling programs. The following exhibit shows the employee awareness activities at the various Federal agencies.

Agency	Award Programs	Recycling	Ridesharing	Transit Subsidies	Information Dissemination
USDA	✓	✓	✓		✓
DOC	✓	✓	✓		
DOD	✓	✓	✓	✓	✓
DOE	✓	✓	✓	✓	✓
HHS	✓	✓	✓	✓	✓
HUD	✓	✓	✓	✓	
DOI	✓	✓	✓	✓	✓
DOJ	✓	✓	✓		✓
DOL	✓	✓	✓	✓	✓
ST		✓	✓		
DOT	✓	✓	✓	✓	✓
TRSY		✓	✓	✓	✓
VA		✓			
EPA	✓	✓	✓	✓	✓
GSA	✓	✓	✓		
NASA	✓	✓	✓	✓	✓
NARA	✓				
NRC		✓	✓	✓	✓
RRB		✓		✓	
SSA	✓	✓			
TVA		✓	✓		✓
USPS	✓	✓	✓	✓	✓

## **Federal Energy Saver Showcase Facilities**

Nine facilities in five different Federal agencies have been designated Federal Energy Saver Showcases for 1999 for incorporating cost-effective energy efficiency, water conservation, and renewable energy technologies. The agencies and showcase facilities are as follows:

### General Services Administration

- Denver Federal Courthouse, Colorado
- Seattle Federal Courthouse, Washington

### Department of Commerce: National Oceanic and Atmospheric Administration

- Hawaiian Islands Humpback Whale National Marine Sanctuary, Hawaii

### Department of Health and Human Services: National Institutes of Health

- Building 50, Consolidated Laboratory Facility, The Louis Stokes Laboratories, Maryland

### Department of the Interior: National Park Service

- Cottonwood Visitor Use Complex, Joshua Tree National Park, California
- North Manitou Island, Sleeping Bear Dunes National Lakeshore, Michigan
- Visitor Center, Whitman Mission National Historic Site, Washington
- Zion Canyon Visitor Center, Zion National Park, Utah

### Department of Transportation: Federal Aviation Administration

- West Palm Beach Air Traffic Control Tower, Florida

Executive Order 13123, Greening the Government Through Efficient Energy Management, states that agencies shall designate “exemplary new and existing facilities with significant public access and exposure as showcase facilities to highlight energy or water efficiency and renewable energy improvements.”

The nine facilities designated Federal Energy Saver Showcases for FY 1999 are expected to save the Government more than \$1.4 million in energy costs each year. These showcases represent some of the best applications of energy efficiency and renewable energy in the Federal sector, and each helps the Government run more efficiently.

## **E. Funding for Energy Efficiency in Buildings and Facilities**

During FY 1999, 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-sponsored demand side management (DSM) incentives. The latter two options utilize non-Government sources of funding and can be used to supplement Government funding. Each of these three sources can be combined with another. Formerly, the DOE's Federal Energy Efficiency Fund grant program was a fourth option available to agencies for funding projects; however, there were no appropriations for the Fund in FY 1999.

To the extent that agencies have been able to provide complete reporting, funding from the three sources totaled approximately \$338 million in FY 1999.

### **Direct Appropriations**

The National Energy Conservation Policy Act 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. Table 3-A presents agency funding (in nominal dollars) reported from FY 1985 through FY 1999 for energy conservation retrofits and capital equipment. Table 3-B presents the same information in constant 1999 dollars. In constant dollars, funding for energy conservation declined from \$399.6 million in FY 1985 to a low of \$65.1 million in FY 1989. Reports from Federal agencies indicated that \$205.2 million was spent on retrofit expenditures in FY 1999, compared with \$264.7 million in FY 1998. 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. Figure 4 illustrates agency spending trends for the five largest energy-consuming agencies and the remaining group of Federal agencies.

The Defense Department funded \$91.2 million in expenditures for energy efficiency projects in FY 1999, \$102.7 million less than the previous year.

No direct funding was appropriated for the Department of Energy in FY 1999 for retrofit projects in buildings and metered process facilities.

**Table 3-A**  
**Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,**  
**FY 1985 through FY 1999 (Thousands of Nominal Dollars)**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Projected 2000
DOC	0	0	0	0	0	0	0	872	0	51	0	0	NA	330	N/A	N/A
<b>DOD</b>	<b>136,100</b>	<b>120,000</b>	<b>5,550</b>	<b>5,280</b>	<b>1,500</b>	<b>1,020</b>	<b>10,000</b>	<b>49,669</b>	<b>14,444</b>	<b>109,000</b>	<b>189,600</b>	<b>112,487</b>	<b>118,970</b>	<b>191,446</b>	<b>91,243</b>	<b>54,831</b>
<b>DOE</b>	<b>14,800</b>	<b>14,500</b>	<b>16,500</b>	<b>18,900</b>	<b>19,400</b>	<b>19,500</b>	<b>20,400</b>	<b>20,650</b>	<b>20,950</b>	<b>24,850</b>	<b>30,200</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
DOI	3,198	5,535	0	0	4,338	0	1,272	9,800	4,859	1,662	779	891	0	160	1,730	868
DOJ	0	0	0	195	484	6,100	26,400	0	N/A	1,284	994	1,559	2,091	1,500	1,615	1,500
DOL	238	31	106	142	584	17	35	16	0	0	N/A	366	0	0	40	200
DOT	13,650	15,000	12,104	12,700	2,908	0	460	143	593	5,970	3,793	2,585	3,176	3,000	9,005	9,800
EPA	0	0	0	0	0	0	0	0	500	0	1,720	1,600	1,600	0	0	0
<b>GSA</b>	<b>6,700</b>	<b>6,100</b>	<b>2,900</b>	<b>9,400</b>	<b>4,868</b>	<b>11,125</b>	<b>30,123</b>	<b>37,000</b>	<b>30,000</b>	<b>37,000</b>	<b>7,242</b>	<b>7,400</b>	<b>20,000</b>	<b>0</b>	<b>25,000</b>	<b>N/A</b>
HHS	0	0	0	427	427	427	427	0	1,813	1,915	1,271	2,676	2,879	2,200	4,793	7,803
HUD	0	0	0	0	0	0	0	0	43	30	43	0	2,418	0	0	0
NASA	11,800	12,100	1,700	1,400	4,499	2,943	7,556	7,086	25,072	24,658	20,666	30,266	15,919	13,813	18,509	20,162
PCC	1,274	73	1,174	600	378	361	807	249	500	608	14	23	3	104	N/A	N/A
RRB	0	0	0	0	0	0	0	0	16	13	33	0	38	23	0	0
STATE	0	0	0	0	0	0	0	0	0	67	0	0	1,902	51	1,238	N/A
TRSY	0	0	2,977	2,393	2,823	1,134	836	0	1,344	4,826	2,810	170	2,990	1,400	1,495	1,000
TVA	0	0	0	0	0	0	0	0	475	844	4,277	522	1,158	1,466	1,022	750
USDA	2,500	0	0	500	500	1,547	1,752	7,300	7,045	7,277	2,894	5,983	3,891	1,765	994	N/A
<b>USPS</b>	<b>55,300</b>	<b>9,300</b>	<b>5,100</b>	<b>3,800</b>	<b>4,000</b>	<b>4,000</b>	<b>4,000</b>	<b>2,293</b>	<b>1,116</b>	<b>1,123</b>	<b>10,050</b>	<b>9,000</b>	<b>16,000</b>	<b>31,000</b>	<b>38,000</b>	<b>15,000</b>
<b>VA</b>	<b>13,000</b>	<b>11,500</b>	<b>9,500</b>	<b>9,860</b>	<b>5,500</b>	<b>11,200</b>	<b>9,970</b>	<b>10,000</b>	<b>12,100</b>	<b>9,050</b>	<b>11,960</b>	<b>3,700</b>	<b>7,400</b>	<b>13,000</b>	<b>10,500</b>	<b>10,500</b>
Total	258,560	194,139	57,611	65,597	52,209	59,374	114,038	145,078	120,870	230,228	288,346	179,228	200,435	261,258	205,184	122,414

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports



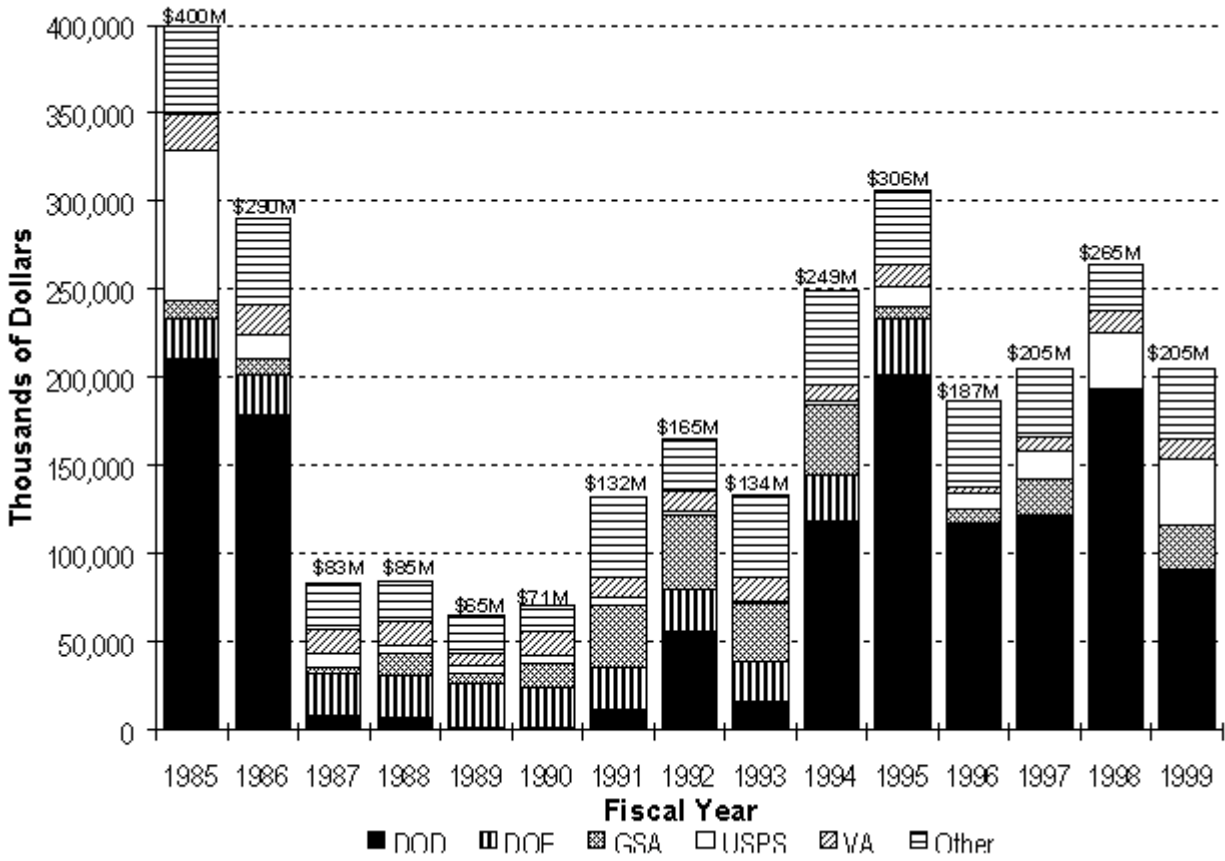
**Table 3-B**  
**Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,**  
**FY 1985 through FY 1999 (Thousands of Constant 1999 Dollars)**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Projected 2000
DOC	0	0	0	0	0	0	0	991	0	55	0	0	0	334	0	0
<b>DOD</b>	<b>210,355</b>	<b>179,372</b>	<b>8,032</b>	<b>6,839</b>	<b>1,870</b>	<b>1,223</b>	<b>11,601</b>	<b>56,442</b>	<b>15,978</b>	<b>118,093</b>	<b>201,060</b>	<b>117,174</b>	<b>121,895</b>	<b>193,968</b>	<b>91,243</b>	<b>53,756</b>
<b>DOE</b>	<b>22,875</b>	<b>21,674</b>	<b>23,878</b>	<b>24,482</b>	<b>24,190</b>	<b>23,381</b>	<b>23,666</b>	<b>23,466</b>	<b>23,175</b>	<b>26,923</b>	<b>32,025</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
DOI	4,943	8,274	0	0	5,409	0	1,476	11,136	5,375	1,801	826	928	0	162	1,730	851
DOJ	0	0	0	253	603	7,314	30,626	0	0	1,391	1,054	1,624	2,142	1,520	1,615	1,471
DOL	368	46	153	184	728	20	41	18	0	0	0	381	0	0	40	196
DOT	21,097	22,422	17,517	16,451	3,626	0	534	163	656	6,468	4,022	2,693	3,254	3,040	9,005	9,608
EPA	0	0	0	0	0	0	0	0	553	0	1,824	1,667	1,639	0	0	0
<b>GSA</b>	<b>10,355</b>	<b>9,118</b>	<b>4,197</b>	<b>12,176</b>	<b>6,070</b>	<b>13,339</b>	<b>34,945</b>	<b>42,045</b>	<b>33,186</b>	<b>40,087</b>	<b>7,680</b>	<b>7,708</b>	<b>20,492</b>	<b>0</b>	<b>25,000</b>	<b>0</b>
HHS	0	0	0	553	532	512	495	0	2,005	2,075	1,348	2,788	2,950	2,229	4,793	7,650
HUD	0	0	0	0	0	0	0	0	48	33	46	0	2,477	0	0	0
NASA	18,238	18,087	2,460	1,813	5,610	3,529	8,766	8,052	27,735	26,715	21,915	31,527	16,310	13,995	18,509	19,767
PCC	1,969	109	1,699	777	471	433	936	283	553	659	15	24	3	105	0	0
RRB	0	0	0	0	0	0	0	0	18	14	35	0	39	23	0	0
STATE	0	0	0	0	0	0	0	0	0	73	0	0	1,949	52	1,283	0
TRSY	0	0	4,308	3,100	3,520	1,360	970	0	1,487	5,229	2,980	177	3,064	1,418	1,495	980
TVA	0	0	0	0	0	0	0	0	525	914	4,536	544	1,186	1,485	1,022	735
USDA	3,864	0	0	648	623	1,855	2,032	8,295	7,793	7,884	3,069	6,232	3,987	1,788	994	0
<b>USPS</b>	<b>85,471</b>	<b>13,901</b>	<b>7,381</b>	<b>4,922</b>	<b>4,988</b>	<b>4,796</b>	<b>4,640</b>	<b>2,606</b>	<b>1,235</b>	<b>1,217</b>	<b>10,657</b>	<b>9,375</b>	<b>16,393</b>	<b>31,408</b>	<b>38,000</b>	<b>14,706</b>
<b>VA</b>	<b>20,093</b>	<b>17,190</b>	<b>13,748</b>	<b>12,772</b>	<b>6,858</b>	<b>13,429</b>	<b>11,566</b>	<b>11,364</b>	<b>13,385</b>	<b>9,805</b>	<b>12,683</b>	<b>3,854</b>	<b>7,582</b>	<b>13,171</b>	<b>10,500</b>	<b>10,294</b>
Total	399,629	290,193	83,373	84,970	65,099	71,192	132,295	164,861	133,706	249,434	305,775	186,696	205,363	264,699	205,184	120,014

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports

**FIGURE 4**  
**Energy Conservation Retrofit Expenditures**  
**(In Constant 1999 Dollars)**



Source: Federal Agency Annual Energy Management Data Reports

## **Federal Energy Efficiency Fund**

The Federal Energy Efficiency Fund (Fund) was established by section 152 of EPACT, which amended section 546 of NECPA, to provide grants to agencies to assist them in meeting the mandated energy efficiency and water conservation requirements. The limited spending authority available in FY 1994 and FY 1995 was applied to those proposals which were most competitive, considering the five following factors:

1. The cost-effectiveness of the project (saving-to-investment ratio).
2. The net dollar cost savings to the Federal Government.
3. The amount of energy savings to the Federal Government.
4. The amount of funding committed by the agency requesting financial assistance.
5. The amount of funding leveraged from non-Federal sources.

No spending authority has been provided beyond FY 1995. A total of 114 proposals were received during FY 1994 and FY 1995 and Fund grants were provided for 37 projects. Of these, 35 projects provide energy savings of 5.8 trillion Btu and two projects result in water conservation in the amount of 738 million cubic feet, with an estimated energy and water cost savings of \$54 million (before payback of the initial investment) over the useful lives of the projects. The total Fund investment to realize these savings was \$7.9 million, which leveraged \$3.6 million in Federal-agency funding and \$0.9 million in non-Federal funding. The projects encompass 14 states and the District of Columbia, with one project located in the Caribbean. A summary of the funded projects is shown on the next page.

EPACT, 42 U.S.C. § 8258, requires energy and cost savings to be reported annually after completion of construction, for each project funded under the Federal Energy Efficiency Fund. Of the 37 funded projects, 25 are complete and operational, realizing annual energy and cost savings which equal or exceed the values projected in the original proposals for Fund grants. Six energy efficient lighting projects, two water projects, and one each HVAC, chiller, and natural gas conversion projects remain under construction for completion by the end of FY 1998. These projects have been integrated into other non-Fund building upgrades funded by the respective agencies, resulting in longer time periods required for completion. In some cases, mission requirements have also limited building access.

Three Federal Energy Efficiency Fund projects will each put in place one base-wide energy savings performance contract (ESPC) for the U.S. Coast Guard in Honolulu, HI, and the National Park Service for the Presidio of San Francisco, CA, and two ESPCs will be put in place for the U.S. Army at Fort Huachuca, AZ. One of the Fort Huachuca projects and the U.S. Coast Guard project will install renewable energy solar hot water systems.

### Federal Energy Efficiency Fund Projects - FY 1999 Status

Agency	State	Project Description	Funds Awarded	Installation Status (Percent Complete)
DOC - NOAA	WA	NW Fish Science Center - Fish Culture System	\$471,399	100%
DOD - US Army	AZ	Solar and Base-wide Upgrades	\$310,000	15%
DOI - National Park Service	UT	Dangling Rope Marina - PV System	\$350,000	100%
DOI - National Park Service	DC	White House - Transformer & NPS Detailee	\$74,000	100%
DOI - National Park Service	WY	Yellowstone NP - Lighting, Heat, & Insulation	\$455,665	100%
DOI - National Park Service	WY	Yellowstone NP - Phase 2 Lighting, Heat, & Insulation	\$174,500	95%
DOI - National Park Service	CA	Channel Island Santa Rosa Island - Wind & PV System	\$272,394	95%
DOI - National Park Service	CA	Yosemite National Park - Lighting Retrofit	\$73,621	100%
DOI - National Park Service	CA	Golden Gate NRA, Presidio - Lighting Retrofit	\$175,000	50%
DOL - Job Corps Center	MT	Electric to Natural Gas Conversion	\$225,000	100%
DOT - FAA	OH	Lighting Retrofit	\$103,706	100%
DOT - Coast Guard	AK	Used Oil Processing Facility	\$530,000	100%
DOT - Coast Guard	MD	USCG Yard, Lighting Retrofit	\$80,671	100%
DOT - Coast Guard	HI	Housing Area - Solar Water Heating	\$100,000	100%
Treasury - US Mint	PA	Lighting Retrofit	\$103,180	100%
Exec. Residence Agency	DC	White House - Lighting Retrofit & Refrigerator	\$50,477	100%
HHS - NIH/National Cancer Inst.	MD	Chiller Installation	\$283,463	56%
HHS - NIH/National Cancer Inst.	MD	Occupancy Sensor Installation	\$129,090	25%
NASA - Dryden	CA	Edwards AFB Bldg #4800 Lighting Retrofit	\$265,414	100%
NASA - Goddard	MD	Bldg's # 17, 21, 22, & 23 Lighting Retrofit	\$286,715	100%
NASA - Goddard	MD	E-Building Complex Lighting Retrofit	\$94,812	100%
NASA - Kennedy	FL	Bldg M7-505 Lighting Retrofit	\$144,500	100%
NASA - Kennedy	FL	Bldg M6-336 Lighting & HVAC Retrofits	\$41,800	100%
NASA - Kennedy	FL	Bldgs M6-339 & M7-581 Lighting Retrofit	\$36,942	100%
NASA - Kennedy	FL	Hanger L, Bldg 1732 Lighting & HVAC Mods	\$88,900	100%
NASA - Kennedy	FL	Launch Complex 39 Lighting Retrofit	\$106,050	100%
NASA - Marshall	AL	Bldg. 4610 Lighting Modifications	\$120,000	91%
NASA - Marshall	AL	Building 4250 Water Conservation	\$116,500	91%
National Gallery of Art	DC	HVAC Automation System	\$2,000,000	95%
Smithsonian Institution	MD	Support Center - Phases 3, 4, & 5 Lighting	\$100,000	100%
Agency for Int'l Development	Jamaica	Executive Office Bldg - Lighting & Windows	\$69,798	100%
USDA - Agric. Research Service	MD	Bldg 011A - Fluorescent Lamp Retrofit	\$3,640	100%
USDA - Agric. Research Service	MD	Bldg 011A - Lighting Occupancy Sensors	\$33,326	100%
USDA - Forest Service	AZ	Apache-Sitgreaves NF Lighting Retrofit	\$35,000	100%
USDA - Forest Service	AZ	Kaibab NF - Replace Telephone Switch	\$66,500	100%
USDA - Forest Service	CA	Shasta-Trinity NF - NCSC Lighting Retrofit	\$28,500	100%
US Soldiers & Airmen's Home	DC	Lighting Retrofit	\$274,677	100%

## Energy Savings Performance Contracting

Section 155 of EPACT amended Title VIII of NECPA, sections 801 and 804, relating to energy savings contracts. Section 801, as amended, gives agencies the authority to enter into energy savings performance contracts (ESPCs) and describes the methodology of contract implementation. The ESPC program was created to provide agencies with a quick and cost-effective way to increase the energy efficiency of Federal buildings. Under an ESPC, a private sector energy service company (ESCO) will assume the capital costs of installing energy and water conservation equipment and renewable energy systems. The ESCO guarantees the agency a fixed amount of energy cost savings throughout the life of the contract and is paid directly from those cost savings. Agencies retain the remainder of the energy cost savings.

On April 10, 1995, DOE published in the *Federal Register* (10 CFR Part 436) a final rule that sets forth the regulations for energy savings performance contracting and achieved the directive to substitute regulations for certain provisions in the FAR. On April 18, 1995, DOE published a correction that changed the effective date of the final rule from May 10 to April 10, 1995.

An application process for a Qualified List of ESCOs was also released with the ESPC regulations. Only firms on the Qualified List may receive an ESPC award. Firms that wish to be on the Qualified List must submit an application to DOE and possess the required experience and expertise. The List is continually updated.

On November 2, 1998, the Energy Conservation Reauthorization Act was signed by the President to become Public Law 105-388. The law makes several significant changes to EPACT and NECPA. Section 4 of Public Law 105-388 amends NECPA section 801 to extend the authority of Federal agencies to enter into ESPCs through September 30, 2003. Without this amendment, the authority would have expired on April 10, 2000. Section 4 also amends the definition of "Federal agency" in NECPA Section 804 to include each authority of the U.S. Government, whether or not it is within or subject to review by another agency.

On June 3, 1999, the President signed Executive Order 13123, *Greening the Government Through Efficient Energy Management*. Section 403(a) states that "Agencies shall maximize their use of available alternative financing contracting mechanisms, including Energy Savings Performance Contracts." This Section goes on to state that "Energy Savings Performance Contracts...provide significant opportunities for making Federal facilities more energy efficient at no net cost to taxpayers." Inherent to implementation of the ESPC regulation is the necessity for action by senior agency officials, agency priority on employing ESPCs, development and maintenance of trained and dedicated procurement personnel, and accountability for results.

During FY 1999, 13 conventional ESPCs were awarded. Total contractor investment from these projects is more than \$87 million, providing the Government with an opportunity to save millions of dollars in energy costs during the life of the contracts. These ESPCs include seven by the United States Postal Service, four by the Department of Defense, and one each by the Department of the Treasury and the National Aeronautic and Space Administration.

**Conventional Energy Savings Performance Contracts Awarded  
by Federal Agencies in FY 1999**

<b>Project Name/Location</b>	<b>Project Description</b>	<b>Contractor Investment</b>	<b>Savings</b>
Dept. of Defense, U.S. Army, Military District of Washington	Lighting retrofit, building automation systems, building envelope modifications, and boiler, chiller, and water/sewer system upgrades	\$67,090,407	Annual savings of \$11,898,523
Dept. of Defense, U.S. Marine Corps, Marine Corps Base Kaneohe Bay, Oahu, Hawaii	Chiller upgrades	\$55,260	Not available
Dept. of Defense, U.S. Marine Corps, Marine Corps Base Kaneohe Bay, Oahu, Hawaii	Hot water decentralization	\$3,349,600	Not available
Dept. of Defense, U.S. Army, West Point Keller Hospital, West Point, New York	HVAC upgrades	\$1,152,887	Not available
Dept. of the Treasury, U.S. Secret Service, Beltsville, Maryland	Lighting retrofits, day lighting	Not available	Annual savings of \$39,000
NASA, Goddard Space Flight Center, Greenbelt, Maryland and Wallops Flight Facility, Wallops Island, Virginia	Lighting retrofits through two delivery orders under two GSFC IDIQ contract awarded to two ESCOs	Each IDIQ has a maximum value of \$5 million	The first two delivery orders will produce annual savings of \$50,000
USPS, New Jersey	Lighting retrofits	\$8,450,000 investment in 7 facilities	Annual savings of \$1,300,000
USPS, West Chester, New York	Lighting retrofits	\$210,000 investment in 6 facilities	Annual savings of \$54,800
USPS, Dallas, Texas	HVAC upgrades, lighting retrofits	\$2,774,000 investment in 8 facilities	Annual savings of \$403,226
USPS, Atlanta BMC, Georgia	Lighting retrofits, HVAC upgrades	\$155,000 investment in 1 facility	Annual savings of \$25,000
USPS, Suncoast District, Florida	Not available	\$660,000 investment in 17 facilities	Annual savings of \$110,000
USPS, Las Vegas, Nevada	Lighting retrofits, air compressor	\$221,000 investment in 1 facility	Annual savings of \$32,715
USPS, Tulsa, Oklahoma	HVAC upgrades, lighting retrofits	\$1,310,953 investment in 1 facility	Annual savings of \$187,955

The ESPC covering the Military District of Washington is the single largest ESPC any Federal agency has awarded. Through a partnership between the Defense Logistics Agency's Defense Energy Support Center (DESC), the U.S. Army's Military District of Washington (MDW), and the National Renewable Energy Laboratory (NREL) savings of over \$100 million will be achieved over the 18-year contract period at 837 buildings across the five participating installations (Fort Belvoir, Fort A.P. Hill, Fort Myer, Fort McNair, and Fort Meade). Utilizing "best value" buying techniques, DESC, in conjunction with its Government partners, determined that the Viron/Pepco Services offer provided the greatest overall benefits to the Government in the areas of energy engineering, equipment installation, construction supervision, commissioning, and measurement and verification. All capital investments will be made within the first three years of the contract. As a result of this ESPC, the five installations will have their overall energy consumption reduced by at least 23 percent in comparison to 1998 levels by 2005. This translates into annual reductions of 89 million kilowatt-hours of electricity and 294 billion Btu in fuel.

However, awarding ESPCs on a one-by-one basis has often proven to be complex and time consuming. To make it easier to use ESPCs, DOE's Federal Energy Management Program (FEMP) has developed Regional and Technology-Specific Super ESPCs. Both Regional and Technology-Specific Super ESPCs share the same general contract terminology and provisions with conventional ESPCs and they present several significant advantages to Federal agencies.

Super ESPCs are unlike conventional ESPCs in two fundamental ways. First, a Super ESPC blankets a large geographic territory; a conventional ESPC is used for a specific site. The second, and real benefit to agencies, is that Super ESPCs substantially reduce the lead time to contract with an energy savings company (ESCO) for energy services. Super ESPCs are broad area indefinite delivery, indefinite quantity (IDIQ) contracts that allow agencies to negotiate site-specific delivery orders with an ESCO without having to start the contracting process from scratch. Demand on agency resources to develop and award contracts, as well as lead times, will be greatly reduced, and energy savings will be realized more quickly.

The Western Regional Super ESPC was awarded to five ESCOs in May 1997. The Southeast, Midwest, and Central Regional Super ESPCs were awarded to various ESCOs during FY 1998. On March 1, 1999 the Mid-Atlantic Regional Super ESPC (covering Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia, and the District of Columbia) was awarded to six ESCOs (ERI Services, EUA Cogenex, HEC Energy and Design Services, Honeywell, NORESKO, and Siebe Government Services). Also on March 1, 1999, the Northeast Regional Super ESPC (covering Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) was awarded to seven ESCOs (CES/Way International, ERI Services, HEC Energy and Design Services, Honeywell, Johnson Controls Government Services, Siebe Government Services, and XENERGY). Each Regional Super ESPC has a contract ceiling of \$750 million.

During FY 1999, 16 Regional Super ESPC delivery orders were awarded. Total contractor investment is more than \$44 million, providing very significant energy and cost savings to the Government. These delivery orders include three by the Department of Defense and the Department of Transportation, two by the Department of the Interior, the Department of

Veteran’s Affairs, and the National Aeronautics and Space Administration, and one each by the Department of Energy, the Department of Labor, the General Services Administration, and the National Archives and Records Administration. Many more delivery orders are expected to be awarded during FY 2000.

**DOE Regional Super ESPC Delivery Orders**

<b>Project Name/Location</b>	<b>Project Description</b>	<b>Contractor Investment</b>	<b>Savings</b>
Dept. of Defense, DOD Center Monterey Bay, California	Lighting retrofit, energy management and control system, and boiler, HVAC, and hot water/steam system upgrades, and efficient motors	\$1,891,128	Annual savings of \$354,738
Dept. of Defense, U.S. Navy, U.S. Naval Submarine Base, Bangor, Washington	Lighting retrofit, energy management and control system, and upgrades to the chiller and hot water/steam systems	\$663,559	Not available
Dept. of Defense, U.S. Navy, Port Mugu Naval Air Weapons Station and Naval Construction Battalion Center, Port Hueneme, California	Lighting retrofit, energy management and control system, HVAC, boiler and chiller system upgrades, and hot water pipe insulation	\$1,699,458	Not available
Dept. of Transportation, U.S. Coast Guard, Integrated Support Command, Alameda, California	Lighting retrofit, building automation systems, and HVAC system upgrades	\$1,149,112	Not available
Dept. of Transportation, U.S. Coast Guard, Integrated Support Command, Kodiak Island, Alaska	Lighting retrofit, upgrades to steam, water, and heat recovery systems This is the second delivery order on this site	\$3,166,628	Not available
Dept. of Transportation, U.S. Coast Guard, Support Center, Elizabeth City, North Carolina	Lighting retrofit, efficient motors and drives, building automation systems, rate reductions and audits, and water and sewer system upgrades	\$1,830,611	Annual savings of \$271,140
Dept. of the Interior, National Park Service, Yosemite National Park, California	Lighting retrofit, efficient motors and drives, building automation systems, and upgrades to boiler, HVAC, and electric distribution systems	\$584,535	Annual savings of \$81,539
Dept. of the Interior, Bureau of Indian Affairs, Chemawa Indian School, Salem, Oregon	Building automation systems, building envelope modifications, efficient motors and drives, and boiler and HVAC system upgrades	\$1,546,684	Annual savings of \$159,361
Dept. of Veteran’s Affairs, VA Domiciliary, White City, Oregon	Lighting retrofit, building automation systems, upgrades to the HVAC system	\$395,629	Annual savings of \$64,734



<b>Project Name/Location</b>	<b>Project Description</b>	<b>Contractor Investment</b>	<b>Savings</b>
Dept. of Veteran's Affairs, Medical Center, Grand Junction, Colorado	Lighting retrofit, upgrades to the steam, water, and heat recovery systems	\$755,857	Annual savings of \$81,539
NASA, Johnson Space Center, Houston, Texas	Lighting retrofit, compressed air system modifications, variable speed pumping systems, cooling tower control systems, water conservation measures, energy management control system installation, HVAC control system upgrade	\$21,000,000	Annual savings of \$2,074,000
NASA, Glenn Research Center at Lewis Field, Cleveland, Ohio	Lighting retrofit and boiler improvements	\$1,747,830	Annual savings of \$275,127
Dept. of Energy, Oak Ridge National Laboratory, Oak Ridge, Tennessee	Lighting retrofit and water conservation	\$279,462	Annual savings of \$37,797
Dept. of Labor, Job Corps Centers, San Bernadino and Sacramento, California	Lighting retrofit	\$169,170	Annual savings of \$29,267
General Services Administration, bundled sites, Atlanta, Georgia	Lighting retrofit, efficient motors and drives, and chiller and HVAC system upgrades	\$7,045,074	Annual savings of \$1,005,386
National Archives and Records Administration, Eisenhower Museum and Library, Abilene, Kansas	Lighting retrofit, energy management and control system, and steam trap replacements	\$266,431	Annual savings of \$35,914

Technology-Specific Super ESPCs emphasize a particular advanced energy-efficiency or renewable energy technology to advance these proven yet still emerging technologies in the Federal marketplace. They blanket the entire nation and carry the same agency resource and time saving benefits as Regional Super ESPCs. ESCOs chosen for these awards have unique capabilities and experience in providing energy savings through installation of the technology, thereby greatly reducing the risks of misapplying emerging technologies. Technology-Specific Super ESPCs can also be comprehensive projects employing multiple energy conservation measures, as long as the named technology is the focus of the project.

The first Technology-Specific Super ESPC was awarded in September 1996 to provide solar hot water heating with parabolic troughs. Contract value is \$30 million. During FY 1998, the photovoltaics Technology-Specific Super ESPC was awarded to two ESCOs. This contract is worth \$50 million. In February 1999, the geothermal heat pump Technology-Specific Super ESPC was awarded to five ESCOs (Constellation Energy Source, DukeSolutions, The Enron Team, Exelon Energy Services, and The Trane Company). This contract is worth \$500 million. Over the next several years more Technology-Specific Super ESPCs will be awarded covering a wide range of energy and cost saving technologies.

## Utility Partnerships

Although the availability of utility-sponsored demand side management programs is waning, Federal agency reports identified the receipt of at least \$2.6 million in incentive rebates in FY 1999. Utility incentive activities reported by the agencies occurred at installations widely distributed across the country. This decentralization of utility incentive participation makes it difficult for agencies to track all utility incentive activities undertaken by all respective sub-agencies, bureaus, and field offices. Total utility incentive benefits received by the Federal Government as a whole for FY 1999 are therefore assumed to be greater than reported.

Under incentive programs, utilities offer rebates to the customer which partially fund and help to promote the installation of new, more efficient equipment such as lighting systems, insulation, cooling equipment, and high efficiency motors. The customer, in this case the Federal Government, is then required to finance the remainder of the equipment cost. Utility incentive programs provide leverage for the user's investment dollars and at the same time help the utility to avoid the cost of building new power plants. EPACT and Executive Orders 12902 and 13123 place heavy emphasis on utility incentive as a means for Federal agencies to achieve energy conservation.

The following agencies reported participation in demand side management programs in FY 1999:

- Department of Defense,
- Department of Energy,
- Department of the Interior,
- Department of Transportation,
- Department of the Treasury,
- General Services Administration,
- Health and Human Services,
- Housing and Urban Development, and
- National Aeronautics and Space Administration.

## F. Life-Cycle Costing (LCC)

Section 544 of NECPA, as amended in 1988, requires DOE to establish practical and effective methods for estimating and comparing the life-cycle costs for Federal buildings using the sum of all capital and operating costs for energy systems of new buildings involved over the expected life of such systems or during a period of 25 years, whichever is shorter, and using average fuel costs and a discount rate determined by the Secretary of Energy. In addition, section 544 requires that procedures be developed in applying and implementing the methods that are established. EPACT further amends NECPA to require, after January 1, 1994, agencies which lease buildings to fully consider the efficiency of all potential building space at the time of renewing or entering into a new lease.

On November 20, 1990, DOE issued a Notice of Final Rulemaking to amend Title 10 of the Code of Federal Regulations, Part 436, which sets forth guidelines applicable to Federal agency in-house energy management programs. The principal regulatory changes involved amending the

life-cycle cost methodology and procedures to provide for an annually determined, market-based discount rate and for a more effective system to revise annually the energy cost escalation rates that Federal agencies are required to assume. In developing the final amendments, the Department of Energy actively consulted with the Office of Management and Budget, the Department of Defense, and the General Services Administration.

In the past, DOE's Federal Energy Management Program has published updated fuel price projections for life-cycle cost analyses on October 1 of each year to coincide with the beginning of the fiscal year. The FY 1999 update of the *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 1998.

## **G. Procurement Policy**

The U.S. Government is the single largest user of energy in the world. Not surprisingly, it is also the largest purchaser of energy-related products, buying an estimated \$10 to \$20 billion worth each year for its buildings. Consequently, there is an enormous potential for energy and dollar savings through procurement policies emphasizing energy efficiency. Such policies not only save taxpayer dollars, but also decrease the emission of air pollutants associated with fuel combustion (both directly and in the generation of electricity), while simultaneously expanding the overall market for energy-efficient products.

Executive Order 13123, "Greening the Government through Efficient Energy Management," directs Federal agencies to purchase ENERGY STAR labeled products, or, for those product types not covered by the EPA/DOE ENERGY STAR labeling program, products "in the upper 25 percent of energy efficiency as designated by FEMP." Reinforcing the message is a stipulation in the Federal Acquisition Regulations (48 CFR 23.704) that "Agencies shall implement cost-effective contracting preference programs favoring the acquisition of . . . energy-efficient products. . . ., i.e., products that are in the upper 25 percent of energy-efficiency for all similar products." This FAR provision was initiated in response to Executive Order 12902 (1994), and efforts are presently under way to modify the language in accordance with E.O. 13123 (e.g., to refer to ENERGY STAR products).

The ENERGY STAR labeling program is a joint effort between EPA and DOE to get manufacturers (and some retailers) to identify efficient products with an easily recognizable logo, the ENERGY STAR. Since this is a nation-wide labeling program covering multiple products, it makes it very simple for customers to identify truly efficient models among those offered – for instance, on a retail floor, or among various models listed in a product catalog. Presently, the program includes a wide variety of office equipment and home heating and cooling products, as well as many consumer audio and video products (e.g., TVs, VCRs, and DVD players), appliances, and residential windows. Some commercial equipment, such as exit signs, low-voltage distribution transformers, and roof products, is also covered.

To assist Federal agencies in meeting the requirements of the Executive Order and FAR directives, FEMP publishes a series of *Product Energy Efficiency Recommendations*, which delineate the efficiency levels that meet the ENERGY STAR and "upper 25%" requirements of the

Executive Order. The *Recommendations* also provide cost-effectiveness examples, tips on important product selection parameters such as sizing and fuel choice, and leads to the Federal supply agencies (the Defense Logistics Agency and the General Services Administration) that offer efficient models. The *Recommendations*, which now cover more than 30 products, are available on FEMP's Web site at [www.eren.doe.gov/femp/procurement](http://www.eren.doe.gov/femp/procurement), as well as in print, through a loose-leaf binder called "Buying Energy Efficient Products." The binder is available free of charge from FEMP's clearinghouse (800-363-3732); subscribers receive new and updated material as it is printed, approximately every six months.

To be most effective, FEMP's product efficiency recommendations need to be incorporated into other purchasing guidance, such as technical specifications and agency-specific policies and practices. Pursuant to this concern, FEMP has made considerable progress in partnership with the two major Government supply agencies, DLA and GSA. FEMP is working with GSA's Federal Supply Service arm and with DLA to identify energy-efficient equipment among supply offerings. As a result of FEMP's joint effort with GSA/FSS on electronic product coding, GSA customers shopping on-line can, in most cases, distinguish models that are ENERGY STAR compliant.

DLA's customers rely heavily on the information in the Federal Logistics Information System (FLIS) database to procure products and equipment. The FLIS catalogs millions of items by "national stock numbers" (NSNs), which can be accessed by vendor name or code. DLA has established a database "field" highlighting positive environmental attributes (such as energy-efficient or made from recycled material) within the FLIS, and has utilized the FEMP efficiency thresholds as its definitions for "energy-efficient" and "water-conserving" (for plumbing fixtures such as showerheads and toilets).

FEMP's biggest success to date with its energy-efficient purchasing program has been the incorporation by several large Federal construction agencies of FEMP-recommended product efficiency levels into agency master, or guide, specifications for construction and major renovation. When an agency writes a FEMP recommendation into a "guide spec" for a given product, it generally assures that virtually all the buildings constructed by that agency will use only models that comply with the highly efficient levels – affecting millions of dollars worth of product. On the vanguard of this movement are the Army Corps of Engineers and the Navy. Products for which guide specifications incorporating FEMP's recommended efficiency levels had been written by the end of fiscal year 1999 include electric chillers, fluorescent lighting, exit signs, distribution transformers, and roof products.

## **H. Public Education Programs**

NECPA, 42 U.S.C. § 8258(b), requires the Secretary of Energy to include in this and subsequent annual reports information on public education programs carried out by Federal agencies and previously reported under the authority of section 381 of the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6361(b).

EPCA requires the Secretary of Energy to establish and carry out public education programs to encourage energy conservation and energy efficiency and to promote vanpooling and carpooling

arrangements. The Department of Transportation (DOT) has promoted ride sharing activities, while DOE has been responsible for other energy conservation education programs.

Through its Federal Highway Administration, DOT obligates Federal aid funds to assist State and local agencies in implementing programs designed to encourage the use of car pools, van pools, and buses by commuters. DOT efforts have included van pool acquisition programs, fringe and corridor parking facilities, ride-matching projects, preferential treatments for high occupancy vehicles, and transit service improvement. Since 1974, more than \$875 million in Federal aid highway funds have been spent on such projects in an effort to establish self-sufficient programs across the Nation.

The Department of Transportation's Technology Sharing Program (TSP) makes high quality reports in a user-friendly format available to the non-scientist or technical person to understand and act on transportation problems of state and local governments. This low-cost program disseminates technical reports on a variety of topics to this user community, thus saving them the time and cost of researching the information on an individual basis, or not having the information at all. The TSP products consist of reports, manuals, and summary documents which can be ordered at the following Internet site: <http://www.tsp.dot.gov/cgi-bin/borwsere.pl>. Subjects include commuter issues and travel demand, traffic congestion, land-use development, and risk assessment. In addition, a variety of products of the National Science and Technology Council's Subcommittee on Transportation R&D are also available through the site.

The Department of Energy's public education programs encompass a wide variety of services, objectives, and audiences, covering all major areas of conservation and renewable energy. DOE has organized its technology transfer programs to meet the specific information requirements of various audiences.

Three services are managed through subcontracts at the National Renewable Energy Laboratory (NREL): DOE's Energy Efficiency and Renewable Energy Clearinghouse (EREC), DOE's Energy Efficiency and Renewable Energy Network (EREN), and the FEMP Help Desk.

EREC provides basic, technical, and financial information on various energy efficiency and renewable energy technologies and programs. The audience served by EREC includes the general public, business and industry, educational community, media, utility companies, and state and local governments. Information is provided in the form of fact sheets, DOE and National Laboratory books and brochures, bibliographies, and on-line computer-generated technology synopses. Some requests are handled completely over the phone and the caller receives no publications. EREC's telephone number is 800-DOE-EREC (800-363-3732) and its Web site is at [www.eren.doe.gov/consumerinfo](http://www.eren.doe.gov/consumerinfo). In FY 1999, EREC staff responded to 70,296 inquiries and disseminated 373,672 publications.

EREN is the official Web site of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). The audience served by EREN includes business and industry, the general public, the educational community, the media, and state and local governments. EREN's Web address is [www.eren.doe.gov](http://www.eren.doe.gov). In 1999, EREN averaged 86,000 unique users per month, and 5 million hits per month. The site is a comprehensive resource for energy

information, providing links to more than 600 energy-related Web sites, allowing keyword searches, and offering a full range of information on topics such as building energy efficiency, wind power, and alternative fuels. In addition, EERE provides its organizational chart, major initiatives, and budget. The site also features current press releases, consumer information, and lists of discussion groups on various energy-related topics. There are even forms to submit energy-related questions and to subscribe to the EREN Network News e-mail newsletter.

The Federal Energy Management Program (FEMP) Help Desk provides Federal energy managers with specialized information on effective energy management practices, technical assistance on implementing Federal sector energy projects, financing information, energy modeling software, publications, and energy management training programs. The Help Desk responds to requests for information via a toll-free telephone service, electronic mail, and through the Internet. The Help Desk was merged into EREC in FY 1997. The telephone number is 800-DOE-3732. The Web site is [www.eren.doe.gov/femp](http://www.eren.doe.gov/femp).

The 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. It also makes available the publications produced by the DOE Energy Information Administration. NEIC provides information to Federal employees and the public at [www.eia.doe.gov](http://www.eia.doe.gov). Electronic inquiries may be sent to [infoctr@eia.doe.gov](mailto:infoctr@eia.doe.gov). In 1999, NEIC staff responded to 25,049 inquiries and distributed approximately 30,635 publications.

The Office of Scientific and Technical Information (OSTI), as part of the Office of Science, provides coordination and direction for the management of scientific and technical information resulting from the DOE's multi-billion dollar research and development activities. As a cross-cutting Headquarters office, OSTI accomplishes its mission through the Scientific and Technical Information Program (STIP). STIP operates in partnership with program offices, operations offices, and contractors to develop and implement information management "best business practices" to ensure that DOE maximizes the return on its \$6 billion annual R&D investment.

In support of national competitiveness, OSTI collects, processes, and disseminates DOE-originated research information and selected worldwide research literature on subjects of interest to domestic communities. OSTI also provides scientific and technical information services to, or on behalf of, DOE elements in support of Departmental mandates, missions, and objectives. OSTI serves the public directly or indirectly through agreements with the National Technical Information Service, Government Printing Office, depository libraries, and commercial vendors. EnergyFiles is a publicly available, web-based gateway to a wide array of energy-related information. Included among the EnergyFiles family is the DOE Information Bridge, an electronic full-text collection of 26,000 documents available to the DOE research community.

OSTI manages a comprehensive collection of approximately one million scientific and technical information documents, representing 50 years of energy-related activities. The organization also maintains the Energy Science and Technology Database (EDB), which has more than 3.5 million summaries of DOE and worldwide information. EDB is made available to the public on-line and on CD-ROM through commercial vendors. The majority of its users are industry, Federal and State officials, contractors, libraries, research institutions, and the public. In FY 1999, OSTI

added more than 110,879 research summaries to the database and provided 18,356 full-text documents for public availability to the National Technical Information Service and the Government Printing Office Depository Library Program.

FY 1999 initiatives included a strategic effort to process and disseminate information in an increasingly decentralized environment. As a continuing step towards a “National Library of Energy Science and Technology,” the effort will significantly improve DOE and public access to bibliographic and full-text information without major additional investment. In addition to the core program activities, OSTI’s other services include developing Internet-based applications for DOE offices, providing information management advice and consultation to the Departmental community, managing and disseminating DOE and Nuclear Regulatory Commission scientific and technical software, and representing the United States in multilateral and bilateral international information exchange agreements.

The DOE public information mechanisms include several direct service programs designed to provide technical assistance to specific target groups. Some of these include:

- The State Energy Program, a formula grant program, which provides a flexible, supportive framework to enable the States to address their own energy priorities, as well as focus on national initiatives and strengthens their capabilities to deliver energy services. This customer-driven program seeks to increase the extent to which Federal, State, and local governments work with other public and private sector entities to achieve widespread adoption of available energy efficiency and renewable energy technologies, and to demonstrate the use of emerging technologies which benefit the entire economy.
- The Special Projects component of the State Energy Program offers States the opportunity to apply for competitively selected grants covering a wide range of activities that may expand upon a State’s formula grant activities or offer an opportunity to take new initiatives. These projects are designed to utilize the State’s unique and effective skills in forming and sustaining partnerships with local governments, industry, utilities, and private organizations. Many of these projects involve the dissemination of information about, and/or the demonstration of the viability of a variety of energy efficiency and renewable energy applications.
- The Industrial Assessment Center (IAC) Program provides no-cost energy, waste, and productivity assessments to help small and mid-sized manufacturers identify measures to maximize energy-efficiency, reduce waste, and improve productivity. The assessments are conducted by local teams of engineering faculty and students from 30 participating universities across the country. This program not only improves manufacturing efficiency, but at the same time provides valuable, hands-on technical training and experience for engineering students throughout the U.S. Additional information can be obtained by visiting the program Web site at [www.oit.doe.gov](http://www.oit.doe.gov).

A full list of DOE’s energy education, extension, and information services is provided in Appendix E to this report.

## II. ENERGY MANAGEMENT IN BUILDINGS AND FACILITIES

### A. Energy Consumption and Costs for Buildings and Facilities

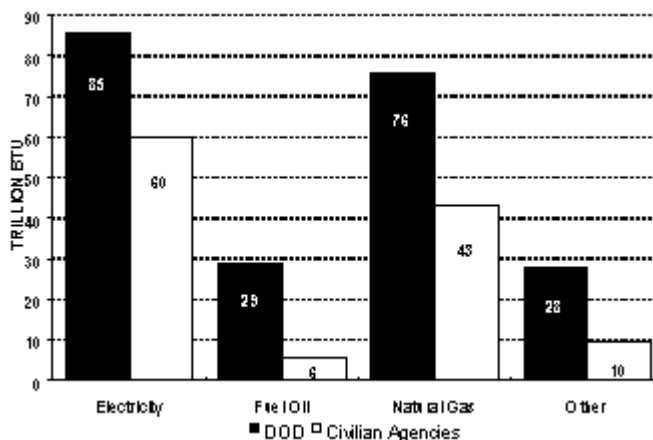
The Federal Government provides energy to approximately 500,000 buildings and facilities comprising approximately 3.1 billion square feet of floor area. This energy is used to provide lighting, heating, ventilation, air conditioning, and other standard building services, as well as a significant amount of process operations that are not reported separately.<sup>11</sup> Federal buildings include both Federally-owned and leased buildings. However, in many instances the lessor pays the energy bill, and consumption and cost data may not be available to the Government. Accordingly, Federal agencies report data for leased space to the maximum extent practicable.<sup>12</sup>

Table 4-A shows the total primary energy consumed in Federal buildings and facilities, including energy resources used to generate, process, and transport electricity and steam.<sup>13</sup> Primary energy consumed in buildings and facilities in FY 1999 decreased 16.7 percent from FY 1985 and 0.4 percent from FY 1998.

Table 4-B shows that agencies have decreased net energy consumption in buildings by 28.4 percent, from 470.4 trillion Btu in FY 1985 to 336.9 trillion Btu in FY 1999. A comparison to FY 1998 shows a decrease of 1.1 percent in total buildings energy consumption.

Of the 28 agencies represented on the tables for FY 1999, 11, including DOD, consume more than 98 percent of the reported buildings energy use. Energy used in buildings accounts for approximately 33.3 percent of the total 1.01 quads used by the Federal Government. The mix of Federal buildings energy use for Defense and civilian agencies is depicted in Figure 5. Electricity constitutes 43.3 percent (145.8 trillion Btu) of Federal buildings energy use; 35.4 percent is accounted for by natural gas

**FIGURE 5**  
**Defense and Civilian Energy Consumption in Buildings and Facilities by Fuel Type, FY 1999**



<sup>11</sup>Process energy is that energy used in buildings for operations other than standard building services. In cases where separate reporting was not possible, due to the lack of meters or estimation techniques, process energy was reported as though it was part of the energy used for standard building services.

<sup>12</sup>The General Services Administration (GSA) is the primary leasing agent for the Federal Government, although most of the other agencies do have some leasing authority. In some cases, GSA will delegate operations and maintenance responsibility to individual agencies for leased space, requiring the agency to be responsible for paying the utility bills and reporting energy consumption.

<sup>13</sup>Source conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors for net energy consumption.



**TABLE 4-A**  
**FEDERAL PRIMARY ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES**  
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	<b>35,915.2</b>	42,631.6	43,820.8	45,472.7	49,064.6	50,297.9	51,256.8	53,195.9	48,869.8	<b>50,939.9</b>	<b>52,058.2</b>	44.9	2.2
VA	<b>39,673.2</b>	40,902.8	41,915.5	41,740.0	42,540.0	43,113.2	43,556.3	44,780.8	45,068.6	<b>45,496.7</b>	<b>45,731.8</b>	15.3	0.5
DOE	<b>53,246.1</b>	50,948.4	49,154.4	52,211.1	53,011.7	51,148.3	49,739.6	49,759.9	46,277.4	<b>45,107.4</b>	<b>43,445.8</b>	-18.4	-3.7
GSA	<b>37,553.7</b>	32,697.3	31,461.5	31,129.0	31,050.0	30,558.4	29,845.2	31,186.6	31,339.2	<b>31,278.2</b>	<b>31,527.5</b>	-16.0	0.8
DOJ	<b>8,531.9</b>	8,692.4	11,106.3	8,464.4	11,128.5	10,588.5	10,996.1	13,343.0	13,678.7	<b>14,132.4</b>	<b>14,696.6</b>	72.3	4.0
NASA	<b>6,257.3</b>	7,333.0	7,481.2	7,254.2	7,289.4	7,375.9	7,877.4	8,613.0	9,058.4	<b>9,132.0</b>	<b>8,836.0</b>	41.2	-3.2
DOT	<b>7,811.6</b>	6,601.8	6,104.4	7,677.4	7,954.1	7,736.2	8,345.0	8,367.3	8,661.3	<b>7,835.4</b>	<b>7,779.2</b>	-0.4	-0.7
DOI	<b>7,879.7</b>	6,985.2	7,160.1	6,270.2	7,660.0	7,537.0	7,028.1	5,690.7	6,665.0	<b>6,862.1</b>	<b>6,949.6</b>	-11.8	1.3
ST <sup>1</sup>	<b>6,209.8</b>	6,323.1	6,347.8	747.0	119.9	212.2	230.4	706.0	6,531.3	<b>6,532.6</b>	<b>6,173.0</b>	-0.6	-5.5
HHS	<b>4,581.3</b>	14,941.5	13,252.0	14,665.0	14,849.6	15,084.4	11,005.3	11,703.6	13,264.6	<b>5,027.0</b>	<b>5,076.6</b>	10.8	1.0
USDA	<b>4,008.4</b>	4,937.7	5,109.3	4,855.2	4,985.2	4,785.1	4,657.8	4,831.6	4,293.5	<b>4,538.2</b>	<b>4,045.5</b>	0.9	-10.9
TRSY	<b>1,334.9</b>	4,540.0	3,933.6	4,350.4	3,843.4	3,936.9	3,399.3	3,287.8	4,363.8	<b>4,126.0</b>	<b>4,011.4</b>	200.5	-2.8
DOL	<b>3,455.8</b>	3,603.6	3,521.9	3,555.5	3,681.6	3,749.7	3,635.3	3,756.8	3,786.9	<b>3,818.4</b>	<b>2,986.9</b>	-13.6	-21.8
EPA	<b>1,488.8</b>	1,483.2	1,635.5	1,662.7	1,744.4	1,824.9	1,963.1	1,933.8	1,914.0	<b>1,923.7</b>	<b>2,130.1</b>	43.1	10.7
TVA	<b>1,180.5</b>	1,260.5	1,270.9	1,269.4	1,308.1	1,988.7	2,202.4	2,133.7	2,007.6	<b>1,981.0</b>	<b>1,959.6</b>	66.0	-1.1
DOC	<b>1,092.9</b>	2,946.6	2,945.7	1,340.6	1,499.9	1,851.9	1,231.1	1,190.5	1,175.6	<b>1,090.5</b>	<b>1,125.3</b>	3.0	3.2
HUD	<b>315.2</b>	384.2	374.3	345.2	314.4	293.4	285.2	301.4	289.7	<b>279.9</b>	<b>286.8</b>	-9.0	2.5
FCC	<b>26.7</b>	37.0	39.3	30.6	31.7	35.5	35.5	28.8	28.8	<b>28.8</b>	<b>28.8</b>	7.7	0.0
OTHER*	<b>859.4</b>	1,593.2	1,168.0	1,164.4	945.5	932.2	2,772.5	4,551.1	4,792.4	<b>4,568.8</b>	<b>4,754.9</b>	453.3	4.1
<b>CIVILIAN AGENCIES TOTAL</b>	<b>221,502.9</b>	238,929.8	237,901.0	234,296.3	243,120.5	243,145.7	240,159.4	249,460.8	252,169.5	<b>244,699.0</b>	<b>243,603.5</b>	10.0	-0.4
<b>DOD</b>	<b>545,800.0</b>	541,109.0	487,672.6	489,972.8	486,658.5	466,182.5	441,755.4	419,879.3	405,417.0	<b>397,287.8</b>	<b>395,675.6</b>	-27.5	-0.4
<b>ALL AGENCIES TOTAL</b>	<b>767,302.9</b>	780,038.8	725,573.6	724,269.1	729,779.0	709,328.2	681,914.7	669,340.0	657,586.5	<b>641,986.7</b>	<b>639,279.1</b>	-16.7	-0.4
MBOE	<b>131.7</b>	133.9	124.6	124.3	125.3	121.8	117.1	114.9	112.9	<b>110.2</b>	<b>109.7</b>		
Petajoules	<b>809.5</b>	822.9	765.5	764.1	769.9	748.3	719.4	706.1	693.7	<b>677.3</b>	<b>674.4</b>		

DATA AS OF 10/26/00

\*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FEREC.

Note: This table uses a conversion factor for electricity of 10,346 Btu per kilowatt hour and 1,390 Btu per pound of steam. Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source : Federal Agency Annual Energy Management Data Reports

**TABLE 4-B**  
**FEDERAL NET ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES**  
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
VA	<b>24,552.0</b>	24,380.1	24,733.0	24,620.0	25,077.2	25,213.4	25,075.4	26,172.3	26,062.0	<b>26,216.9</b>	<b>26,134.8</b>	6.4	-0.3
USPS	<b>16,238.3</b>	18,480.0	18,620.8	19,449.2	21,159.8	21,602.2	21,649.7	22,210.0	22,006.4	<b>22,683.9</b>	<b>23,127.0</b>	42.4	2.0
DOE	<b>32,607.5</b>	29,297.3	28,077.6	29,564.3	30,546.8	29,193.0	28,011.6	25,987.3	23,746.2	<b>23,126.7</b>	<b>21,730.4</b>	-33.4	-6.0
GSA	<b>16,563.0</b>	13,937.3	13,116.3	13,061.4	13,075.2	12,832.9	12,366.7	13,439.4	13,353.7	<b>13,123.7</b>	<b>13,083.9</b>	-21.0	-0.3
DOJ	<b>6,112.0</b>	4,863.8	5,894.3	3,869.2	6,245.8	6,143.9	6,303.9	7,490.6	8,003.7	<b>7,783.0</b>	<b>8,047.1</b>	31.7	3.4
NASA	<b>3,095.7</b>	3,450.1	3,375.6	3,335.8	3,250.4	3,262.6	3,466.3	3,730.4	3,875.4	<b>3,941.4</b>	<b>3,847.8</b>	24.3	-2.4
DOI	<b>4,762.4</b>	4,039.4	3,886.2	3,173.4	3,974.3	3,922.1	3,596.3	2,979.1	3,668.5	<b>3,747.4</b>	<b>3,794.6</b>	-20.3	1.3
DOT	<b>4,534.6</b>	3,750.4	3,297.6	3,918.0	3,886.6	3,903.0	3,898.8	3,948.8	3,857.7	<b>3,679.3</b>	<b>3,722.6</b>	-17.9	1.2
ST <sup>1</sup>	<b>2,756.9</b>	2,792.5	2,799.0	273.8	45.3	82.9	92.9	289.2	2,894.1	<b>2,893.3</b>	<b>3,012.2</b>	9.3	4.1
HHS	<b>2,962.8</b>	7,957.0	7,107.1	7,954.7	7,969.1	8,231.9	6,024.2	6,610.3	7,417.8	<b>2,744.0</b>	<b>2,810.6</b>	-5.1	2.4
USDA	<b>2,096.3</b>	2,363.0	2,342.4	2,151.6	2,234.8	2,164.5	2,083.1	2,261.3	1,996.0	<b>2,111.1</b>	<b>1,901.8</b>	-9.3	-9.9
TRSY	<b>615.0</b>	1,918.4	1,494.7	1,749.1	1,568.0	1,624.7	1,418.3	1,484.9	1,904.4	<b>1,741.2</b>	<b>1,701.6</b>	176.7	-2.3
DOL	<b>2,153.0</b>	2,137.1	2,044.1	2,063.7	2,145.8	2,158.3	2,028.8	2,153.9	2,153.9	<b>2,190.2</b>	<b>1,697.9</b>	-21.1	-22.5
EPA	<b>772.3</b>	747.0	822.4	839.7	894.1	943.4	1,021.1	1,023.3	1,011.5	<b>1,022.9</b>	<b>1,170.1</b>	51.5	14.4
TVA	<b>402.4</b>	427.8	426.6	425.6	439.8	664.0	748.5	728.4	665.6	<b>658.4</b>	<b>650.8</b>	61.7	-1.2
DOC	<b>540.3</b>	1,376.0	1,406.9	531.0	571.9	752.9	494.9	490.1	457.2	<b>429.9</b>	<b>449.4</b>	-16.8	4.5
HUD	<b>116.9</b>	140.3	132.2	123.1	116.2	113.5	105.9	115.4	109.3	<b>103.1</b>	<b>106.3</b>	-9.1	3.1
FCC	<b>11.2</b>	14.8	14.9	12.4	12.9	14.1	14.1	12.8	12.8	<b>12.8</b>	<b>12.8</b>	14.4	0.0
OTHER*	<b>369.0</b>	698.5	503.8	518.3	426.0	403.9	1,189.7	1,884.6	1,989.1	<b>1,898.7</b>	<b>1,958.9</b>	430.9	3.2
<b>CIVILIAN AGENCIES TOTAL</b>	<b>121,288.4</b>	122,799.3	120,127.9	117,664.1	123,672.5	123,258.6	119,621.9	123,044.5	125,219.3	<b>120,107.8</b>	<b>118,960.5</b>	-1.9	-1.0
<b>DOD</b>	<b>349,076.7</b>	321,101.6	286,885.7	295,719.8	279,726.5	262,661.5	247,166.9	235,688.1	227,070.0	<b>220,567.6</b>	<b>217,958.2</b>	-37.6	-1.2
<b>ALL AGENCIES TOTAL</b>	<b>470,365.1</b>	443,900.9	407,013.6	413,383.9	403,399.0	385,920.2	366,788.8	358,732.6	352,289.3	<b>340,675.4</b>	<b>336,918.7</b>	-28.4	-1.1
MBOE	<b>80.7</b>	76.2	69.9	71.0	69.3	66.3	63.0	61.6	60.5	<b>58.5</b>	<b>57.8</b>		
Petajoules	<b>496.2</b>	468.3	429.4	436.1	425.6	407.1	386.9	378.4	371.7	<b>359.4</b>	<b>355.4</b>		

DATA AS OF 10/26/00

\*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FEREC.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

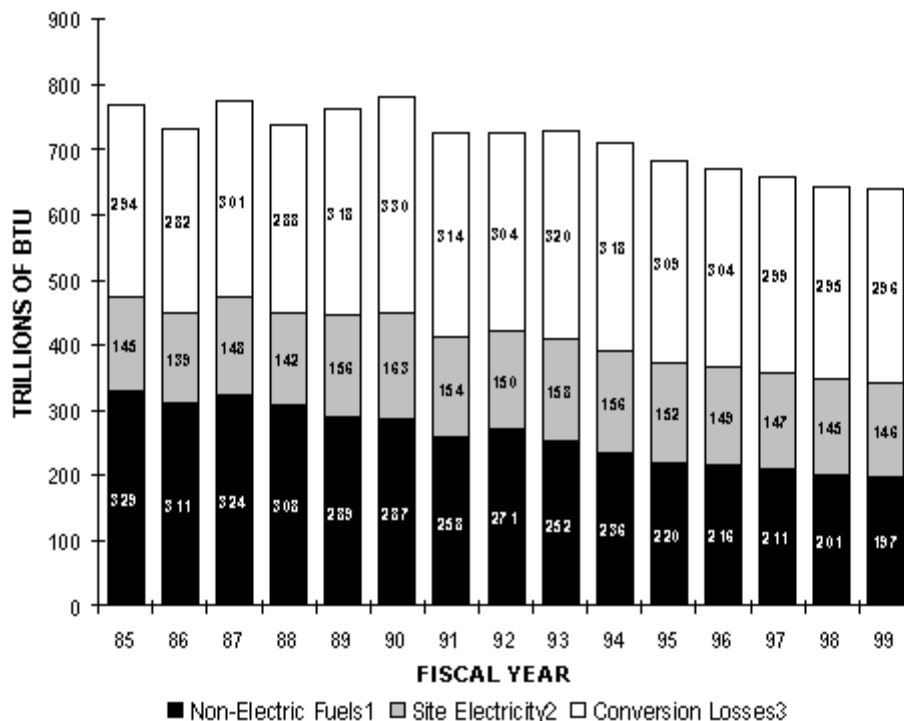
<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source : Federal Agency Annual Energy Management Data Reports

(119.2 trillion Btu), and 10.2 percent by fuel oil (34.5 trillion Btu). Coal, purchased steam, liquefied petroleum gas (LPG)/propane, and energy reported as “other” (comprised mainly of chilled water and renewable energy), account for the remaining 11.1 percent.

Figure 6 illustrates the proportion of energy consumption in buildings and facilities that is attributable to electricity for FY 1985 through FY 1999. The figure also breaks out the amount of Btu lost through the generation and transmission processes and amount of Btu delivered to the site. In FY 1999, electricity consumption, including energy used at the source of generation, accounted for approximately 69.1 percent (441,964.6 billion Btu) of the total primary Btu consumed in buildings and facilities (639,279.1 billion Btu; see Table 4-A). Of this amount, approximately 29.4 percent or 145.8 trillion Btu reached the site of use. The remaining 70.6 percent, 296.2 trillion Btu, was lost during the generation and transmission processes.

**FIGURE 6**  
**Consumption of Electricity and Other Fuels in Buildings/Facilities,**  
**FY 1985 through FY 1999**



<sup>1</sup>Includes Fuel Oil, Natural Gas, LPG/Propane, Coal, Purchased Steam, and Other. Uses a conversion factor for steam of 1,390 Btu per pound (source conversion).

<sup>2</sup>Uses a conversion factor of 3,412 Btu per kilowatt hour. Amount of energy which reaches the site of use when generation and transmission losses are subtracted.

<sup>3</sup>Amount of energy lost through generation and transmission processes. When added to amount of energy reaching the point of use, the total equals amount of Btu consumed at the source. The source conversion factor is 10,346 Btu per kilowatt hour.

Source: Federal Agency Annual Energy Management Data Reports

Decreases in consumption relative to FY 1998 were seen in fuel oil (5.1 percent), natural gas (1.0 percent), LPG/propane (26.0 percent), and coal (6.3 percent). Increases from the previous year were seen in electricity (0.3 percent), purchased steam (1.9 percent) and in fuels reported under the category of “other” (52.5 percent).

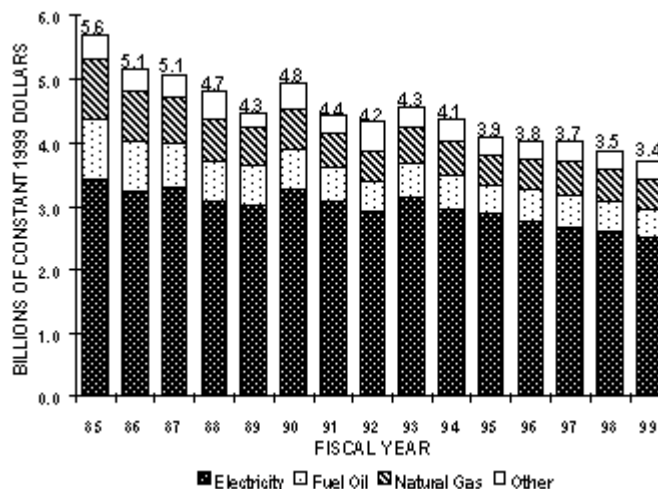
The mix of fuels consumed by Government buildings has changed notably from FY 1985 through FY 1999. The actual consumption of electricity has remained fairly steady since FY 1985, with a increase of 0.3 percent in FY 1999 while square footage has declined 9.7 percent. However, the proportion of energy consumed in Federal buildings and facilities that is electricity has increased from 30.7 percent in FY 1985 to 43.3 percent in FY 1999. Over the same period, fuel oil use decreased from 22.7 percent of the total in FY 1985 to only 10.2 percent in FY 1999. The portion of the Federal buildings fuel mix comprised by natural gas has increased from 30.8 percent in FY 1985 to 35.4 percent in FY 1999. The use of coal as a fuel source, which accounted for 12.3 percent of the total energy consumed in FY 1985, has declined to 5.3 percent of the total in FY 1999. Contributing to this has been the practice of agencies, such as DOE, to purchase steam rather than generating their own in coal-fired plants.

As shown in Table 5, the consumption of petroleum-based fuels in buildings during FY 1999 decreased 66.8 percent compared to FY 1985 and 6.7 percent from FY 1998. Efforts by agencies to utilize natural gas as a cost-effective substitute for petroleum-based fuels in buildings, as well as conservation of fuel oil and LPG/propane in buildings contributed to these reductions. Petroleum fuel consumption in buildings during FY 1999 represented only 10.9 percent of all energy consumed in Federal buildings. Of this amount, 94.0 percent is attributed to fuel oil and the remaining 6.0 percent to LPG/propane.

The energy used in buildings in FY 1999 accounted for approximately 42.9 percent of the total Federal energy bill. Tables 6-A and 6-B show that the Federal Government spent approximately \$3,410.8 million for buildings energy during the fiscal year, a decrease in constant dollars of approximately \$124.4 million from FY 1998 expenditures. The combined cost of buildings energy in FY 1999 was \$10.12 per million Btu, down 2.4 percent from the combined cost of \$10.38 reported in FY 1998.

Figure 7 illustrates energy expenditures for buildings and facilities from FY 1985 through FY 1999. In constant 1999 dollars, Federal energy costs for buildings and facilities decreased 39.5 percent from \$5,642.2 million in FY 1985 to \$3,410.8 million in FY 1999. The combined cost for buildings energy in constant dollars in FY 1999 was \$10.12 per million Btu, down 15.6 percent from \$12.00 per million Btu in FY 1985.

**FIGURE 7**  
**Energy Costs in Buildings and Facilities**  
**FY 1985 through 1999**



**TABLE 5**  
**PETROLEUM-BASED FUEL\* CONSUMPTION IN BUILDINGS AND FACILITIES**  
(In Billions of Btu)

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
DOD	<b>96,817.3</b>	69,030.1	59,451.5	65,654.1	55,585.9	50,285.7	42,939.0	42,861.7	35,214.4	<b>32,354.5</b>	<b>30,506.7</b>	-68.5	-5.7
ST <sup>1</sup>	<b>817.8</b>	817.8	817.8	0.0	0.0	0.0	0.0	21.8	706.0	<b>706.0</b>	<b>1,098.0</b>	34.3	55.5
VA	<b>2,176.7</b>	2,219.3	1,404.9	1,506.0	1,533.9	1,827.4	1,292.9	2,098.2	1,186.3	<b>954.6</b>	<b>954.8</b>	-56.1	0.0
USPS	<b>1,673.2</b>	1,502.2	1,219.4	1,195.8	988.8	983.7	813.9	595.2	819.0	<b>1,139.4</b>	<b>821.7</b>	-50.9	-27.9
DOT	<b>2,376.9</b>	1,524.1	1,308.4	1,426.0	854.0	1,001.6	911.7	709.2	670.5	<b>816.8</b>	<b>823.9</b>	-65.3	0.9
DOE	<b>1,641.8</b>	1,900.5	2,063.7	2,042.7	1,943.5	1,924.4	1,973.5	1,554.1	1,394.0	<b>1,174.5</b>	<b>646.5</b>	-60.6	-45.0
DOI	<b>1,591.6</b>	1,273.9	1,141.1	919.1	1,181.9	1,560.6	1,574.3	1,177.7	799.6	<b>964.7</b>	<b>835.1</b>	-47.5	-13.4
HHS	<b>710.7</b>	2,138.7	1,545.9	2,144.2	1,765.2	1,525.7	1,152.5	1,718.8	760.7	<b>333.4</b>	<b>324.5</b>	-54.3	-2.6
DOL	<b>437.8</b>	331.2	258.3	263.6	276.1	277.5	210.8	220.6	254.2	<b>226.1</b>	<b>188.9</b>	-56.8	-16.4
DOJ	<b>381.7</b>	371.6	503.7	383.8	250.8	234.8	182.8	234.3	134.9	<b>103.1</b>	<b>115.0</b>	-69.9	11.5
NASA	<b>230.2</b>	277.8	161.6	217.6	129.0	139.6	88.6	110.9	88.3	<b>93.5</b>	<b>83.1</b>	-63.9	-11.1
GSA	<b>991.3</b>	668.1	443.1	418.2	359.4	379.8	199.0	242.3	143.0	<b>54.8</b>	<b>68.4</b>	-93.1	24.8
CIA	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	49.6	87.9	84.6	<b>60.2</b>	<b>53.6</b>	0.0	-11.1
TRSY	<b>22.5</b>	281.3	127.7	84.2	190.5	160.8	116.6	116.2	57.0	<b>44.8</b>	<b>43.3</b>	92.9	-3.3
FEMA	<b>56.7</b>	72.3	59.1	66.9	67.6	49.1	49.1	49.1	49.1	<b>49.1</b>	<b>30.6</b>	-46.1	-37.6
EPA	<b>16.8</b>	5.9	6.4	17.6	13.9	26.8	43.4	51.8	26.1	<b>9.6</b>	<b>20.0</b>	19.0	107.2
USDA	<b>414.2</b>	260.0	291.3	242.9	255.6	236.3	244.1	242.5	272.2	<b>270.6</b>	<b>114.1</b>	-72.4	-57.8
DOC	<b>130.3</b>	77.6	13.1	9.8	23.8	52.4	10.8	33.4	9.3	<b>8.7</b>	<b>6.1</b>	-95.3	-30.1
TVA	<b>4.2</b>	3.2	0.1	1.3	2.7	3.5	3.9	4.1	0.0	<b>3.0</b>	<b>2.9</b>	-31.4	-2.3
FCC	<b>1.7</b>	1.9	1.0	1.3	1.3	1.3	1.3	1.7	1.7	<b>1.7</b>	<b>1.7</b>	0.8	0.0
Other**	<b>19.4</b>	11.4	0.0	0.3	0.0	0.0	0.0	8.2	11.8	<b>8.9</b>	<b>3.5</b>	-82.0	-60.7
<b>TOTAL</b>	<b>110,512.9</b>	82,768.8	70,817.9	76,595.5	65,423.9	60,671.0	51,857.6	52,139.7	42,682.9	<b>39,378.1</b>	<b>36,742.2</b>	-66.8	-6.7

DATA AS OF 10/26/00

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

\*\*Other includes for certain years EEOC, NSF, SSA, and USA.

Note: Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE 6-A**  
**DEFENSE AND CIVILIAN FEDERAL COSTS FOR BUILDINGS ENERGY IN FY 1999**  
(In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE	1,384.470	149.000	285.608	14.310	32.712	159.510	0.765	2,026.375
CIVILIAN	1,112.432	23.791	177.410	4.665	4.521	53.719	7.850	1,384.389
TOTAL	2,496.902	172.790	463.018	18.975	37.234	213.229	8.615	3,410.764

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	= 58.45 / MWH
FUEL OIL	= 0.69 / GALLON
NATURAL GAS	= 4.01 / THOUSAND CUBIC FEET
LPG/PROPANE	= 0.82 / GALLON
COAL	= 50.98 / SHORT TON
PURCHASED STEAM	= 13.52 / MILLION BTU
OTHER	= 5.67 / MILLION BTU

DATA AS OF 10/26/00

Note: Contains estimated data for the following agencies: FCC, FTC, and OPM.  
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports.



**TABLE 6-B**  
**CONSUMPTION AND COSTS OF FEDERAL BUILDINGS ENERGY**  
**BY FUEL TYPE IN FY 1999, FY 1998, AND FY 1985**  
**(Constant 1999 Dollars)**

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
<b>FY 1999</b>			
ELECTRICITY	145,755.2	17.1308	2,496.902
FUEL OIL	34,523.0	5.0051	172.790
NATURAL GAS	119,176.8	3.8851	463.018
LPG/PROPANE	2,219.3	8.5503	18.975
COAL	17,953.8	2.0739	37.234
PURCHASED STEAM	15,772.0	13.5194	213.229
OTHER	1,518.7	5.6729	8.615
<b>TOTAL</b>	<b>336,918.7</b>		<b>3,410.764</b>
AVERAGE COST PER MMBTU = \$10.123			
<b>FY 1998</b>			
ELECTRICITY	145,296.7	17.6552	2,565.244
FUEL OIL	36,380.2	5.2841	192.235
NATURAL GAS	120,371.4	4.0621	488.958
LPG/PROPANE	2,997.9	8.7866	26.338
COAL	19,162.8	2.0357	39.008
PURCHASED STEAM	15,470.7	14.1702	219.224
OTHER	995.7	4.1668	4.149
<b>TOTAL</b>	<b>340,675.4</b>		<b>3,535.157</b>
AVERAGE COST PER MMBTU = \$10.377			
<b>FY 1985</b>			
ELECTRICITY	144,581.5	23.6376	3,417.560
FUEL OIL	106,902.6	8.4149	899.577
NATURAL GAS	144,653.7	6.4941	939.391
LPG/PROPANE	3,610.2	9.7121	35.063
COAL	57,923.3	3.3034	191.340
PURCHASED STEAM	7,983.9	15.9461	127.312
OTHER	4,709.9	6.7771	31.920
<b>TOTAL</b>	<b>470,365.1</b>		<b>5,642.163</b>
AVERAGE COST PER MMBTU = \$11.996			

DATA AS OF 10/26/00

Note: FY 1998 contains estimated data for the following agencies: FEMA, FCC, FTC, and OPM;  
FY 1999 contains estimated data for: FCC, FTC, and OPM.

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

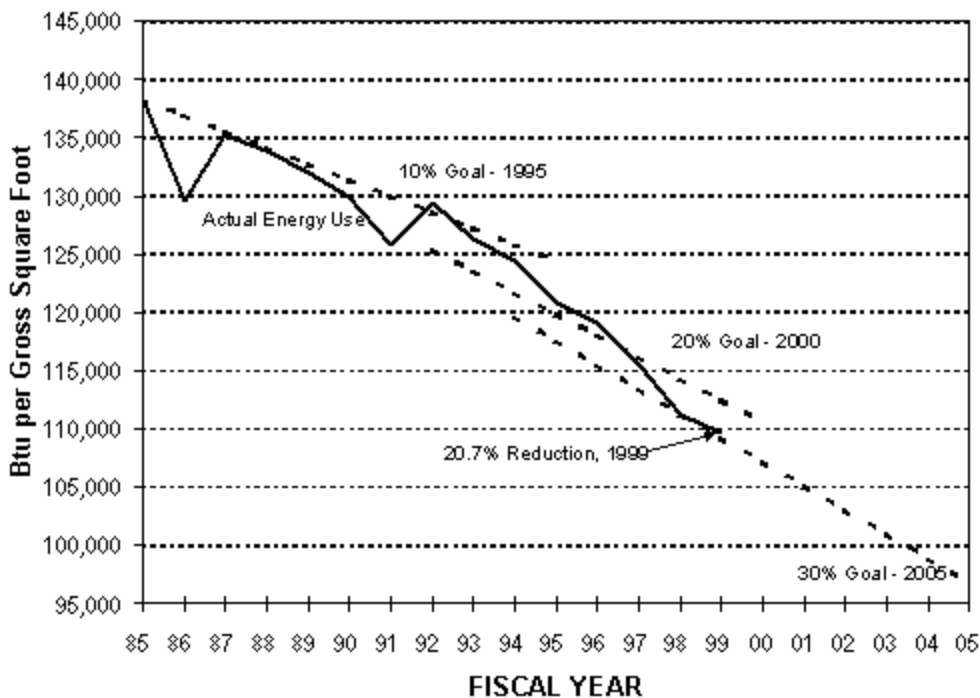
Electricity costs of \$2,496.9 million represent approximately 73.2 percent of total expenditures of \$3,410.8 million for buildings energy in FY 1999. Natural gas costs account for approximately 13.6 percent of the total, expenditures for fuel oil account for 5.1 percent, with the remaining 8.2 percent attributable to expenditures for LPG/propane, coal, purchased steam, and “other.”

In FY 1999, the cost of all energy used in Federal buildings was \$1.11 per gross square foot. Of the \$1.11 spent per square foot Government-wide, \$0.81 was spent for electricity, \$0.15 was spent for natural gas, \$0.06 was spent for fuel oil, and the remaining \$0.09 was spent for purchased steam, coal, LPG/propane, and other fuels.

**B. Progress Toward the Mandated Goals for Buildings and Facilities**

Both the magnitude of energy consumption and the potential for energy savings have prompted legislative and executive branch initiatives to achieve energy conservation in the Federal buildings sector.<sup>14</sup> Federal Government progress toward the 10, 20, and 30 percent energy reduction goals of NECPA and Executive Order 12902 is illustrated in Figure 8. (Executive Order 13123 establishes a 35 percent reduction goal for 2010.) Overall, the Federal Government reduced its net energy consumption in buildings and facilities by 20.7 percent in FY 1999 compared to FY 1985 when measured in terms of British Thermal Units consumed per gross square foot (Btu/GSF) of floor area.

**FIGURE 8**  
**Progress Toward the Energy Reduction Goals for Federal Buildings and Facilities,**  
**FY 1985 through FY 1999**



<sup>14</sup>The legislative authorities for Federal agencies are detailed in Appendix A.

Table 7-A shows the FY 1999 performance of the individual agencies in net Btu/GSF compared to FY 1985. Net Btu reflects the amount of energy delivered to the point of use and is used to measure agency performance toward the mandated goals.

Table 7-B shows the performance of the agencies measured in terms of primary Btu/GSF. Primary Btu represents the average amount of energy required at the source of generation (primary energy) rather than the actual Btu delivered to the site. Primary Btu includes energy resources used to generate, process, and transport electricity and steam. Measured in terms of source energy, the Federal Government shows a reduction of 7.8 percent in FY 1999 compared to FY 1985. This large difference from the net Btu/GSF reduction of 20.7 percent reflects the significant declines in direct use of fossil fuels and the offsetting increases in the share of the fuel mix contributed by electricity.

Contributing to the overall reduction of 20.7 percent in net Btu/GSF were the percentage reductions greater than 20 percent made by the following eight agencies: the Departments of Agriculture, Commerce, Energy, Justice, Labor, Transportation, and National Aeronautics and Space Administration, and the Tennessee Valley Authority.

These agencies used a variety of strategies to reduce their energy consumption. Operations and maintenance (O&M) procedures continued to be emphasized as a major component in the effort to achieve the energy reduction goals. Improvements in energy efficiency were achieved through improved energy systems operations and both preventive maintenance and improved maintenance. O&M funding, used for the replacement of boilers, HVAC equipment, windows, and lighting systems, continued to benefit energy conservation.

In FY 1999, the implementation of many no-cost and low-cost energy conservation measures was continued, such as reducing lighting levels, lowering hot water temperatures, turning off unused equipment, and installing energy-efficient windows, insulation, weather stripping, and set-back thermometers.

Numerous energy-efficient building retrofits and energy conservation projects were undertaken to supplement the no-cost, low-cost measures. These initiatives can be categorized by lighting system replacement, HVAC equipment modernization, building envelope improvements, and other miscellaneous projects, such as installation of energy management control systems. Utility-sponsored demand side management programs were often pursued as supplemental sources of funding, as well as energy savings performance contract initiatives.

Other activities include energy awareness programs featuring energy awareness seminars, the identification of no-cost or low-cost measures, the designation of building energy monitors, publication of materials promoting energy efficiency, the procurement of energy-efficient goods and products, increased maintenance training, and increased engineering assistance.

**TABLE 7-A**  
**FEDERAL BUILDINGS AND FACILITIES NET ENERGY USE**  
**PER GROSS SQUARE FOOT, FY 1985 AND FY 1999**

	FISCAL YEAR 1985			FISCAL YEAR 1999			%CHANGE 1985-1999
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
VA	123,650.0	24,552.0	<b>198,560</b>	154,669.0	26,134.8	<b>168,972</b>	-14.9
USPS	189,400.0	16,238.3	<b>85,736</b>	329,062.6	23,127.0	<b>70,281</b>	-18.0
DOE	72,920.8	32,607.5	<b>447,163</b>	79,055.0	21,730.4	<b>274,876</b>	-38.5
GSA	196,341.4	16,563.0	<b>84,358</b>	186,788.1	13,083.9	<b>70,047</b>	-17.0
DOJ	20,768.8	6,112.0	<b>294,289</b>	45,959.1	8,047.1	<b>175,092</b>	-40.5
NASA	11,509.1	3,095.7	<b>268,977</b>	20,110.7	3,847.8	<b>191,330</b>	-28.9
DOI	54,154.4	4,762.4	<b>87,940</b>	51,192.7	3,794.6	<b>74,124</b>	-15.7
DOT	32,007.8	4,534.6	<b>141,673</b>	35,865.5	3,722.6	<b>103,793</b>	-26.7
ST <sup>1</sup>	44,674.4	2,756.9	<b>61,711</b>	52,469.5	3,012.2	<b>57,409</b>	-7.0
HHS	11,895.2	2,962.8	<b>249,078</b>	13,215.0	2,810.6	<b>212,686</b>	-14.6
USDA	24,709.9	2,096.3	<b>84,837</b>	28,916.6	1,901.8	<b>65,767</b>	-22.5
TRSY	5,776.9	615.0	<b>106,463</b>	11,843.6	1,701.6	<b>143,672</b>	34.9
DOL	18,268.3	2,153.0	<b>117,852</b>	18,582.5	1,697.9	<b>91,372</b>	-22.5
EPA	1,931.2	772.3	<b>399,923</b>	3,103.4	1,170.1	<b>377,048</b>	-5.7
TVA	4,886.6	402.4	<b>82,357</b>	10,230.8	650.8	<b>63,608</b>	-22.8
DOC	4,522.6	540.3	<b>119,476</b>	5,629.4	449.4	<b>79,837</b>	-33.2
HUD	1,432.0	116.9	<b>81,668</b>	1,432.0	106.3	<b>74,235</b>	-9.1
FCC	121.0	11.2	<b>92,182</b>	124.8	12.8	<b>102,204</b>	10.9
OTHER*	2,558.5	369.0	<b>144,232</b>	15,945.3	1,958.9	<b>122,853</b>	-14.8
<b>CIVILIAN AGENCIES</b>							
TOTAL	822,021.4	121,288.4	<b>147,549</b>	1,064,195.6	118,960.5	<b>111,784</b>	-24.2
DOD	2,578,984.0	349,076.7	<b>135,354</b>	2,007,714.4	217,958.2	<b>108,560</b>	-19.8
TOTAL	3,401,005.4	470,365.1	<b>138,302</b>	3,071,910.0	336,918.7	<b>109,677</b>	-20.7

DATA AS OF 10/26/00

\*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

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.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE 7-B  
FEDERAL BUILDINGS AND FACILITIES PRIMARY ENERGY USE  
PER GROSS SQUARE FOOT, FY 1985 AND FY 1999**

	FISCAL YEAR 1985			FISCAL YEAR 1999			%CHANGE 1985-1999
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
USPS	189,400.0	35,915.2	<b>189,626</b>	329,062.6	52,058.2	<b>158,202</b>	-16.6
VA	123,650.0	39,673.2	<b>320,851</b>	154,669.0	45,731.8	<b>295,675</b>	-7.8
DOE	72,920.8	53,246.1	<b>730,191</b>	79,055.0	43,445.8	<b>549,564</b>	-24.7
GSA	196,341.4	37,553.7	<b>191,267</b>	186,788.1	31,527.5	<b>168,788</b>	-11.8
DOJ	20,768.8	8,531.9	<b>410,805</b>	45,959.1	14,696.6	<b>319,775</b>	-22.2
NASA	11,509.1	6,257.3	<b>543,679</b>	20,110.7	8,836.0	<b>439,366</b>	-19.2
DOT	32,007.8	7,811.6	<b>244,053</b>	35,865.5	7,779.2	<b>216,900</b>	-11.1
DOI	54,154.4	7,879.7	<b>145,504</b>	51,192.7	6,949.6	<b>135,754</b>	-6.7
ST <sup>1</sup>	44,674.4	6,209.8	<b>139,002</b>	52,469.5	6,173.0	<b>117,649</b>	-15.4
HHS	11,895.2	4,581.3	<b>385,135</b>	13,215.0	5,076.6	<b>384,154</b>	-0.3
USDA	24,709.9	4,008.4	<b>162,218</b>	28,916.6	4,045.5	<b>139,903</b>	-13.8
TRSY	5,776.9	1,334.9	<b>231,071</b>	11,843.6	4,011.4	<b>338,694</b>	46.6
DOL	18,268.3	3,455.8	<b>189,167</b>	18,582.5	2,986.9	<b>160,736</b>	-15.0
EPA	1,931.2	1,488.8	<b>770,909</b>	3,103.4	2,130.1	<b>686,382</b>	-11.0
TVA	4,886.6	1,180.5	<b>241,575</b>	10,230.8	1,959.6	<b>191,537</b>	-20.7
DOC	4,522.6	1,092.9	<b>241,648</b>	5,629.4	1,125.3	<b>199,900</b>	-17.3
HUD	1,432.0	315.2	<b>220,090</b>	1,432.0	286.8	<b>200,300</b>	-9.0
FCC	121.0	26.7	<b>220,860</b>	124.8	28.8	<b>230,617</b>	4.4
OTHER*	2,558.5	859.4	<b>335,891</b>	15,945.3	4,754.9	<b>298,198</b>	-11.2
<b>CIVILIAN AGENCIES</b>							
TOTAL	822,021.4	221,502.9	<b>269,461</b>	1,064,195.6	243,603.5	<b>228,909</b>	-15.0
DOD	2,578,984.0	545,800.0	<b>211,634</b>	2,007,714.4	395,675.6	<b>197,078</b>	-6.9
TOTAL	3,401,005.4	767,302.9	<b>225,611</b>	3,071,910.0	639,279.1	<b>208,105</b>	-7.8

DATA AS OF 10/26/00

\*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

Note: This table uses a conversion factor for electricity of 10,346 Btu per kilowatt hour and 1,390 Btu per pound of steam. Sum of components may not equal total due to independent rounding.

<sup>1</sup>In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

A number of agencies began submitting energy data to DOE starting in FY 1989 in compliance with NECPA as amended by the Federal Energy Management Improvement Act of 1988 (Pub. L. 100-615). Among these agencies are the Department of State, the Office of Personnel Management, and the Federal Energy Regulatory Commission. These three agencies submitted historical energy data back to FY 1985.

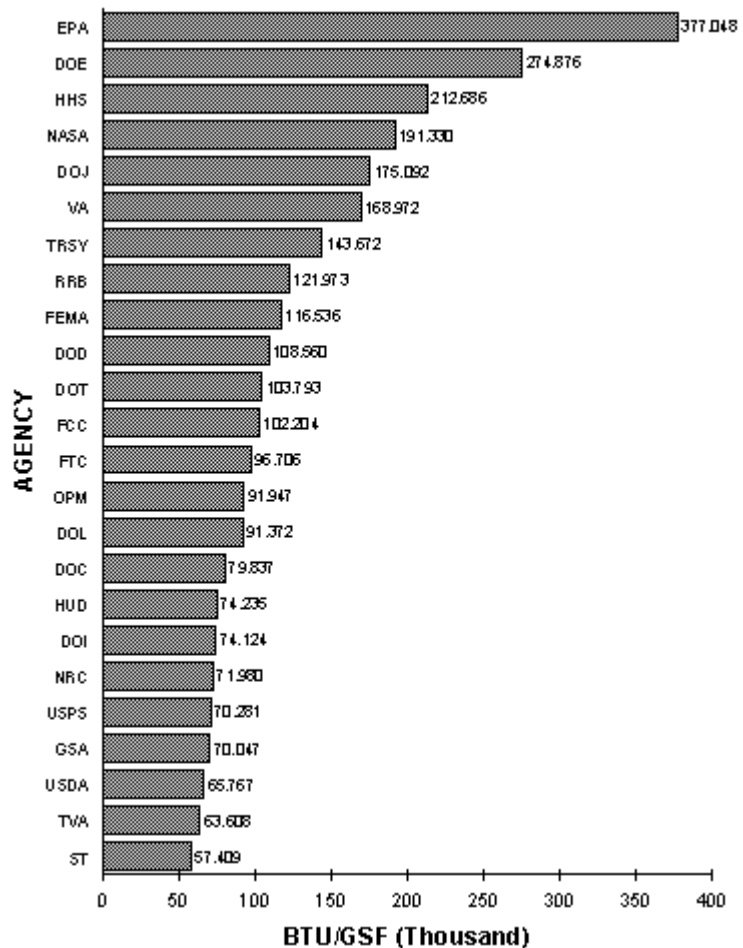
For FY 1990 and forward, Federal Energy Regulatory Commission energy consumption is reported as part of DOE and is therefore grouped under the category of "Other." Other agencies grouped under the category of "Other" in the tables had no buildings data to report for FY 1985. These agencies include the Federal Trade Commission, the National Archives and Records Administration, the Nuclear Regulatory Commission, the Railroad Retirement Board, and the U.S. Information Agency. The National Science Foundation, Federal Emergency Management Agency, and Office of Personnel Management also are grouped under this category due to lack of reporting in more recent years.

In FY 1999, GSA continued to delegate building management authority to agencies that occupy buildings owned and operated by GSA. As a result, several agencies reported increased gross square footage and energy consumption relative to FY 1985, while GSA reported decreases in these categories during the same period. The GSA delegation accounts for the significant inter-year changes in energy consumption reported by various individual agencies. Two agencies, the Department of Health and Human Services and the Department of Commerce, adjusted their baseline year consumption and GSF figures during FY 1988 to reflect GSA delegations. DOC added the Jeffersonville Federal Center to its data reports, which greatly increased its gross square footage. In addition, three Commerce Bureaus, the Bureau of Economic Affairs, the National Technical Information Service, and the Patent and Trademark Office, all became eligible for reporting in FY 1989 as a result of leasing delegation.

The Treasury Department's large increase in buildings energy consumption since FY 1985, is a result of the addition of the Internal Revenue Service delegated buildings to the Department's building inventory. Also contributing to the Treasury's increase was the additions, in FY 1989, of the Office of Thrift Supervision's square footage and the GSA delegation of building management authority for the Financial Management Service. The energy consumption and square footage for these delegated buildings were included in GSA's FY 1985 reports.

Figure 9 illustrates the range of energy intensity in agency buildings measured in terms of Btu/GSF. High rates of energy intensity at the EPA, HHS, and DOE reflect the special requirements of their laboratory and research facilities. At DOE, if more than 80 percent of a facility's metered energy is dedicated to process operations, then the entire facility's energy is excluded from the buildings category, according to how DOE defines its buildings and facilities. The Interior Department's relatively low Btu/GSF results from the lack of energy intensive activities (i.e., laboratories, hospitals, etc.) in space under its control. The wide range of rates of Btu/GSF among different agencies is a result of the varying missions of the agencies as well as their varying criteria for excluding energy intensive facilities.

**FIGURE 9**  
**Range of Energy Intensity (Btu/GSF) in Buildings and Facilities by Agency in 1999**



### C. ENERGY STAR® Program Participation

The Federal ENERGY STAR® Buildings Program Memorandum of Understanding (MOU) was signed by Mary Nichols, Environmental Protection Agency (EPA), and Christine Ervin, former Assistant Secretary for Energy Efficiency and Renewable Energy, Department of Energy, in March 1997.

During FY 1999, several Federal agencies took actions regarding both the Federal ENERGY STAR® Buildings and the Green Lights programs:

- Department of Defense—The Norfolk District, Army Corps of Engineers, in a joint demonstration with DOD and the EPA, developed a military housing design to achieve an “EPA 5 Star Energy Efficiency Rating” for 135 family housing units at Fort Lee, Virginia.

- Department of the Interior—In conjunction with EPA and DOE, DOI prepared a MOU to participate in the Federal ENERGY STAR® Program partnerships. This MOU was forwarded to the Interior’s Assistant Secretary for Policy, Management and Budget.
- Department of State—State has committed to meeting ENERGY STAR® Building Program goals for all new overseas construction.
- Department of Transportation—The United States Coast Guard is actively engaged in the development of eight ENERGY STAR® buildings that will become showcase buildings upon project completion.
- Environmental Protection Agency—Several EPA facility construction projects demonstrate ENERGY STAR® Buildings technologies and concepts including the New Headquarters Buildings (Washington, DC), the New Consolidated RTP Facility (Research Triangle Park, NC), the Region IV Science and Ecosystems Support Laboratory (Athens, GA), Region IV Office (Atlanta, GA), Region III Office (Philadelphia, PA), Region VII Central Regional Laboratory (Kansas City, KS), National Vehicle and Fuel Emissions Laboratory (Ann Arbor, MI), and the Fort Meade Environmental Science Center (Fort Meade, MD).
- Department of Health and Human Services—The HHS Energy Officer and the operating division energy coordinators met with EPA to discuss the Federal ENERGY STAR® Buildings program. Each HHS operating division will sign a MOU which will be forwarded to operating division heads with a cover letter encouraging participation from the Office of the Secretary’s Assistant Secretary for Management and Budget.
- National Aeronautics and Space Administration—Both Goddard Space Flight Center and the Santa Susana Field Laboratory participate in the Green Lights program.
- Tennessee Valley Authority (TVA)—TVA is in the process of becoming a partner in the Federal ENERGY STAR® Buildings program. As a member of the Green Lights program, TVA developed the SWAP program to eliminate the cycle time for lighting upgrades and to reduce survey and design cost as part of these efforts. SWAP II, which will evaluate the implementation of lighting controls as a first step in the reduction of energy, will be initiated in FY 1998.
- United States Postal Service—Signed MOU with EPA to participate in the Federal ENERGY STAR® Buildings program.



#### **D. Federal Building Energy Performance Standards**

Federal agencies are subject to the provisions of 10 CFR part 435, subpart A, which set forth interim building energy performance standards for new Federal buildings. Standards for new Federal buildings are issued under the Energy Conservation Standards in New Buildings Act of 1976, as amended, 42 U.S.C. 6831 *et seq.*, and under Title V, subtitle H, of the Energy Security Act, 42 U.S.C. § 8286 and 8286a. On August 6, 1996, the Department of Energy issued a proposed rule in the *Federal Register*, 61 FR 40882, to revise the 1989 interim rule, 10 CFR part 435, which established energy efficiency voluntary performance standards for design of new Federal commercial and multi-family high-rise residential buildings.

EPACT mandates that new Federal buildings must contain energy saving and renewable energy specifications that meet or exceed the energy saving and renewable energy specifications of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)/ Illuminating Engineering Society of North America (IES) Standard 90.1-1989 and the Council of American Building Officials Model Energy Codes (MEC) 1992.

Furthermore, Executive Order 12902, which was designed to assist agencies in meeting or exceeding the Federal energy and water efficiency provisions contained in EPACT, requires each agency involved in the construction of a new facility that will be either owned by or leased to the Government to:

- (1) design and construct such facility to minimize the life-cycle cost of the facility by utilizing energy efficiency, water conservation, or solar or other renewable energy technologies;
- (2) ensure that the design and construction of facilities meet or exceed the energy performance standards applicable to Federal residential or commercial buildings as set forth in 10 CFR 435, local building standards, or a Btu-per-gross-square-foot ceiling as determined by the Task Force within 120 days of the date of this order, whichever will result in a lower life-cycle cost over the life of the facility;
- (3) establish and implement, within 270 days of the date of this order, a facility commissioning program that will ensure that the construction of such facilities meets the requirements outlined in this section before the facility is accepted into the Federal facility inventory; and
- (4) utilize passive solar design and adopt active solar technologies, where cost-effective.

The Department of Energy has endeavored to fulfill these requirements by developing common energy conservation standards for all new Federal buildings and by issuing life-cycle costing procedures for use by Federal agencies in the assessment of energy conserving investments for existing buildings.

In response to the Executive Order 12902 requirement for Federal agencies to establish and implement a facility commissioning program, DOE formed the New Space Working Group under the Federal Interagency Energy Management Task Force. The Working Group, in conjunction with GSA and other Federal agencies, drafted a *Building Commissioning Guide*

which has been distributed to agencies for final comment. The *Guide* is designed to help all parties involved in the planning, design, construction, acceptance, and post-acceptance phases work together to produce a building that operates according to design intent and provides occupant comfort and energy savings. The draft *Guide* will be posted on the Federal Energy Management Program's Internet Web site at [www.eren.doe.gov/femp](http://www.eren.doe.gov/femp) for use during the review process.

A proposed rule, *Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings*, revises the interim Federal standards to conform generally with the codified version of ASHRAE Standard 90.1-1989 and incorporates changes in the areas of lighting, mechanical ventilation, motors, building envelope, and fenestration rating procedures, and test procedures for heating and cooling equipment. Since Standard 90.1-1989 is written as a standard of professional practice, it cannot be directly adopted as a building code. DOE's New Space Working Group expressed concern that the *Energy Code* be concise as possible, publishing the minimal exceptions to the commercial standard, rather than publishing an entire new energy code. Using one standard would allow the architect/engineer community to focus on designing energy saving elements, rather than on implementing an unique Federal standard. The Working Group also recommended that an electronic version of the codified rule be placed on the Internet. The final version of the *Energy Code* is expected to be published by DOE in 2000.

A separate proposed rule for new Federal residential buildings was issued by the Department of Energy in the *Federal Register* in May 1997. The proposed rule, *Energy Code for New Federal Residential Buildings*, uses the Model Energy Code (MEC) format and contains performance standards from the current Federal residential standard, the MEC, and the codified version of ASHRAE Standard 90.2-1993 that are economically justified and technologically feasible.

DOE has also worked closely with HUD in coordinating the technical factors and data used to develop HUD's Manufactured Housing Standards and has committed to work closely with all Federal agencies to coordinate and upgrade the standards applied by these agencies to non-Federal buildings.

DOE is concurrently working on a model commissioning plan based on a GSA plan for a Federal courthouse in Portland, Oregon. This model will be more detailed than the *Building Commissioning Guide* and will include forms, model plans, training, and acceptance procedures for the building.

### **III. ENERGY INTENSIVE OPERATIONS IN FEDERAL FACILITIES**

#### **A. Energy Consumption and Costs for Energy Intensive Operations**

NECPA, as amended, 42 U.S.C. § 8253, allows agencies to exclude from the buildings goal, facilities which house energy intensive activities. The energy consumed in these facilities is reported under the category of excluded/process energy. The reporting of energy used in excluded buildings assures that total Federal energy consumption is monitored.

The designation of excluded buildings is at the discretion of each agency. Currently, 15 agencies are excluding specific facilities from the NECPA goal: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Justice, State, Transportation, and the Treasury, the General Services Administration, the National Aeronautics and Space Administration, the National Archives and Records Administration, the Social Security Administration, the Tennessee Valley Authority, and the U.S. Information Agency. Lists of the excluded buildings that have been identified by the agencies are included in Appendix D.

Table 8 shows that fuels consumed by excluded/process energy have increased 56.0 percent compared to FY 1985 and decreased 2.5 percent from FY 1998. During FY 1999, the Department of Defense consumed 32.9 trillion Btu of excluded/process energy, 48.2 percent of all excluded/process energy used by the Federal Government.

Some of the fluctuations in consumption of excluded/process energy resulted from agencies changing data collection and reporting procedures. The Social Security Administration began reporting its energy separately from the Department of Health and Human Services in FY 1996 and has elected to exclude check processing facilities as energy intensive. In FY 1994, the Tennessee Valley Authority began reporting electricity used for certain processes of its generating plants. The Department of Justice also commenced reporting energy consumption in its excluded buildings during FY 1994. Increases in consumption of excluded/process energy compared to FY 1985 is also partially attributable to DOD's reallocation, beginning in the FY 1988 reporting year, of energy previously reported in the buildings category to the process category. Also contributing to this increase was the Treasury Department's initial reporting of process energy in FY 1991. Treasury neither reported process energy prior to 1991 nor revised its building energy consumption prior to 1990 to exclude process energy. NASA began reporting process energy in FY 1989 and has revised its prior year data. As a result of the prioritization survey required by Executive Order 12902, NASA redesignated the entire Dryden Flight Research Center, virtually all of the White Sands Test Facility, and many individual facilities at the Goddard Space Flight Center and the Langley Research Center as non-exempt facilities in FY 1996. NASA also redesignated the entire Michoud Assembly Facility as an industrial facility. USIA also began reporting energy under this category in FY 1989. USIA has not reported any process energy consumption for any prior years. GSA began reporting energy in excluded buildings in FY 1990 and has backed out this energy consumption from its FY 1985 buildings data. The Departments of Agriculture and Commerce both began excluding buildings where energy intensive activities occur in FY 1992. USDA revised all of its prior year buildings data back to FY 1985 to reflect the exclusion of the Agricultural Research Service. The Commerce

**TABLE 8**  
**FEDERAL NET ENERGY CONSUMPTION IN EXCLUDED BUILDINGS/PROCESS OPERATIONS**  
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
DOE	<b>16,038.0</b>	11,649.9	11,541.3	12,657.8	10,900.5	11,000.3	17,236.2	16,876.6	8,209.1	<b>6,367.8</b>	<b>7,188.9</b>	-55.2	12.9
NASA	<b>5,759.6</b>	7,135.0	7,215.7	7,327.6	7,310.3	7,590.9	7,172.0	6,210.8	6,482.8	<b>6,347.4</b>	<b>6,158.5</b>	6.9	-3.0
DOT	<b>2,970.7</b>	3,064.0	3,323.0	4,406.8	4,703.8	2,952.5	2,559.8	3,392.5	2,920.2	<b>4,685.6</b>	<b>5,915.0</b>	99.1	26.2
HHS	<b>2,617.4</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>4,209.1</b>	<b>3,778.0</b>	44.3	-10.2
USDA	<b>1,942.8</b>	2,204.2	2,133.3	1,966.3	2,166.9	2,119.3	2,824.0	2,140.8	2,221.6	<b>2,416.5</b>	<b>2,589.0</b>	33.3	7.1
USPS	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,974.4	<b>2,026.2</b>	<b>2,063.3</b>	0.0	1.8
TVA	<b>1,871.0</b>	1,701.0	1,661.9	1,546.5	1,354.1	1,390.6	1,317.1	1,235.6	1,251.8	<b>1,208.4</b>	<b>1,436.1</b>	-23.2	18.8
DOC	<b>938.6</b>	0.0	0.0	976.6	770.8	1,110.2	1,627.4	1,823.0	1,335.2	<b>1,332.0</b>	<b>1,400.4</b>	49.2	5.1
GSA	<b>623.6</b>	160.6	746.2	677.6	994.6	1,060.2	1,213.8	961.0	890.7	<b>849.2</b>	<b>1,150.8</b>	84.5	35.5
USIA	<b>0.0</b>	1,406.9	850.6	828.5	796.8	861.1	878.2	936.2	1,092.2	<b>1,020.4</b>	<b>951.4</b>	0.0	-6.8
DOJ	<b>0.0</b>	0.0	0.0	0.0	0.0	668.4	707.8	944.1	846.9	<b>850.7</b>	<b>862.8</b>	0.0	1.4
TRSY	<b>0.0</b>	0.0	1,026.8	814.1	923.7	771.8	941.0	928.3	1,131.8	<b>996.5</b>	<b>776.2</b>	0.0	-22.1
NARA	<b>0.0</b>	0.0	0.0	0.0	274.7	610.7	792.2	562.9	572.7	<b>591.8</b>	<b>582.1</b>	0.0	-1.6
ST	<b>0.0</b>	0.0	0.0	0.0	337.4	339.4	344.4	364.1	339.1	<b>324.2</b>	<b>315.5</b>	0.0	-2.7
SSA	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	0.0	215.5	204.7	<b>211.4</b>	<b>199.1</b>	0.0	-5.8
CIVILIAN AGENCIES TOTAL	<b>32,928.8</b>	27,512.3	28,695.9	31,395.8	30,731.0	30,676.5	37,823.1	36,810.1	29,694.4	<b>33,437.3</b>	<b>35,367.3</b>	7.4	5.8
DOD	<b>10,857.2</b>	39,209.1	56,372.1	67,913.1	41,159.3	39,781.4	37,962.6	37,260.1	35,702.3	<b>36,588.4</b>	<b>32,919.0</b>	203.2	-10.0
ALL AGENCIES TOTAL	<b>43,786.0</b>	66,721.4	85,068.0	99,308.9	71,890.4	70,457.9	75,785.7	74,070.1	65,396.7	<b>70,025.7</b>	<b>68,286.3</b>	56.0	-2.5
MBOE	<b>7.5</b>	11.5	14.6	17.0	12.3	12.1	13.0	12.7	11.2	<b>12.0</b>	<b>11.7</b>		
Petajoules	<b>46.2</b>	70.4	89.7	104.8	75.8	74.3	80.0	78.1	69.0	<b>73.9</b>	<b>72.0</b>		

DATA AS OF 10/26/00

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

Source: Federal Agency Annual Energy Management Data Reports

Department revised its FY 1985 base year data only to reflect the exclusion of its energy intense facilities. The State Department and NARA began reporting excluded/process energy in FY 1993 and have not revised data for any prior years. The Justice Department commenced reporting of excluded buildings in FY 1994 and has not revised data for any prior years. The U.S. Postal Service began reporting energy consumption under this category in FY 1997 with no revisions to prior years. In FY 1999, HHS began reporting National Institutes of Health facilities under this category. HHS revised its FY 1985 baseline data to reflect this change and provided aggregated energy consumption information, not by energy type, for the intervening years. Therefore, the intervening years are not reflected in Table 8 and are instead included in HHS totals for standard buildings and facilities.

Energy used in energy intensive operations accounts for approximately 6.7 percent of the total 1.01 quads used by the Federal Government. Electricity constitutes 56.7 percent of the energy used in energy intensive operations, 26.2 percent is accounted for by natural gas, 4.8 percent by coal, and 9.2 percent by fuel oil. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and “other” energy account for the remaining 3.2 percent.

The energy used in energy intensive operations in FY 1999 accounted for approximately 8.0 percent of the total Federal energy bill. Table 9 shows that the Federal Government spent approximately \$639.7 million for excluded/process energy during the fiscal year. The combined cost of excluded/process energy in FY 1999 was \$9.37 per million Btu, down 1.8 percent from the combined cost of \$9.54 reported in FY 1998 (see Appendix C).

**TABLE 9**  
**DEFENSE AND CIVILIAN FEDERAL COSTS FOR EXCLUDED BUILDINGS/  
 PROCESS ENERGY IN FY 1999**  
 (In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE <sup>1</sup>	173.334	13.514	30.835	0.523	5.464	3.905	0.005	227.580
CIVILIAN <sup>2</sup>	362.427	6.133	27.836	0.278	0.327	12.774	2.379	412.155
TOTAL	535.762	19.647	58.671	0.800	5.791	16.679	2.384	639.735

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	=	47.25 / MWH
FUEL OIL	=	0.43 / GALLON
NATURAL GAS	=	3.38 / THOUSAND CUBIC FEET
LPG/PROPANE	=	0.56 / GALLON
COAL	=	43.85 / SHORT TON
PURCHASED STEAM	=	8.60 / MILLION BTU
OTHER	=	25.28 / MILLION BTU

DATA AS OF 10/26/00

<sup>1</sup>Includes DOD costs for process and cold iron energy.

<sup>2</sup>Includes DOE costs for metered process energy and energy costs for buildings excluded from performance measurement by DOC, DOJ, DOT, GSA, HHS, NASA, NARA, SSA, STATE, TRSY, TVA, USDA, and USIA.

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

Source: Annual energy cost data submitted to DOE by Federal agencies.

## **B. Statutory Background and Progress Toward Goals for Industrial Facilities**

Under section 543(a)(2) of NECPA, as amended by EPACT, 42 U.S.C. § 8253, buildings that house energy-intensive activities may be excluded from NECPA's performance goal for buildings. These buildings are listed in Appendix D. Most energy used in excluded buildings is process energy. Process energy is consumed in industrial operations, certain R&D activities, and in electronic-intensive facilities.

Executive Order 12902 expanded the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial operations. It required industrial facilities to increase in energy efficiency by at least 20 percent by 2005 as compared to 1990. Section 203 of Executive Order 13123 further expands this goal by requiring 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. This goal covers laboratory and other energy-intensive facilities in addition to industrial facilities. Measures undertaken to achieve this goal must be life-cycle cost-effective, and agencies are also directed to implement all cost-effective water conservation projects.

During FY 1999, the Energy Intensive Facilities Working Group worked to produce a guidance document entitled *Guidelines: Executive Order 13123, Section 203 Performance Goals for Industrial, Laboratory, Research, and Other Energy-Intensive Facilities*. The document was reviewed and approved by the Interagency Energy Management Task Force and issued in January 2000. The guidelines fulfill two requirements under the Executive Order. These are that the Secretary of Energy shall:

- Issue guidelines to assist agencies in measuring energy per square foot, per unit of production, or other applicable unit in industrial, laboratory, research, and other energy-intensive facilities (Section 502(a)); and
- Develop guidance to assist agencies in calculating appropriate energy baselines for previously exempt facilities and facilities occupied after 1990 in order to measure progress toward goals (Section 502(c)).

The guidance presented three options for measuring performance. These are: a rate-based measure of annual energy consumed per number of production units; a rate-based measure of annual energy consumed per number of other applicable units (for example, number of experiments, labor hours, customers served); and, Btu per gross square foot. The guidance provides advice on which measurement option is appropriate, depending on agency-specific factors.

The guidance also advises agencies on the proper manner of calculating appropriate energy baselines for previously exempt buildings and facilities. The Executive Order contains strict criteria for exemption that will mean agencies having to re-examine previously exempt buildings and possibly reassign them to one of the goal categories.

The Department of Defense excludes two types of energy from the NECPA performance goal: process energy and “cold iron” energy. Process energy is used in facilities that perform production or industrial functions. “Cold iron” energy is used to supply power to Navy ships docked in port. Both types of energy are included in this report under the category of excluded/process.

The Department of Energy reports its use of metered energy in extensive experimental research and production processes under excluded/process energy. The metered process energy used by DOE includes energy consumed in: production nuclear reactors, industrial-type operations for weapons and nuclear fuel production, and research and development facilities such as experimental nuclear reactors and linear accelerators. Excluded/process energy totaled almost 7.2 trillion Btu in FY 1999, which represents 23.7 percent of all energy consumed by DOE. The use of excluded process energy by DOE in FY 1999 was 55.2 percent less than in FY 1985, and 12.9 percent more than FY 1998. The primary contributor to the substantial drop beginning in FY 1997 was the sale by DOE of the Naval Petroleum Reserve, California, and subsequent decreases in natural gas consumption.

NASA excludes from the NECPA performance goal facilities which fall under its definition of mission-variable facilities. These highly specialized, energy-intensive facilities house space science experimental and testing activities, as well as some industrial operations. Examples of these facilities include wind tunnels driven by multi-thousand horsepower electric motors, launch facilities, space simulation chambers, space communication facilities, and research analysis centers. The Michoud Assembly Facility (MAF), which manufactures the Space Shuttle external tank, is the only NASA facility subject to the Executive Order goal for industrial facilities. MAF selected billion Btu (BBtu) per external tank as its industrial energy metric. In the FY 1990 baseline year, MAF total energy consumption was 925.8 BBtu at a production rate of 4.6 external tanks per year, or 201.3 BBtu/external tank. In FY 1999, MAF total energy consumption was 996.5 BBtu at a production rate of 7 external tanks per year, or 142.4 BBtu/external tank. This represents a 29.3 percent reduction in energy consumption per external tank produced.

The Department of Commerce excludes buildings operated by three of its agencies: the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the Bureau of the Census. NIST installations have been excluded because they are comprised of general purpose and special laboratories that require constant environmental space control and base electrical loads for scientific equipment and computer systems. NOAA Weather Service facilities operate 24 hours a day and consist of radar towers, computers, special gauges, meters and other sophisticated equipment. Marine Fisheries and Laboratories conduct marine biology research and utilize refrigerators, freezers, incubators, coolers, seawater pumps, and compressors that operate 24 hours a day. The Bureau of Census Charlotte Computer Center is a leased facility and is used solely as a computer center. The building is operated 24 hours a day.

Within the Department of Transportation, the Federal Aviation Administration excludes all buildings involved in implementing the National Airspace System Plan. These buildings house energy-intensive electronic equipment with the associated HVAC requirements to maintain an environment for reliable equipment operation.



The U.S. Information Agency designates domestic and overseas Voice of America Relay Stations as energy-intensive facilities and reports this consumption as process energy excluded from the NECPA performance goal.

The GSA excludes from the NECPA performance goal those buildings and facilities 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 prepare for disposal; buildings undergoing major renovation and/or major asbestos removal; or buildings functions like that of outside parking garages which consume essentially only lighting energy, yet are classed as buildings. GSA's excluded buildings, due to these factors, could distort GSA's actual progress toward meeting the energy reduction goal.

Energy reported by the Treasury Department under the category of excluded/process energy is comprised mainly of industrial energy consumption by the Bureau of Engraving and Printing and the Mint.

The State Department excludes unique, special-use facilities with special security and operational requirements including the President's guest house, a computer facility, the International Chancery Center, and the Main State Facility.

NARA designates all 12 of its facilities as energy intensive because of stringent records storage requirements which demand that documents and records be maintained in a controlled environment 24 hours per day, 365 days per year.

The Department of Justice excludes the Justice Data Center in Washington, DC, a 24-hour-a-day energy intensive facility and five installations operated by the Federal Bureau of Investigation which operate 24 hours per day. These facilities have limited conservation measures available. Also exempted by the Justice Department are Immigration and Naturalization Service repeater stations located nationwide that house equipment operations only.

The Social Security Administration, which began reporting energy consumption this year as an independent agency, has designated its National Computer Center as an energy intensive facility. The Center contains SSA's main database and operates 24 hours per day and 365 days per year.

Since 1985, the Postal Service has deployed energy intensive automated equipment which has improved the efficiency of mail operations. Surveys indicate that this equipment deployment has increased process energy usage by 8.9 percent in FY 1999. The Postal Service energy consumption reported under this category reflects process energy consumed by mail processing equipment. This consumption has been factored out of energy consumption of Postal Service non-excluded buildings in order to provide a better measure of their energy efficiency status.

Beginning in FY 1999, the Department of Health and Human Services reported the facilities controlled by the National Institutes of Health under energy-intensive category. HHS expects that a large portion of its entire inventory will eventually be subject to the goals established by Section 203 of Executive Order 13123 for industrial, laboratory, and other energy-intensive facilities.

## **IV. ENERGY MANAGEMENT IN VEHICLES AND EQUIPMENT**

### **A. Energy Consumption and Costs for Vehicles and Equipment**

Vehicle and equipment energy consists of energy used by equipment ranging in size and function from aircraft carriers to forklifts. It includes aircraft and naval fuels, automotive fuels consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business, and the energy used in Federal construction.

Table 10 shows that in FY 1999, the Federal Government used approximately 607.5 trillion Btu of energy for vehicles and equipment, a decrease of 35.0 percent relative to FY 1985. DOD's vehicle and equipment energy consumption decreased 37.2 percent from FY 1985, while the civilian agencies increased consumption by 9.5 percent. Overall, vehicle and equipment consumption decreased 3.2 percent from FY 1998. Federal energy consumption in vehicles and equipment is at its lowest level since Federal agencies began reporting consumption in 1975. This is mainly attributable to decreased operations by the Department of Defense.

Jet fuel consumption accounted for 73.2 percent of all vehicle and equipment energy in FY 1999. In FY 1999 compared to the previous year, jet fuel consumption decreased 0.2 percent from 445.5 trillion Btu to 444.7 trillion Btu.

Agencies have taken many tangible steps to keep the use of vehicle fuels to a minimum. For example, USPS continues to modernize its fleet, adding diesel delivery vans and long-life vehicles to its inventory, both of which are more fuel efficient than the older vehicles they replaced. DOD continues to increase the use of flight simulators, as well as the use of new propulsion technologies in order to lessen the growth of vehicle and equipment fuel consumption.

Increased mission activities accounted for higher levels of operations energy use by some agencies. The Commerce Department's significant increase in consumption during FY 1990 was due primarily to increased miles driven by Census personnel in conducting the 1990 Census. Energy consumption in DOC's vehicles has declined by 73.1 percent in FY 1999 from FY 1990.

Other fluctuations in consumption of vehicle fuels resulted from changes in data collection and reporting procedures. The significant decrease in vehicular fuel consumption compared to FY 1985 reported by the Department of Health and Human Services is the result of data collection difficulties which omitted from their reports fuel consumed by leased vehicles and privately-owned vehicles authorized for Government service after FY 1987. HHS reported no vehicles under the agency's control during FY 1990, FY 1991, and FY 1992.

**TABLE 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 10<sup>15</sup>])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	<b>11,524.2</b>	12,136.2	12,196.2	12,225.0	12,565.3	13,348.6	14,571.2	14,217.1	16,779.2	<b>14,777.2</b>	<b>14,583.7</b>	26.5	-1.3
DOT	<b>11,957.0</b>	12,150.8	12,350.7	8,702.6	10,769.7	12,917.0	12,193.7	12,222.9	12,347.9	<b>10,145.0</b>	<b>10,870.5</b>	-9.1	7.2
DOJ	<b>2,064.0</b>	2,097.9	2,124.0	3,675.1	2,835.9	3,451.3	3,181.6	3,693.0	3,149.3	<b>7,171.4</b>	<b>6,456.3</b>	212.8	-10.0
DOI	<b>3,053.9</b>	3,352.5	3,208.6	3,819.1	3,507.8	3,970.0	2,782.2	1,347.5	2,943.7	<b>2,679.9</b>	<b>3,661.4</b>	19.9	36.6
USDA	<b>4,319.6</b>	4,952.3	5,123.8	4,982.7	4,931.2	5,129.1	4,821.7	4,654.8	3,153.0	<b>3,389.4</b>	<b>3,337.9</b>	-22.7	-1.5
TRSY	<b>2,155.0</b>	1,473.2	1,655.7	2,065.2	2,420.9	2,161.8	1,773.4	1,350.9	1,561.4	<b>2,078.6</b>	<b>2,120.5</b>	-1.6	2.0
DOE	<b>2,882.0</b>	2,520.4	2,559.7	2,078.1	2,241.3	2,085.9	1,841.9	1,561.0	1,971.0	<b>1,955.6</b>	<b>1,444.6</b>	-49.9	-26.1
NASA	<b>1,972.7</b>	1,736.7	1,864.0	1,875.4	1,798.0	1,734.9	1,757.0	1,539.3	1,622.1	<b>1,428.3</b>	<b>1,412.8</b>	-28.4	-1.1
VA	<b>592.8</b>	518.3	317.4	634.9	663.9	374.4	353.6	660.7	1,199.1	<b>1,380.3</b>	<b>1,337.6</b>	125.7	-3.1
DOC	<b>1,010.2</b>	3,100.3	1,315.2	952.5	995.7	995.2	760.6	570.1	929.1	<b>708.4</b>	<b>834.5</b>	-17.4	17.8
HHS	<b>373.3</b>	0.0	0.0	0.0	177.3	176.3	105.5	18.6	435.0	<b>447.7</b>	<b>447.7</b>	19.9	0.0
TVA	<b>578.5</b>	476.6	534.7	408.8	452.4	480.3	541.7	583.8	479.5	<b>429.1</b>	<b>423.3</b>	-26.8	-1.4
DOL	<b>232.2</b>	239.0	401.9	388.7	369.1	369.6	356.9	337.7	336.2	<b>350.2</b>	<b>350.2</b>	50.8	0.0
EPA	<b>132.2</b>	0.0	0.0	0.0	100.7	97.8	99.5	76.3	136.8	<b>97.7</b>	<b>120.5</b>	-8.8	23.4
GSA	<b>144.1</b>	128.1	122.6	102.9	79.6	69.9	91.3	98.8	119.9	<b>123.3</b>	<b>102.9</b>	-28.6	-16.6
ST	<b>14.8</b>	34.9	0.0	0.0	7.5	0.0	0.0	0.0	44.7	<b>40.9</b>	<b>40.9</b>	177.0	0.0
HUD	<b>0.0</b>	0.0	32.7	33.6	31.6	30.7	25.4	25.4	28.3	<b>23.3</b>	<b>23.3</b>	0.0	0.0
FCC	<b>12.4</b>	9.1	7.2	7.5	7.2	6.6	6.6	4.8	7.1	<b>6.6</b>	<b>6.6</b>	-46.7	0.0
OTHER*	<b>39.2</b>	69.6	27.6	113.6	106.7	105.4	119.6	116.9	140.1	<b>147.6</b>	<b>144.0</b>	267.1	-2.4
<b>CIVILIAN AGENCIES TOTAL</b>	<b>43,588.4</b>	45,649.7	44,420.7	42,765.2	44,746.7	48,193.3	46,250.1	43,909.3	48,150.2	<b>47,380.6</b>	<b>47,719.4</b>	9.5	0.7
DOD	<b>890,679.9</b>	881,345.1	926,033.6	740,357.2	727,887.1	674,597.5	640,893.4	631,202.0	617,235.4	<b>579,959.8</b>	<b>559,785.8</b>	-37.2	-3.5
<b>ALL AGENCIES TOTAL</b>	<b>934,268.3</b>	926,994.8	970,454.3	783,122.4	772,633.7	722,790.8	687,143.4	675,111.3	665,385.6	<b>627,340.3</b>	<b>607,505.2</b>	-35.0	-3.2
MBOE	<b>160.4</b>	159.1	166.6	134.4	132.6	124.1	118.0	115.9	114.2	<b>107.7</b>	<b>104.3</b>		
Petajoules	<b>985.6</b>	977.9	1,023.8	826.2	815.1	762.5	724.9	712.2	702.0	<b>661.8</b>	<b>640.9</b>		

DATA AS OF 10/26/00

\*Other includes for certain years the CFTC, CIA, FEMA, HUD, NSF, NRC, OPM, and USIA.

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy consumption for FY 1999. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

**FIGURE 10**  
**Defense and Civilian Energy Consumption in**  
**Vehicles and Equipment by Fuel Type, FY 1999**

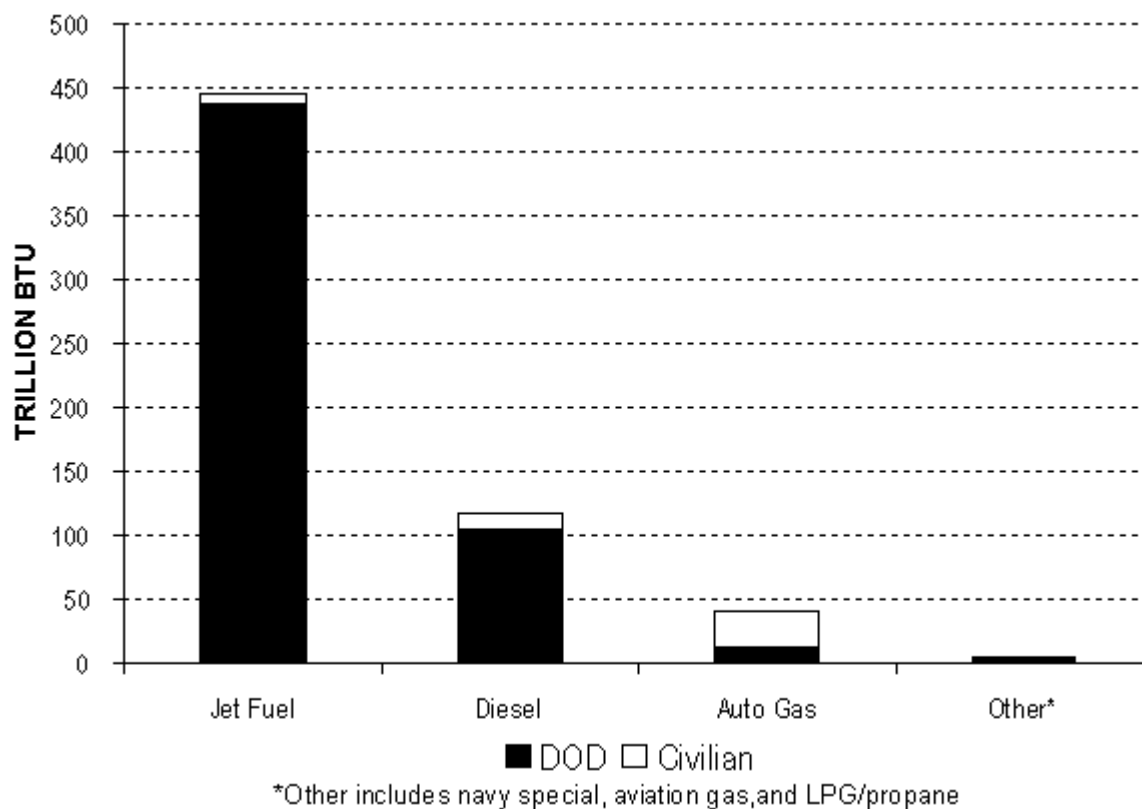


Figure 10 depicts the vehicles and equipment fuel mix within DOD and civilian agencies. Jet fuel accounts for 444.7 trillion Btu or 73.2 percent of the total energy usage in the category, with 19.2 percent attributed to diesel and distillate fuel, 6.8 percent to auto gasoline, and 0.9 percent to aviation gasoline, navy special, LPG/propane and other fuels, combined.

As shown in Tables 11-A and 11-B, the Federal Government spent \$3,908.0 million on vehicles and equipment energy in FY 1999, 11.2 percent less than the FY 1998 expenditure of \$4,400.4 million constant dollars. In FY 1999, the combined price for all types of vehicles and equipment energy was \$6.43 per million Btu, down 8.3 percent from FY 1998. The average real cost of gasoline to the Federal Government rose from \$1.05 per gallon in FY 1998 to \$1.10 in FY 1999. The unit cost for diesel/distillate fuel declined 10.3 percent while the unit cost for jet fuel fell 9.1 percent.

When compared to FY 1985 using constant 1999 dollars, energy costs for vehicles and equipment decreased 54.2 percent from \$8,528.1 million to \$3,908.0 million in FY 1999. During that same period, the Government's combined cost for vehicles and equipment energy, in constant dollars, fell 29.5 percent from \$9.13 per million Btu to \$6.43 per million Btu.

Vehicle and equipment fuel costs in FY 1999 represent 49.1 percent of the Government's total energy costs of \$8.0 billion.

TABLE 11-A  
 DEFENSE AND CIVILIAN FEDERAL COSTS FOR VEHICLE AND EQUIPMENT ENERGY  
 IN FY 1999  
 (In Millions of Dollars)

	AUTO GAS	DIST. DIESEL	LPG/ PROPANE	AVIATION GAS	JET FUEL	NAVY SPECIAL	OTHER	TOTAL
DEFENSE	121.041	595.346	0.569	0.008	2,799.107	15.725	0.160	3,531.955
CIVILIAN	240.367	69.273	0.078	1.807	61.156	0.002	3.397	376.080
TOTAL	361.408	664.619	0.647	1.815	2,860.263	15.727	3.556	3,908.035

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

AUTO GAS	=	1.10	/	GALLON
DIST/DIESEL	=	0.79	/	GALLON
LPG/PROPANE	=	0.78	/	GALLON
AVIATION GAS	=	1.70	/	GALLON
JET FUEL	=	0.84	/	GALLON
NAVY SPECIAL	=	0.48	/	GALLON
OTHER	=	8.31	/	MILLION BTU

DATA AS OF 10/26/00

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy costs for FY 1999.  
 Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

**TABLE 11-B**  
**CONSUMPTION AND COSTS OF VEHICLE AND EQUIPMENT**  
**ENERGY BY FUEL TYPE IN FY 1999, FY 1998, AND FY 1985**  
**(Constant 1999 Dollars)**

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
<b>FY 1999</b>			
AUTO GASOLINE	41,065.5	8.8008	361.408
DIST/DIESEL	116,575.0	5.7012	664.619
LPG/PROPANE	79.2	8.1776	0.647
AVIATION GASOLINE	133.4	13.6105	1.815
JET FUEL	444,680.1	6.4322	2,860.263
NAVY SPECIAL	4,543.9	3.4611	15.727
OTHER	428.1	8.3067	3.556
<b>TOTAL</b>	<b>607,505.2</b>		<b>3,908.035</b>
AVERAGE COST PER MMBTU = \$6.433			
<b>FY 1998</b>			
AUTO GASOLINE	43,050.5	8.3733	360.471
DIST/DIESEL	132,313.3	6.3525	840.524
LPG/PROPANE	393.0	9.9326	3.904
AVIATION GASOLINE	209.9	14.3325	3.009
JET FUEL	445,520.3	7.0794	3,154.017
NAVY SPECIAL	0.0	0.0000	0.000
OTHER	5,853.3	6.5793	38.511
<b>TOTAL</b>	<b>627,340.3</b>		<b>4,400.436</b>
AVERAGE COST PER MMBTU = \$7.014			
<b>FY 1985</b>			
AUTO GASOLINE	50,420.0	10.6290	535.916
DIST/DIESEL	169,215.0	8.4857	1,435.895
LPG/PROPANE	149.2	9.8609	1.471
AVIATION GASOLINE	1,882.3	15.7075	29.565
JET FUEL	705,675.5	9.1698	6,470.828
NAVY SPECIAL	6,687.7	7.8695	52.629
OTHER	238.6	7.5864	1.810
<b>TOTAL</b>	<b>934,268.3</b>		<b>8,528.115</b>
AVERAGE COST PER MMBTU = \$9.128			

DATA AS OF 10/26/00

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy costs for FY 1999. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

## **B. Alternative Fuel Vehicles**

An alternative fuel vehicle (AFV) can be manufactured as an AFV or converted to an AFV as either a bi-fuel, flexible fuel, or dedicated vehicle. A bi-fuel vehicle has the ability to operate on either an alternative fuel or gasoline, whereas a flexible fuel vehicle has the ability to operate on a mixture of alternative fuel and petroleum-based fuels. Dedicated vehicles are designed to operate only on alternative fuel. The alternative fuels currently used by Federal agencies are: M-85 (85 percent methanol, 15 percent gasoline), E-85 (85 percent ethanol, 15 percent gasoline), CNG (compressed natural gas), LNG (liquefied natural gas), LPG (liquefied petroleum gas), and electricity.

The U.S. Postal Service continues to operate the largest CNG fleet in the country. Since 1989, 7,678 vehicles have been converted to compressed natural gas. Most USPS AFVs are dual-fueled (gasoline and CNG). USPS acquired two electric vehicles in FY 1998 in joint efforts with the Department of Energy and under contract with Ford Motor Company and General Motors Corporation-Hughes. USPS engineering staff, in cooperation with other Federal agencies and private industry, continues to evaluate electric and alternative fuel technologies as they become available.

Section 308 of Title III of EPACT, 42 U.S.C. § 13217, requires agencies to measure the aggregate percentage of alternative fuel use in dual-fueled vehicles in their fleets. In an effort to better fulfill this reporting requirement, vehicle fleet managers and representatives from DOE, GSA, and other agencies conducted coordinating meetings during FY 1996 on this issue. These meetings resulted in a revised GSA Agency Report of Motor Vehicle Data (form SF-82) for collecting acquisition, fuel consumption, and fuel cost data for non-tactical motor vehicles. The revised SF-82 was distributed by GSA to agency fleet managers beginning in FY 1997. GSA compiled this data for FY 1998, including alternative fuel consumption data reported under Sections 303 and 308 of EPACT, and forwarded this information to DOE for inclusion in the Annual Report to Congress for that year. GSA was unable to provide FY 1999 fuel consumption data for non-tactical motor vehicles in time for the publication of this report. FY 1998 data was used to estimate the non-tactical vehicle component of agency vehicles and equipment energy consumption and costs.

During FY 1998, compressed natural gas (CNG) comprised the largest portion of alternative fuel consumption with 91.7 percent. An ethanol and gasoline blend (E-85) is the second most consumed alternative fuel with 6.5 percent.

The Department of Energy has made efforts to provide the private and public sector with information on issues concerning AFVs. An Alternative Fuels Hotline (1-800-423-1DOE) was established in June 1992 to provide callers from Federal agencies, industry and the public with answers to questions on AFVs. By calling the toll free number, callers can request information on AFVs.

The Alternative Fuels Data Center (AFDC), which is located at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, may be accessed by the public on the Internet at <http://www.afdc.nrel.gov>. The AFDC is the central repository for data from DOE's alternative

fuel vehicle demonstration programs. The AFDC stores data on demonstration programs that receive funding support authorized by the AMFA of 1988. Information collected and provided by the AFDC includes:

- data on 600 government fleet vehicles;
- refueling site information for CNG, LPG, Ethanol, and Methanol;
- information on emissions, mileage, fuel economy;
- information on emissions, for flexible fuel vehicles running on alcohol fuels and gasoline;
- repair and maintenance logs for alternative fuel fleet vehicles;
- heavy duty and transit bus data on performance, emissions, fuel economy, and mileage;
- data on the Clean Fleet Program - run by Federal Express and South Coast Air Quality Management District (a controlled comparative study of operating data from gasoline vehicles and different types of alternative fuels).

Federal efforts to expand deployment of AFVs were boosted by the Clean Cities Program during FY 1999. The Clean Cities Program, initiated by the DOE in September 1993, is a voluntary program designed to increase fleet vehicle alternative fuel use by encouraging partnerships between fuel suppliers, vehicle manufacturers, fleet managers, and Federal, State, and local government agencies. DOE supports Clean Cities participants through the placement of Federal vehicles and by maintaining a national hotline and a support staff member at each of its ten regional support offices, which provide local assistance concerning Federal and State requirements for AFV acquisitions and conversions and assist local Clean Cities with their alternative fuels market development. In 1999, 10 new cities were awarded the Clean Cities designation, for a total of 79 Clean Cities. DOE has established a number to handle inquiries from cities interested in joining the program: 1-800-CCITIES. The program's Internet address is [www.ccities.doe.gov](http://www.ccities.doe.gov).



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# 1. DEPARTMENT OF AGRICULTURE (USDA)

## Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Agriculture reported a decrease in energy consumption in buildings of 22.5 percent in Btu per gross square foot compared to FY 1985.

**USDA Performance Toward Buildings Energy Reduction Goals**



**USDA Buildings Energy Use and Costs, FY99**

	<b>BBtu</b>	<b>\$ (Thou.)</b>
Electricity	1,033.4	19,740.1
Fuel Oil	12.4	89.6
Natural Gas	573.3	1,994.7
LPG/Propane	101.7	637.2
Coal	0.6	3.0
Purchased Steam	112.0	1,126.0
Other	68.4	1,562.0
<b>Total</b>	<b>1,901.8</b>	<b>25,152.6</b>

The signing of Executive Order 13123 prompted USDA to initiate a reassessment of energy management program activities; specifically those related to energy data collection and analysis, examination of its building inventory, determining building status under various goals, and performing outreach assistance to USDA agencies.

USDA's major facility-owning and leasing agencies have made substantial progress since 1995 in funding energy conservation projects, incorporating energy factors into Solicitations for Offers, designating energy showcase facilities, and utilizing active and passive solar power systems. Based on the prioritization surveys and SAVEnergy audits of previous years, numerous retrofit and new consumption projects have been undertaken across the country.

DOE's Federal Energy Management Program, through its SAVEnergy program, has completed comprehensive energy audits on 305 Forest Service (FS) buildings for a total of 1.4 million square feet.

An in-house survey of the energy consumption at ARS facilities identified those research locations with a high Btu per gross square foot energy utilization. Based on this survey, ARS developed a national priority list for conducting comprehensive facility audits. The order of audit priorities was assigned considering such factors as current level of energy utilization per gross square foot, research program priority, and past and future planned renovation/modernization actions.

Energy conservation activities identified in a previously completed audit for the National Animal Disease Center (NADC) facility in Ames, Iowa, have been incorporated in planning for an ESPC contract anticipated for NADC.

The Animal Plant and Health Inspection Service's (APHIS) Hawaii Fruit Fly Rearing Facility in Waimanaalo, Hawaii replaced ten eight-year old corroded air handling units with new efficient motors. The new system is designed to permit 36 percent less outdoor air intake.

During FY 1999, ARS conducted energy efficiency improvement projects at more than 30 facilities across the country. Energy conservation measures implemented include roof replacements, upgrading HVAC and lighting systems, building envelope improvements, boiler replacements, and office equipment upgrades. Other energy and water projects implemented during FY 1999 at ARS's Midwest and North Atlantic Area include:

- Recirculating water bath with annual savings of 315,000 gallons.
- New water tower for heat pumps at a cost of \$204,000 and an annual savings of \$12,000 and 10 million cubic feet of water.
- HVAC steam coil preheat project completed at a cost of \$64,000 for an annual savings of 24.4 billion Btu at National Soil Tilth Lab.
- Replacement of archaic windows at the main building of Ft. Detrick, Maryland with energy efficient insulated glass windows at a cost of \$75,000.

- A building automated control system is being upgraded in Boston, Massachusetts. Phase 1 was implemented during FY 1999 at a cost of \$247,000.
- Growth chamber controls and lighting systems have been upgraded at a facility in Beaver, West Virginia for maximum efficiency at a cost of \$155,000. Also, greenhouse control systems have been converted and upgraded with computer based control systems at a cost of \$69,000.
- Installation of variable frequency drives, hot water line sensors, and pressure sensors on fume hood ducts at a Riverside, California facility.
- Several fume hoods at the ARS's Wapato, Washington facility were placed on a night shutdown schedule, cutting the facility's heating fuel usage by almost 50 percent, and producing estimated savings of \$50,000 annually.

Water conservation efforts implemented during FY 1999 included ARS's Wapato, Washington facility totally eliminating waste water from its evaporators with a newly designed recirculating closed water cooling system. Water usage was cut by an estimated 240,000 gallons annually.

ARS's National Center for Agricultural Utilization Research (NCAUR) in Peoria, Illinois also installed several water conservation projects during FY 1999. They include:

- A cooling water loop replacing single pass water used for heat pumps and air conditioning units with recycled water. Annual savings are estimated at \$13,766 and more than 1 million cubic feet of water.
- A condensate control project with annual savings of \$3,679 and more than 10,000 therms.

In FY 1999, ARS activities to reduce the use of petroleum in buildings and facilities included the following:

- Dual fuel burners (oil and gas) for spot gas market availability are utilized at the Eastern Regional Research Center in Wyndmoor, Pennsylvania and the Appalachian Soil and Water Conservation Research Laboratory in Beaver, West Virginia.
- A natural gas emergency generator in lieu of a diesel generator has been installed for the new

25,000-square-foot laboratory/office building nearing completion in Weslaco, TX.

#### **Solar and Other Renewable Energy**

DOE's Federal Energy Management Program funded the following two projects during FY 1998 and FY 1999 at the FS's Fishlake National Forest in Utah:

- A trailer-mounted photovoltaic system for the Big Flat Guard Station. Funds provided totaled \$48,700. Project payback period is 9.3 years.
- Portable photovoltaic generators for use in fighting fires. Estimated payback is 8.8 years.

The Forest Service's Missoula Technology and Development Center received, in FY 1999, a \$44,000 grant from the Department of Energy to install photovoltaic lighting systems at fire camps. Other FY 1999 Forest Service renewable projects include the installation of:

- Ground-source heat pumps during the construction of the Choctaw Ranger District Office in Oklahoma and the Middle Fork Office in the Willamette National Forest.
- Photovoltaic-powered pumps at the Baseline-Horesprings Allotments Range/Wildlife Watering Project in Apache-Sitgreaves National Forest and the Douglas Ranger District in Coronado National Forest.
- Photovoltaic lighting and fan systems at three toilet buildings and a photovoltaic powered pump at the Red Canyon Camp Ground in the Cibola National Forest.
- Photovoltaic systems to power a pump and alarm system for a wastewater holding tank at the Alto Pit in the Prescott National Forest.
- Three communication repeaters powered by photovoltaic batteries in the Coronado National Forest.

During FY 1999, ARS's Horticultural Research Laboratory in Fort Pierce, Florida, implemented passive solar strategies including daylighting, shading, and glazing.

#### **Showcase Facilities**

ARS has named the Horticultural Research Laboratory in Fort Pierce, Florida, and the San Joaquin Valley Agricultural Center in Parlier, California as new

building showcases. These buildings incorporated advanced technologies and practices for energy efficiency and conservation.

#### **Personnel Development**

ARS, the Office of Operations and the Forest Service report that energy conservation will be incorporated as an element, as appropriate, in position descriptions and performance standards of engineers, facility managers and other personnel considered to be critical for the implementation, coordination, and monitoring of USDA's energy management program.

In FY 1999, ARS engineers and other employees participated in energy management training or attended energy conferences offered by the Federal government or private sector. The Forest Service often includes energy management issues and short training sessions during the Forest Service National Facilities Workshops and regional meetings.

Three Office of Operations engineers are Certified Energy Managers.

#### **Funding**

During FY 1999, the Office of Operations (OO) reported the funding of energy conservation improvements by the Washington Area Service Center (WASC) amounting to \$100,000. Most of this funding was expended in the modernization of an energy and water efficient showcase facility in the South Building Phase I, and the design of a new showcase in South Building Phase II.

Also during FY 1999, ARS accomplished more than \$2.2 million worth of building energy efficiency projects in more than 30 facilities across the country.

#### **Energy Savings Performance Contracts (ESPC)**

ARS will award a delivery order under the Department of Energy's Mid-Atlantic Regional Super ESPC in February 2000. The project at the National Agricultural Library in Beltsville, Maryland will include lighting retrofits, burner replacements, chiller system updates, and a building automation system. Estimated cost savings over the 18-year contract are \$1.8 million.

ARS will also award a delivery order under the Midwest Regional Super ESPC in January 2000 at the National Animal Disease Center in Ames, Iowa. The project will include lighting, HVAC, and chiller system retrofits and replacements, and installing cogenerators. Savings are estimated at \$13.1 million over the 17-year contract.

The Forest Service signed an ESPC delivery order with Honeywell, Inc., in September 1998 for the Corvallis, Oregon Laboratory. The installation phase began in February 1999. Energy conservation measures installed will include lighting retrofits, steam system modifications, and premium efficiency motors. The project will produce annual savings of \$84,500 over the 10-year term.

The Forest Service is evaluating several ESPC opportunities for FY 2000:

- The Rocky Mountain Research Station is proposing to use an ESPC at the Southwest Forest Science Complex in Flagstaff, Arizona.
- The Northeastern Forest Experiment Station/Northeastern Area are evaluating possible ESPCs at the Ohio, Durham Eastern, and West Virginia Forestry Sciences Laboratories.

#### **Procurement of Energy Efficient Products**

USDA relies on government-wide procurement policies for purchase of life-cycle cost-effective goods and products, as promulgated by GSA and DOD supply schedules, DOE guidelines, and the FAR.

One particular area in which USDA has made significant progress is the procurement of environmentally sound energy-efficient products and those products that contain a high percentage of recovered materials. USDA agencies purchase energy-efficient products whenever practicable and whenever they meet the Agency's specific performance requirements and are cost-effective.

ARS purchases all its energy-efficient products through the Departments Customer Supply Centers, and through GSA. In accordance with Executive Order 12845, ARS acquired microcomputers which met the Environmental Protection Agency ENERGY STAR® requirements for Energy Efficiency Products.

#### **Energy Management Contact**

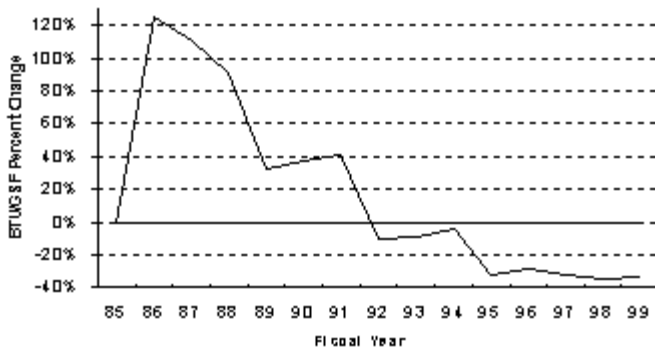
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## 2. DEPARTMENT OF COMMERCE (DOC)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Commerce reported a decrease in buildings energy consumption of 33.2 percent in Btu per gross square foot compared to FY 1985.

**DOC Performance Toward Buildings Energy Reduction Goals**



### DOC Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	324.1	6,949.0
Fuel Oil	5.3	22.6
Natural Gas	75.2	295.5
Propane	0.8	5.3
Purchased Steam	44.1	659.4
<b>Total</b>	<b>449.5</b>	<b>7,932.8</b>

Commerce Department bureaus with responsibility for energy and water management in Federal facilities are:

- DOC, Headquarters, Herbert C. Hoover Building (HCHB);
- National Oceanic and Atmospheric Administration (NOAA);
- National Institute of Standards and Technology (NIST);
- Patent and Trademark Office; and
- Bureau of Census.

Commerce is continuing to benefit from the SAVEnergy audits offered by the Department of Energy's Federal Energy Management Program. In FY 1999, Commerce completed five audits and plans to complete approximately six more in FY 2000. These include audits of weather service stations, laboratories, and office buildings.

NIST requested SAVEnergy audits for Buildings 1, 24, and 2 on the Boulder campus and Building 101 on the Gaithersburg campus.

Commerce is participating on the Task Force Working Group developing Federal guidelines for sustainable development and is preparing a far-reaching sustainable design policy statement to incorporate into its standard practices. NOAA is already incorporating this criteria into designs for the new laboratory in Santa Cruz eliminating the traditional mechanical ventilation systems and, utilizing natural ventilation instead.

NIST facilities are defined as energy intensive due to the nature of the laboratory operations and required environmental conditions. NIST is thereby exempt from some energy reduction requirements of the National Energy Conservation Policy Act (NECPA) Section 543 and Executive Order 12902. However, NIST is working to meet these goals to the extent possible without affecting mission critical operational needs. NIST is planning to reduce energy consumption at facilities in the following ways:

The site-wide energy conservation master plan for NIST's Gaithersburg Campus is used for planning energy conservation projects. Architectural/engineering design of energy conservation measures for building modifications to conserve energy and water is underway. The design contract includes HVAC enthalpy-based economizer and HVAC setback controls. Design of energy conservation measures in one laboratory building will retrofit variable air volume measures and control adjustments to air handling units that are planned for FY 2000 construction. Calculated savings projected for FY 2001 are \$342,000 for gas and electricity.

Improvements at the NIST steam and chilled water generation plant continued during FY 1999. The two new boilers at the central steam plant are operating. New boiler submittal information shows operating efficiencies from 82 to 85 percent, whilst the older boilers were performing at efficiencies of less than 80 percent. The improved steam plant efficiency will provide savings in future years. Upgrading the older four existing boilers has similarly improved their performance and reduced emissions.

NIST's Technical Services Division, Boulder, Colorado completed a study to evaluate the potential energy savings of a central utility plant instead of existing satellite heating and cooling facilities. The study

revealed that a central plant will be more efficient than older individual equipment. They also continue the upgrading of buildings by adding additional R-22 insulation to exterior walls during remodeling. Conversion to energy efficient lighting continues through the use of efficient ballasts and lower energy use bulbs during maintenance.

A contract design for installation of water flow restrictors, low flow toilets and urinals within six Gaithersburg site buildings is now complete.

#### **Solar and Other Renewable Energy**

Solar film installation has been completed on the NIST Administration Building with estimated savings of \$6,000 per year.

NOAA's Western Administrative Support Center installed photovoltaic security lights and solar water heaters. More photovoltaics are planned.

#### **Showcase Facilities**

Commerce designated HCHB an energy showcase and has identified eight major projects at an estimated cost of \$3 million and savings of \$745,000 annually.

The Kihei Whale Sanctuary in Kihei Maui, Hawaii, is also designated an energy showcase.

#### **Personnel Development**

Commerce cosponsored the World Energy and Environmental Congress and Environmental Technology Conference (WEEC/ETE) hosted by the Association of Energy Engineers in Atlanta, GA. In addition, WEEC/ETE was selected by Commerce as an official Foreign Buyer Program in support of the export potential of the industry it serves.

#### **Energy Savings Performance Contracts**

NOAA is working with the Department of Energy using the Super Energy Saving Performance Contract (ESPC) program to implement energy cost savings projects. The proposed projects include:

- Upgrade existing HVAC units;
- Replace existing HVAC units;
- Replace and/or retro fit fluorescent lighting fixtures.

#### **Utility Partnerships**

Commerce is working with GSA and DOE to implement some of the HCHB projects through an energy service agreement with the local utility company, PEPCO. Using this method, improvements will be completed at no initial cost to the government.

The Kihei Whale Sanctuary photovoltaic project is being cofunded by DOE's National Renewable Energy Laboratory and the Maui Electric Company.

#### **Energy Management Contact**

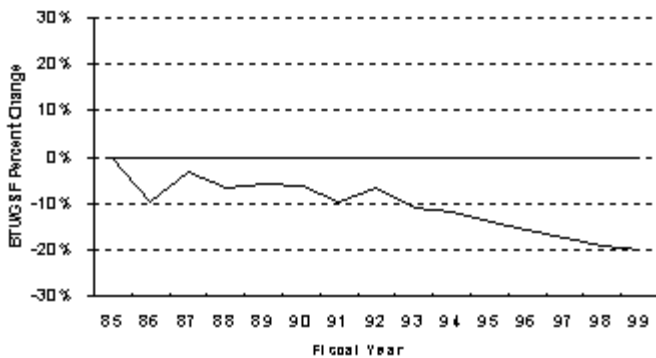
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### 3. DEPARTMENT OF DEFENSE (DOD)

#### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Defense reported a decrease in energy consumption in buildings of 19.8 percent in Btu per gross square foot compared to FY 1985.

**DOD Performance Toward Buildings Energy Reduction Goals**



#### DOD Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	85,404.3	1,384,470.2
Fuel Oil	28,980.7	148,999.5
Natural Gas	75,758.6	285,607.8
Propane	1,525.9	14,309.9
Coal	14,982.6	32,712.2
Purchased Steam	10,654.8	159,510.0
Other	651.1	765.2
<b>Total</b>	<b>217,958.2</b>	<b>2,026,374.8</b>

The Department's excluded buildings and industrial process facilities (i.e. buildings with energy intensive operations) consumed 171,348 BTU/square foot in FY 1999. DOD cannot measure specific progress towards meeting the Executive Order 13123 goal for these facilities (25 percent energy reduction between FY 1990 and FY 2010), because many Defense Components lack adequate square footage records prior to FY 1996 and no other practical metric has been found. However, on a BTU/Square foot basis, the energy consumed in these facilities has come down 3.9 percent since FY 1996—an average of 1.3 percent per year—a rate greater than the 1.25 percent annual reduction called for by Executive Order 13123.

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 existing DOD Installations Policy Board (IPB), chaired by the Deputy Under Secretary of Defense (Installations) and chartered to address a broad spectrum of installations issues, has been designated as the DOD Agency Energy Team. The membership of the IPB contains the cross-section of DOD senior leadership necessary to make decisions needed to remove obstacles hindering compliance with the Executive Order

All 61 U.S. Navy FY 1999 Military Construction (MILCON) projects incorporated sustainable design criteria. The Navy participated in the National Town Meeting for a Sustainable America in May 1999. Their booth highlighted the Whole Building Design Guide and the bachelor enlisted quarters (BEQ) at Great Lakes, Illinois. The BEQ was accepted by the U.S. Green Building Council as one of their 25 pilot projects being used to test their Leadership in Energy and Environmental Design criteria. The new BEQ at Naval Station Pearl Harbor, Hawaii, incorporating several sustainable design features, was awarded the First Annual Good Business Energy Efficiency Award by the Hawaiian Electric Company in February 1999.

The Air Force has employed sustainability concepts during the planning, design, construction, operation, and demolition of Air Force facilities. This also supports many aspects of DOD's compliance assurance and pollution prevention program requirements. Projects designed or built this fiscal year using sustainable design principles include: 108 units of replacement housing at Vandenberg AFB, California; FY 2000 Fitness Center at Barksdale AFB, LA; and a multimillion-dollar MILCON C-17 beddown at McChord AFB, Washington.

The U.S. Army Corps of Engineers has the responsibility to develop and adopt sustainable design for Army installations. The installations are encouraged to approach land use planning and urban design in a more holistic manner and integrate sustainable development into the master planning process. The Army Planning for Community Energy, Economic, and Environmental Sustainability program (PLACE<sup>3</sup>S), which creates a coordinated, information-based planning process, is facilitated by "Smart Places," a public domain software.

Other DOD agencies emphasize energy efficiency in new facility construction and rental procurement. Agencies that do not use the Army Corps of Engineers or Naval

Facilities Engineering Command issue their own energy policy. The Defense Commissary Agency (DeCA) has published a design criteria handbook, which emphasizes sustainable design, life cycle costing, and pollution prevention. The Fort McPherson, Georgia, Commissary, built in 1999, incorporates dual path air conditioning, occupancy sensors, refrigeration monitoring control system, and state of the art lighting systems.

The new remote delivery facility project, being built directly adjacent to the Pentagon for Washington Headquarters Service, will incorporate sustainable design principles to minimize the impact that the facility has on the environment. These design elements include minimizing the building profile, low maintenance, native landscaping, energy efficient mechanical and electrical systems, indoor air quality monitoring and ventilation control, and the use of environmentally preferred products.

NIMA completed a construction of a replacement facility in Arnold, Missouri for those lost during the St. Louis floods in 1993. The new facility, a \$40 million complex to house printing, distribution, and storage functions, has been designed to conform with DOD energy efficiency requirements. In FY 1999, the National Security Agency has obtained a new and more efficient leased office building at their annex complex. The main strategy was to ensure that new buildings and renovations are being designed with "energy smart" features and endorsing the Agency's procurement of more energy efficient equipment.

The Defense Finance and Accounting Service (DFAS) and other DOD components using GSA leased facilities incorporate sustainable technologies when renovating existing facilities or when new buildings are designed. In close coordination with GSA and using an Army Corps of Engineers design, a complete renovation was made to the DFAS Indianapolis Center. The project included improvements to the building envelope and replacement of the heating, ventilation, and air conditioning (HVAC) system. In addition, four other MILCON program improvement projects were completed in FY 1999 for DFAS facilities at Rock Island, Illinois, Columbus and Dayton, Ohio, and DFAS Headquarters in Arlington, Virginia. These projects featured energy efficiency measures such as energy monitoring systems, motion sensors, state of the art controls, efficient HVAC systems, double pane windows, and building insulation.

DOD fuel oil consumption in buildings decreased by 5.8 percent from FY 1998 to FY 1999. Each component's energy management plan includes a

strategy to reduce the use of petroleum and to replace the fuel oil-fired boilers with natural gas or dual-fuel burners. The Army encourages maximum efforts be taken to improve plant efficiency and implement usage of non-petroleum fuels. The Air Force has a program to convert from petroleum to other energy sources where cost effective and logical, achieving a 66.9 percent decrease since FY 1985.

The Navy aggressively pursues the elimination of fuel oil for heating buildings where natural gas is available and conversion costs can be recovered within 10 years resulting in petroleum use decreasing by 16 percent from FY 1998 to FY 1999. Distributed heating projects are currently underway at Naval Air Engineering Station Lakehurst, New Jersey; Naval Technical Training Center Pensacola, Florida, and Naval Air Station Fallon, Nevada. The Navy also uses an optimization program for its central plants, which includes reviewing boiler loading and redundancies, and operator training. In FY 1999, projects identified include fuel switching, remote monitoring and control, and re-building equipment.

DESC is the implementing agency for the DOD Direct Supply Natural Gas Program. The objective of this program is to obtain the most cost-effective and reliable supply of natural gas for DOD installations, encouraging the Components to minimize their use and reliance on petroleum products. In FY 1999, DESC competitively procured over 46 trillion Btu of natural gas, with 166 DOD installations participating in the program, saving more than \$29 million (five more installations and \$5.5 million greater savings than FY 1998). Fuel oil as backup to interruptible natural gas reduced by 18,375 gallons (2.5 billion Btu) from FY 1998 to FY 1999. Direct conversion from fuel oil to natural gas eliminated more than 55,000 gallons of fuel oil in FY 1999 (annual thermal content of 7.6 billion Btu).

#### **Solar and Other Renewable Energy**

In early 1998, the Department committed itself to the Million Solar Roofs Initiative, with a Departmental goal of 3,000 solar roofs in use by the end of FY 2000. The Department installed 1,226 solar roofs in FY 1998 and another 1,436 solar roofs in FY 1999. These 2,589 solar roofs demonstrate the Department's commitment to the increased use of solar energy and other forms of renewable energy, where it is cost-effective. Passive solar designs, such as building orientation and window placement/sizing, are already being implemented in a variety of building types as part of sustainable design features.

In general, renewable energy projects still are not competitive with other energy projects on a life-cycle



cost basis. The capital costs tend to be high for the energy savings generated, resulting in paybacks that are considerably longer than competing conventional technology. Each of the Services has developed strategies to overcome this problem. The Navy uses the revenue from sales of excess geothermal power at Naval Air Weapons Station (NAWS) China Lake, California to finance additional energy conservation and technology projects. The Army intends to increase their renewable energy program by putting special emphasis on it in their Energy Conservation Investment Program (ECIP) projects and by increasing the use of DOE renewable energy funding programs. The Air Force specifically sought energy service companies (ESCOs) with experience in renewable energy projects for their regional ESPCs.

Washington Headquarters Services (WHS), in collaboration with DOE, and with cost-sharing support from private-sector companies, installed a 15kW photovoltaic panel array demonstration project at the Pentagon Heating and Refrigeration Plant compound. This project demonstrates a new technology—micro-inverters attached to each panel rather than one large inverter on the entire array. This will facilitate the planned increase in size of the array to 60kW in FY 2000. In FY 2001, WHS is planning a roof-top solar hot water heating system for the Pentagon, allowing the steam distribution line serving the building to be secured during the summer months.

The Department also is developing other solar and solar-thermal projects. At Luke AFB, Arizona, an ESCO has proposed refurbishing and modifying existing solar systems to heat water for some dormitories and a nearby dining hall. The National Imaging and Mapping Agency (NIMA), St. Louis, Missouri, is currently investigating solar and other renewable energy projects within the scope of the ESPC that is being implemented, and they are investigating the augmentation of the domestic hot water system with solar heating.

In addition to the application of solar energy, the Department is also committed to other renewable energy technologies. The largest on-going renewable energy project is the 180 megawatt geothermal power plant located at the NAWS China Lake, California. Revenue from the excess electric power from the geothermal plant is used to finance energy cost reduction efforts throughout the Navy.

Other renewable initiatives are being undertaken. Design has been completed on a project to install almost 1,000 geothermal heat pumps at Charleston

AFB. Additionally, Air Force Space Command is designing a project to install more wind turbines and is considering the use of pumped water for energy storage at Ascension Island. The Air Force also asked the Idaho Engineering Laboratory to perform a wind study for a 5 megawatt power plant at Lajes AFB, Azores. Additionally, Sandia National Laboratory has been surveying Nellis, Davis Monthan, Edwards, and Luke AFBs for the Air Force to find potential renewable projects. Finally, DLA has continued testing of solar tracking skylights.

#### **Showcase Facilities**

Showcase facilities demonstrate the use of innovative techniques to improve energy and water efficiency. Although hindered by a lack of funding in previous years, the Department intends to emphasize the benefit of these facilities, with a target of developing at least three showcase facilities per year.

Two modifications to existing facilities have been designated showcase facilities by the Air Force. Budget constraints have limited this designation elsewhere within the Department. The two Air Force projects were:

- Dyess AFB, Texas. At the aircraft hanger, supply warehouse, and youth center both active and passive daylighting with lighting controls was installed. 460 units in all were installed.
- Misawa AB, Japan. An ECIP project enabled the replacement of 6 200-ton centrifugal chillers and removed 4,000 pounds of R-11 refrigerant from operation. This produced 9.2 billion Btu in annual energy savings.

#### **Personnel Development**

Adequately trained personnel are critical to the safe and efficient operation of DOD utility systems. During FY 1999, more than 1,600 DOD employees received energy management or technical training.

DOD components include specific energy related responsibilities into position descriptions, provide performance recognition programs, and support the use of incentive awards, which are normally implemented at the installation level. The Services and Components have individual awards programs and are also participants in the DOE Federal Energy and Water Management Awards Program. In FY 1999, DOD received 14 awards (6 Army, 4 Navy, and 4 Air Force).

The Army Energy Program Team was the recipient of Vice President Gore's Hammer Award, presented by the Secretary of the Army, the Honorable Louis Caldera on

September 9, 1999. The team is composed of action officers from the Army's Logistics Integration Agency, the U.S. Army Corps of Engineers, and the Office of the Assistant Chief of Staff for Installation Management.

The Navy hosted the FY 1999 annual Secretary of the Navy awards ceremony with the Honorable Robert B. Pirie, Jr., Assistant Secretary of the Navy for Installations and Environment, presenting the awards. Seven awards were provided to Navy and Marine Corps winners in the categories of facilities, ships, and air squadrons.

USAF's Air Education Training Command (AETC) has an energy management incentive award program to award the two best energy management programs in the command each fiscal year. The Air Mobility Command energy awards provide \$400,000 to bases who demonstrate the greatest energy program emphasis and success toward meeting reduction goals. Both awards evaluate both industrial and family housing categories, cumulative energy reduction between the current year and the FY 1985 baseline year, current year and the previous year, and a narrative from each installation detailing their energy program efforts.

DOD components routinely incorporate energy management responsibilities into their unique and respective awards and performance appraisal programs. The Washington Headquarters Service, for example, established an "on the spot" cash award program to recognize outstanding performance in energy management. Most major DOD installations have Certified Energy Managers assigned and installations' performance goals are established at each site level.

DOD emphasizes and supports cost effective training, through recognized professional organizations, DOE and other Government agencies' training programs, multi-media sources and energy management training offered by the Military Services' training programs for all personnel within the Department's energy management community. The Department also participates in the identification and development of long term training needs and initiatives to meet the energy management training and certification requirements, supporting the planned increase in energy and water conservation.

The Army provided energy management training for 685 personnel during FY 1999. The current year cost for the training was \$200,000. The U.S. Army Logistics Integration Agency (LIA) conducts Army Energy Awareness Seminars at approximately 20 installations

per year. A course in energy management for existing facilities for trained Energy Managers is available through the Association of Energy Engineers, and the Army Corps of Engineers in Huntsville, Alabama. LIA has also established an Army Energy Program Home Page on the Internet. It contains numerous reference materials applicable to the energy program as well as an "Ask Captain Conservo" interactive e-mail chat room feature to promote information sharing and interaction within the Army energy management community.

Approximately 415 Navy energy managers/facilities personnel received technical training in areas specified in EPAct. Personnel attended technical courses offered by universities, associations and government agencies. Four sessions of the Navy in-house facilities energy management course were conducted in four different Engineering Field Division regions.

The Air Force Institute of Technology (AFIT) Civil Engineering School at Wright-Patterson AFB, Ohio conducts an Energy Management Training (EMT) course twice a year. AFIT has also incorporated emphasis on energy efficiency in its other technical courses offered, as well as in their on-line computer-training programs. The Air Force uses specialized courses from other sources when the need arises, i.e., a training class by Association Energy Engineers Instructors, provided Certified Energy Manager (CEM) training to 33 individuals. During FY 1999, 299 personnel (from engineering, contracting, legal and comptroller areas) from 41 locations were trained via satellite down-link on the Air Force Regional ESPC program.

Each DOD component has its own unique energy management training plan. Many of them have implemented extensive public relations campaigns. These include recognizing non-energy individuals for conservation efforts, producing stickers for light switches, publishing "how-to" and "point of contact" manuals, and supporting energy poster contests.

### **Funding**

In FY 1999, Congress appropriated \$32.5 million for the ECIP. Although Congress cut all ECIP funding for FY 2000, the FY 2001 President's budget contains \$33.6 million for the program. DOD has typically used ECIP funding to augment private-sector investment and plans to focus more on projects with large energy savings that are not very attractive to the private sector because they require substantial up-front capital investments with long pay-back periods. DOD plans to program about \$50 million per year for the ECIP in the future.

### **Energy Savings Performance Contracts**

In FY 1999, DOD greatly increased the use of Energy Savings Performance Contracts (ESPCs) and utility incentive agreements—saving nearly 1.7 trillion BTU per year, and more than doubling the energy savings obtained the previous year. In excess of \$6 billion in ESPC investment capacity is now available to DOD installations as a result of indefinite-delivery contracts developed by the Military Departments and a memorandum of agreement between the Defense Energy Support Center (DESC) and DOE.

FY 1999 was a record year for the DOD ESPC programs in terms of the number of awards and the magnitude of potential savings (the Defense components awarded 45 ESPC task/delivery orders with an average contract term of 16 years, with an estimated life-cycle savings of nearly \$379 million). The annual energy savings resulting from these awards is estimated to be 1,204,533 million BTU. There are now approximately 70 ESPC projects underway within DOD.

A combined private sector investment capacity of \$3.2 billion is available for use by the Department on one of the existing Defense indefinite delivery indefinite quantity (IDIQ) multi-regional ESPCs, which cover all 50 states and the District of Columbia. Additionally, several Defense components have executed Memorandums of Agreement (MOA) to use DOE Regional or Technology-Specific Super-ESPCs. In June, DESC awarded the single largest ESPC issued by the Federal Government to date, that will use over \$67 million in private capital to install energy savings measures at five bases in the Army's Military District of Washington. This ESPC guarantees an annual reduction of 597.7 billion Btu, annual cost savings of \$11.9 million. There will also be an annual reduction of approximately 24,000 metric tons of greenhouse gas emissions (carbon is the standard for measurements) and more than 600 metric tons of pollutants that cause smog and acid rain, and saves over 50 million gallons of water. Over the 18 year term of the contract, cost savings are expected to total more than \$219 million.

Congress added \$4 million to the Defense-wide O&M account in FY 2000, to assist in training, providing technical expertise and performing energy audits, and otherwise facilitate the ESPC process. This money has been allocated to the components for technical support and project oversight, measurement and validation training, and an ESPC awareness program. DOD will continue to build on its FY 1999 successes with the Military Departments planning to use more than \$1.2 billion in private-sector financing over the next five years.

The Navy has initiated a pilot program that offers some up-front funding to help overcome some of the reluctance of installation commanders to enter into ESPCs. Using FY 1999 operations and maintenance energy program funds, this program invested \$1 million to reduce the capital investment cost of ESPCs.

#### **Utility Projects**

There are now approximately 150 demand side management (DSM) and utility partnership agreements in effect at Defense installations.

The Air Force and Navy have continued to aggressively pursue DSM agreements with local utility companies for energy and water retrofit projects. In FY 1999, the Air Force initiated 10 DSM agreements that will initially save 97,877 Btu per year, while the Navy initiated 107 DSM projects. The Navy also invested \$7 million in O&M funds to reduce the amount of project financing required, which installed \$66 million in energy efficiency equipment. Basic ordering agreements are in place with most utility companies servicing Navy activities. These contracts cover a wide range of technologies including lighting, natural gas conversions, controls, and boiler systems. DESC continues to work with the Services and local utilities to encourage the use of these incentives. Other Defense components, including the NSA and DeCA, have entered into long-term electricity purchase agreements with their local utilities that facilitate the use of various financial incentives.

The Department intends to take maximum advantage of electricity rate restructuring to lower its energy costs, and will include green power in its procurements where it is cost-effective. Where practicable, DOD will bundle regionally the diverse loads of DOD installations to create greater buying power. DESC has established a competitive electricity procurement program. Power contracts awarded by DESC in California, Pennsylvania and New Jersey, bundled demand regionally to obtain the best rates possible and resulted in approximately \$825,000 in cost avoidance.

DOD continues its efforts to privatize its utility systems. Defense Reform Initiative Directive #49 directed the Military Departments to develop plans for privatizing all of their utility systems by September 30, 2003. This initiative is designed to allow the Department to manage resources rather than utility infrastructure B using the expertise and investment capital of local utilities and private-sector suppliers to modernize, operate, and maintain DOD's utility systems more efficiently and effectively. The scope of the task is daunting, however, with over 1,500 systems remaining to be evaluated for transfer.

In June 1997, DOD, DOE, and EPA entered into a memorandum of understanding (MOU) regarding ENERGY STAR® labels for all DOD buildings. The MOU considers buildings as ENERGY STAR® Buildings if they were included in comprehensive audits and all projects with a 10-year or better payback are implemented, to the maximum extent practicable, within agency resources. DOD continues to honor its commitment as an ENERGY STAR® Buildings partner with EPA and DOE, to encourage the use of cost-effective, energy-efficient building designs and technologies, and to improve personnel productivity and reduce pollutant emissions. This is reinforced by the Department's commitment to sustainable design.

The Air Force has obtained the ENERGY STAR® information and the DOD partnership agreement and placed it on the AFCESA home page. Additionally, the Air Force has distributed this information to all major commands (MAJCOMs), and is encouraging the MAJCOM/bases to participate in this program. Several Air Force bases have signed up for the "Green Lights" program including Bolling AFB, Maryland; Westover ARB, Massachusetts; and Malmstrom AFB, Massachusetts. At Malmstrom, they have surveyed 74 percent of the facilities and upgraded 31.2 percent of the facilities. For Westover ARB, they have surveyed 64 percent of floor space, and upgraded 46 percent of lighting to "Green Lights" standards.

The Navy has surveyed approximately 51 percent of its facilities and installed approximately half of the projects identified. The other DOD components occupy fewer facilities, operations are smaller in scope, and typically have fewer resources and opportunities to implement the principle of the ENERGY STAR® Program. However, they are all partners and support and implement ENERGY STAR® principles as resources allow.

#### **Procurement of Energy Efficient Products**

The Department is committed to actively searching the competitive markets to identify and procure energy efficient products for facilities and equipment, as required by the 1992 Energy Policy Act. The Defense Logistics Agency (DLA), is working closely with other Federal agencies, such as the Department of Energy's Federal Energy Management Program and GSA, to identify energy efficient products. The FEMP, GSA and DLA product catalogs are widely used within DOD. Although no specific procurement targets exist within the Department, purchasing agents, including users of government credit cards, are encouraged strongly to procure ENERGY STAR® products and products in the

top 25 percent of energy efficiency, when they are cost-effective.

DOE and GSA were tasked with identifying energy efficient products for the Federal Government. The Navy was an active participant in the GSA working group of Energy Efficient Products. The Department concentrated its efforts on making use of the guidance generated by the lead agencies. In addition, the Navy recommends that energy managers utilize the DLA lighting catalog and Washington State Energy Office Motor-Master database to assist in purchasing energy efficient equipment. The recently published DOE resource of energy efficient products was distributed to all Navy energy managers in FY 1999. Energy managers were encouraged to ensure planners, estimators and other procurement officials received the DOE guidance.

During programming and early design reviews of renovation projects, the Air Force encourages the use of highly energy efficient products such as lighting, motors, and chillers. Criteria have been provided to the base level designers to purchase only energy efficient equipment (based on life-cycle cost). The Air Force continues encouraging energy managers to use the references in the Construction Criteria Base (CCB), the DLA lighting catalog, and the electronic version of E-Source, delivered to all installation energy managers.

Other Defense components follow DOD and other Federal guidance in planning, procurement and use of cost-effective energy efficient and environmentally preferred products. Most locations support recycling of toner cartridges and other materials (paper, aluminum, glass, and plastics).

#### **Alternative Fueled Vehicles (AFV)**

In FY 1999, DOD acquired 2,712 AFVs. In addition, the Department received 102 extra AFV credits for acquiring medium- and heavy-duty AFVs, for a total of 2,814 AFVs and credits. The total of 2,814 AFVs and credits for FY 1999 represent an increase of 549, or 24 percent, over the FY 1998 total of 2,265 AFVs and credits included in last year's DOD report. DOD's acquisition rate for AFV increased from 32.3 percent in FY 1998 to 36.6 percent in FY 1999.

DOD continues to take steps in the areas of policy, management and oversight, and budget to achieve compliance with the requirements of Executive Order 13031, "*Federal Alternative Fueled Vehicle Leadership.*" With original equipment manufacturers making more AFV models available, and with use of biodiesel now counting toward achievement of AFV goals, DOD

expects to continue to increase the percentage of AFVs that it acquires.

The Department does not have an automated system to identify, collect, record, and report alternative fuel usage data. Developing such a system at a time when DOD is still striving to ensure that sufficient funds are available to meet mandated AFV acquisition requirements, is cost prohibitive. Manual collection of the data is also cost-prohibitive. Thus, DOD is able to provide only an incomplete estimate of alternative fuel used in FY 1999. One major obstacle to collecting and reporting alternative fuel usage data is that the Government credit card system currently is unable to collect and report detailed data, known as Level 3 data, on the types of fuel being purchased. DOD will continue to work with GSA so that in the future DOD will be able to obtain more complete data on the types of alternative fuel purchased with Government credit cards.

#### **Environmental Benefits of Energy Management Activities**

The Department closely coordinates its energy management and environmental programs to take full advantage of their synergy. As a result, DOD has been very successful in reducing its greenhouse gas emissions. From FY 1998 to FY 1999, DOD installations reduced their carbon emissions by 1.2 percent.

The Navy, through its energy program efforts, reduced carbon equivalent emissions by approximately 500,000 metric tons carbon equivalent compared to emissions in FY 1985. At a cost of \$3 per ton for externalities, the reductions are worth \$1.5 million annually.

The Air Force's windfarm and photo voltaic systems at Ascension Island reduce greenhouse gases by 2.9 million pounds per year for carbon dioxide and 103,000 pounds per year for nitrous oxides. In addition to the direct environmental benefits of energy conservation, the Air Force has also realized the following indirect environmental benefits:

- Under a DSM contract with Virginia Power, Langley AFB, Virginia has disposed of all the obsolete ballasts as part of the \$10.8 million delivery order which involved lighting and HVAC for 15 buildings. The cost to dispose these obsolete ballasts was \$23,200.
- An ECIP project at Mt. Home AFB, Idaho replaced 13 oil-fired boilers in 13 facilities with high efficiency natural gas boilers. As part of the environmental clean up program, the 13 oil tanks were removed.

- Offutt AFB, Nebraska eliminated 1400 pounds of the CFC refrigerant R-11. An FY 1999 ECIP project for Building 304 eliminated an additional 7200 pounds of R-11.

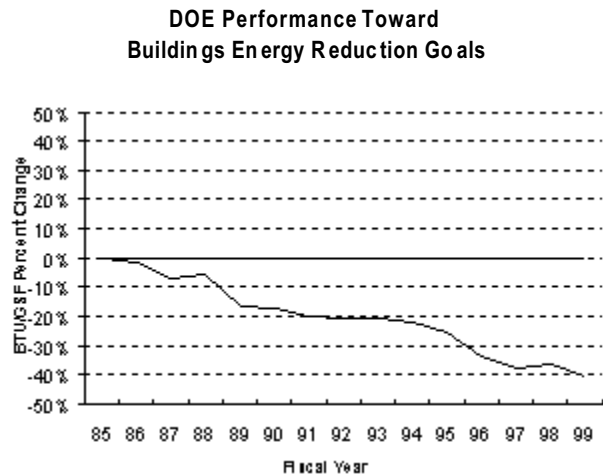
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## 4. DEPARTMENT OF ENERGY (DOE)

### Energy Efficiency Performance and Implementation Strategies:

For FY 1999, the Department of Energy reported a decrease in energy consumption in buildings of 38.5 percent in Btu per gross square foot compared to FY 1985.



### Energy Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	10,355.3	144,917.4
Fuel Oil	608.1	2,247.7
Natural Gas	6,253.5	22,596.7
Propane	38.4	235.3
Coal	2,720.4	4,136.9
Purchased Steam	1,720.6	12,024.4
Other	34.1	715.1
<b>Total</b>	<b>21,730.3</b>	<b>186,873.4</b>

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. This includes review of heating, ventilating, and air conditioning (HVAC) systems; lighting; transformers; and other building equipment usage. Appendix A includes a comparison of DOE's energy consumption and costs for FY 1999 with FY 1985 for specific fuel types within each of the three end-use sectors: Buildings and Facilities, Metered Process Facilities, and Vehicles and Equipment.

DOE's metered process facilities, excluded from the 30 and 35 percent reduction goals of Executive Order

13123 for standard buildings, saw a reduction in Btu per gross square feet of 64.9 percent since FY 1985. This reduction is mainly attributable to reduced mission-related activities and overall downsizing of operations and facilities.

As directed by Executive Order 13123, DOE has designated Deputy Secretary of Energy, T.J. Glauthier as the senior official responsible for meeting the goals and requirements of the Order. DOE also designated a senior level Agency Energy Team consisting of: Dan W. Reicher, Assistant Secretary for Energy Efficiency and Renewable Energy; Michael L. Telson, Chief Financial Officer; Richard H. Hopf, Director of the Office of Procurement and Assistance Management; and Elizabeth L. Shearer, Director of the Federal Energy Management Program, to expedite and encourage use of appropriations, energy savings performance contracts, and other alternative financing mechanisms necessary to meet the goals and requirements of the Order.

In FY 1999, the Department's Energy Management Team assisted the efforts of the Energy Management Steering Committee (EMSC) to reduce energy costs by integrating all energy management activities into DOE program operations. The EMSC is comprised of Federal Energy Management Program and DOE Secretarial Officer representatives. It establishes and implements internal policy for energy management, and integrates these activities into DOE program operations. The EMSC looked beyond the 35 percent reduction goal of Executive Order 13123 by outlining key elements for reducing energy consumption per square foot by 40 percent in 2005 (from the 1985 base year). These key elements are:

- Phasing out Class 1 ozone-depleting refrigerants in old chillers;
- Reducing energy consumption in surplus facilities;
- Procuring energy-efficient products (lighting, CFL's);
- Achieving ENERGY STAR® labels for DOE office buildings;
- Adopting sustainable guidelines for all new buildings; and
- Procuring cost-effective renewable energy systems and electricity.

In 1999, the EMSC agreed that all DOE sites would begin reporting greenhouse gas emissions using data from its energy data collection and reporting system (EMS3) in adherence to the Energy Information Agency's voluntary program. DOE has set a goal to reduce greenhouse gas emissions by 35 percent in the year 2010 (from 1990 base year). This exceeds the 30 percent goal set by Executive Order 13123.

Additionally, the EMSC established guidelines to achieve the Secretary's "Phaseout Goal for DOE's Air-Conditioning and Refrigeration Chillers to Protect the Ozone Layer and to Reduce Energy Costs." DOE will replace or retrofit all of its chillers that use Class 1 refrigerants by 2005. Meeting this goal would eliminate 50 percent of Class 1 refrigerant use by DOE, as well as reduce energy costs by \$6 million annually. The "Phaseout Goal" will be reached by developing:

- Refrigerant management plans;
- Guidance on disposition of Class 1 refrigerant;
- Energy management plans and programs; and
- Chiller exemption process when retrofitting or replacement is not cost effective.

DOE is adopting sustainable design for its new construction and major renovations. Sustainable Design uses a life-cycle cost effective integrated approach to appraise all elements of a building to minimize its impact on the environment.

Many DOE sites have implemented a number of ongoing energy-saving measures resulting from previously funded comprehensive audits such as installing energy monitoring control systems, replacing mercury vapor lamps with higher efficiency metal halide lamps, replacing old fluorescent lamps and ballasts with high-efficiency lamps and electronic ballasts, installing automatic on-off control systems for lighting, installing and replacing building satellite boilers, and maintaining and upgrading HVAC equipment and systems to optimize performance. DOE also seeks to improve energy efficiency through efficient operation of buildings, improved preventive maintenance, and improved energy training for personnel.

Examples of operational and energy efficiency projects accomplished in FY 1999 include:

- The Albuquerque Operations Office completed a number of HVAC and lighting retrofits at the Waste Isolation Pilot Plant (WIPP). The Kansas City Plant (KCP) accomplished several energy conservation activities, including upgrading

boilers, installing direct digital controls, replacing CFC chillers with 134a chillers, installing new steam traps and KCP's plate/frame heat exchanger project, and free cooling during the winter. The Pantex Plant installed photocells on outside lighting, identified and repaired leaking water lines, tuned boilers, right-sized a new air compressor (saving more than \$36,000 per year), installed new steam traps, installed variable-frequency drives, repaired natural gas line leaks, and right-sized chilled water pumps. Pantex also has a water conservation project under construction that will replace domestic water chlorine injection at the sewer plant with sewer water chlorine injection, saving more than 15 million gallons of water per year. The Los Alamos National Laboratory (LANL) audited five buildings and four transportable buildings. The audit identified measures that, if implemented site-wide, could save \$4.3 million annually. LANL installed 64 infrared occupancy sensors in offices, conference rooms, and hallways in six buildings. Sandia National Laboratory improved their energy management control system with a demand-based control strategy, reducing run time of fans and pumps, and reducing simultaneous heating and cooling. One building was completely retrofitted, changing 6,000 lamps from T-12 to T-8 and eliminating more than 1,000 ballasts. Annual savings are estimated at 250,000 kilowatt-hours, with simple payback period of three years. Twelve remote area buildings were converted from propane to natural gas-fired boilers, saving \$70,000 a year. Also, a 1-million-gallon chilled water storage tank, rated for 10,000 ton-hours of chilled water capacity, was constructed. When this is integrated with the existing chilled water plant, annual savings of \$150,000 are expected.

- Argonne National Laboratory-East completed two projects: implementing heat recovery in 200 Area Buildings (\$500,000, with a 3.4-year payback period), and improving raw water distribution (\$260,000, with a 4.4-year payback period).
- The Rocky Flats Environmental Technology Site (RFETS) performed a SAVEnergy audit of 12 buildings along with an energy consumption analysis of 69 other typical buildings, installed two package boilers to improve steam feed efficiency, and reduced exterior lighting at the east and west entry gates.
- The Idaho National Engineering and Environmental Laboratory (INEEL) performed facility audits that developed 274 conservation opportunities. If

implemented, these would save more than \$51,000 annually. An excess buildings study was completed, finding that actions completed to date are saving \$269,200 per year. During the next five years, an additional \$149,200 will be saved as eight other buildings are removed from service. Total annual savings are estimated to be \$420,000. INEEL also installed occupancy sensors, setback thermostats, and LED exit lamps.

- Bonneville Power Administration (BPA) has installed a cooling tower water treatment device at Dittmer Control Center that filters out particles in the loop resulting in savings of nearly 12,000 gallons of water a day and \$17,000 annually. This system will serve as a model for several cooling towers at the Celilo Converter DC Station. Radiant heaters have been installed in garages where the external temperatures can reach -25° F. By heating an object and not the entire space, these measures have reduced the energy bill by 30 percent. BPA replaced a 60 ton air conditioner with a 12 ton unit at the Alston Substation and will save \$20,000 annually.
- The Ohio Field Office's Fernald Environmental Management Project switched to a smaller cooling tower, decreasing the cooling water loop length and reducing pumping energy.
- Pacific Northwest National Laboratory improved energy-related operations and maintenance in the William R. Wiley Environmental Molecular Sciences Laboratory. Early results indicate annual savings of \$100,000.
- The Richland Operations Office upgraded the lighting system at the Fuels and Materials Examination Facility. At the Plutonium Finishing Plant, 900 standard fluorescent light fixtures were replaced with T-8s and electronic ballasts, and fan motors were upgraded. Numerous general-purpose facilities also had T-12 fixtures (7,550 in all) replaced with T-8s, saving more than 140,000 kilowatt-hours and \$3,533 annually. Also during FY 1998, 13 transformers were removed and 7 were exchanged, reducing energy consumption and costs by more than 325,000 kilowatt-hours and \$7,800.
- The Nevada Operations Office installed energy-efficient lighting in the Remote Sensing Laboratory. This project included replacing magnetic ballasts and T-12 lamps with energy-efficient electronic ballasts and T-8 lamps with

reflectors. Total estimated annual savings are \$52,500.

- The Lawrence Livermore National Laboratory completed nine energy conservation projects. The projects consist of DDC system installations, lighting retrofits, occupancy sensor installations, and HVAC upgrades. Total construction cost was \$1.36 million with a cumulative payback period of 3.3 years.
- Brookhaven National Laboratory (BNL) began five new projects. These are an energy management control system optimization, insulation of steam stations and manholes, exit sign LED retrofits, installation of a side-stream filter for the Central Chilled Water Facility's refrigeration machines, and HVAC balancing.
- Bettis Atomic Power Laboratory completed roof repairs and insulation, occupancy sensor installations, central heating plant improvements, improvements to the energy management system for building HVAC controls, installation of an efficient vacuum pump system, and the installation of efficient heaters on the Corrosion Laboratory autoclaves. Energy savings of 14.5 billion Btu were achieved.
- The Oak Ridge Operations Office completed several projects. The Oak Ridge Institute for Science and Education (ORISE) replaced an inefficient electric HVAC system with a digitally controlled system with natural gas heating, and completed a multi-site energy audit, an energy conservation baseline study, an HVAC system study, and a lighting system upgrade. ORISE also completed a multi-phase retrofit construction project at the sites 2714FG Building, which included installing dual glazed windows, attic insulation, and T-8 fluorescent fixtures and electronic ballasts.
- The National Energy Technology Laboratory (NETL) completed a preliminary energy audit for both its Pittsburgh, Pennsylvania, and its Morgantown, West Virginia sites. NETL also began a lighting retrofit at its Morgantown day care facility.
- The Federal Energy Regulatory Commission (FERC) retrofitted all incandescent lights in common areas and department head offices with compact fluorescent bulbs, saving 79,120 kilowatt-hours and more than \$6,300 per year. It also removed 48 recessed incandescent lights in 16 locations, saving 11,232 kilowatt-hours and nearly



\$900 annually. Variable speed drives were installed on fans and water pumps, saving at least 123,000 kilowatt-hours annually.

- Lawrence Berkeley National Laboratory (LBNL) completed eight energy efficiency retrofits. These measures included lighting retrofits, installing variable frequency drives, variable speed drives, boiler retrofits, HVAC replacements, cooling tower efficiency improvements, and installing lighting controls. Estimated annual cost savings are \$154,000. The annual energy savings of nearly 3,000 megawatt-hours will avoid emissions of 725 tons of carbon dioxide, 1.8 tons of nitrogen oxides, and 0.6 tons of sulfur dioxide.
- The Stanford Linear Accelerator Center started a project to install programmable thermostats at packaged HVAC units.

#### **Solar and Other Renewable Energy**

FEMP's Departmental Energy Management Team is actively promoting solar and renewable energy and the President's Million Solar Roofs Initiative, and DOE has solar and renewable projects at the following DOE sites:

- Forrestal and Germantown Headquarters, photovoltaic and solar hot water heating systems;
- LBNL, solar hot water heating system;
- Nevada Test Site, nine photovoltaic systems;
- Western Area Power Administration, two photovoltaic systems;
- National Renewable Energy Laboratory (NREL), passive solar design features and daylighting, trombe wall and photovoltaic systems;
- Sandia National Laboratory (SNL), ground source heat pumps, daylighting, passive solar design, trombe wall, hot water heating system;
- WIPP, skylights/daylighting; and,
- Oak Ridge National Laboratory (ORNL), passive solar building.

#### **Funding**

DOE received no direct appropriations for in-house energy management during FY 1999. No funds have been appropriated by Congress for DOE in-house energy efficiency projects since FY 1995 when DOE

received \$30 million. However, the FEMP-Departmental Energy Management Team and the EMSC worked to provide DOE sites with \$6.4 million in energy retro fit project funding in FY 1998. These funds were made available after being returned by DOE field sites to FEMP from previous projects that were completed but still had funds remaining. In response to requests for project submissions, over 60 projects were submitted with more than \$25 million in total estimated cost. Of these, 32 projects were selected with an average simple payback of 3.5 years. The FEMP-Departmental Energy Management Team has also provided funds to support development of energy savings performance contracts and utility contracts at 12 DOE sites.

DOE has requested \$5 million for energy efficiency projects for FY 2001.

#### **Energy Savings Performance Contracts**

Obtaining alternate financing for energy efficiency projects is considered vital to continued energy reductions. DOE has awarded five site-specific ESPCs to date and is working on several other projects:

- Savannah Operations Office awarded an ESPC to CES/Way International (now Sempra Energy Services) on March 2, 1998. The primary focus of the Savannah River Site Energy Management Team was developing Task Orders, the first of which was approved in FY 1999. Task 1 consists of upgrades in 16 administrative facilities. A total of 540,000 square feet was audited resulting in \$1,655,000 in capital upgrades. Guaranteed energy and O&M savings are approximately \$268,000, due to improvements such as lighting enhancements, energy management control system installations, and HVAC modification.
- The Richland Operations Office's Hanford Site awarded an ESPC in FY 1997 to Johnson Controls, Inc. During FY 1999, the 200 East and 300 Area steam plants were closed and replaced with 42 state-of-the-art package boilers. The new boilers eliminate steam and condensate discharges and reduce energy consumption by 30 percent. More than \$108 million in energy and related operations and maintenance expenses will be saved over the 25 year contract term.
- The Albuquerque Operations Office's Waste Isolation Pilot Project began work to utilize DOE's regional Super ESPC. The initial Request for Proposal (RAP) targets the main chillers, variable-frequency drives for the main underground ventilation fans, DDC for monitoring and control,

and several lighting projects. Estimated investment is \$3 million, with a 15-year payback. The Pantex Plant received a final proposal for \$4,473,000 of energy conservation measures with a simple payback period of 9.6 years. Two million square feet of plant floor space will be audited. Utility incentives of more than \$2.6 million over the project's life have been identified.

- LANL entered into an agreement with its support services subcontractor whereby the contractor would perform ESPC tasks at LANL. One chiller replacement is at the approval stage for construction, one lighting and HVAC upgrade is at the energy audit stage, and a steam plant and another lighting retrofit are at the proposal stage.
- INEEL submitted a delivery order for the Western Regional Super ESPC. This initial delivery order included lighting and transformers.
- The Nevada Operations Office has an ESPC study near completion, which proposes to use efficient technologies in lighting, HVAC, and energy management control systems. A delivery order is expected during FY 2000.
- ORNL engaged an ESCO through the Southeast Regional Super ESPC. A delivery order covers four buildings, involving lighting, chillers, variable frequency drives, and water fixtures.
- NREL has initiated a delivery order under the Mid-Atlantic Regional Super ESPC and selected EUA Cogenex/SAIC as the ESCO.

**Utility Partnerships**

DOE sites continue to participate in and provide utility company incentives and demand-side management programs. Examples include:

- Argonne National Laboratory (ANL) developed an agreement with Commonwealth Edison to provide energy conservation projects under their utility incentive program initiative. The first delivery order for a pump motor replacement was valued at approximately \$180,000. ANL also continued its participation in Commonwealth Edison's demand-side reduction program, receiving more than \$450,000 in compensation. ANL also negotiated a reduced rate from the local gas utility.
- Pumps at the Strategic Petroleum Reserve's (SPR) Raw Water Intake Structure (RWIS) were increased in size, warranting an increase in the size

of Entergy-owned transformers providing power to the RWIS. SPR negotiated an agreement with Entergy to off-set the cost of construction with actual power usage from the site, saving about \$200,000 during the contract period. Three field sites, Bayou Choctaw, Big Hill, and both West Hackberry substations use Entergy's time of use rate for annual savings of approximately \$350,000. Also, the Bryan Mound site is using an interruptible service rate from Houston Lighting and Power.

- BNL modified its contract with the New York Power Authority (NYPA) to save \$2 million. To date, this has saved BNL more than \$190,000 in fuel costs by switching to natural gas compared to the cost of the previously used fuel oil.
- LBNL equalized its electrical energy rates with Lawrence Livermore National Laboratory's (LLNL) rates, which have been historically lower. This change to the 3-Lab (LBNL, LLNL, and the Stanford Linear Accelerator Center) Rebilling Systems will save LBNL an estimated \$800,000 per year.
- The Richland Operations Office started its comprehensive energy management plan and entered into a utility agreement with BPA for energy management services.

At the end of FY 1999, DOE's utility purchasing function was moved from the Office of Field Management to FEMP's Departmental Energy Management Team. The active Utility Program has made continual progress in reducing the cost of utilities to a current \$.047 per kilowatt-hour. This has been accomplished with wheeling of low cost power from the Power Marketing Administrations to DOE sites, and competitive procurement of natural gas and electricity at a number of DOE sites. DOE has also pursued green power purchases at the following sites:

- NREL, commitment for wind power purchase;
- Richland Operations Office, completed study, action pending with a BPA rate case resolution; and
- Albuquerque Operations Office, Public Service Company of New Mexico completed a request for proposals for a solar plant that will eventually provide service to DOE sites.

## **Vehicles**

DOE has an ongoing program to improve vehicle efficiency, including acquiring alternative-fueled vehicles, downsizing vehicles when appropriate, upgrading preventive maintenance programs, improving maintenance techniques, expanding waste minimization programs, implementing driver awareness training, and providing employee outreach.

Fleet vehicles at a number of DOE sites were, or will soon be, converted from gasoline to methanol or dual fuel. Liquefied petroleum gas, liquefied natural gas, compressed natural gas, electricity, and biodiesel gas are some of the alternate fuels currently in use.

Most DOE sites have an ongoing employee commuter program. These programs promote using ridesharing and mass transit services, as applicable at each site. A transportation coordinator at each site promotes these efforts, as appropriate.

DOE has been turning over more of its fleet operations to GSA to take advantage of their vehicle programs. This provides the benefit of having an ever more efficient, and less costly to maintain, vehicle fleet.

## **Environmental Benefits of Energy Management**

DOE continued to focus on reducing CFCs by replacing CFC chillers with new higher efficiency, non-CFC chillers and refrigerant recovery programs. Other measures include fluorescent lamp recycling, procuring recycled goods and products such as printer/copier toner cartridges and paper products, reducing power plant emissions, and reducing automobile emissions through the use of compressed natural gas at many DOE sites. Soy-based inks, which are environmentally friendly, are used in DOE printing plants. Site-wide recycling of aluminum beverage cans, batteries, cardboard, paper products, and fluorescent lamps occurs at many DOE sites. Examples include:

- ANL found an outlet for recycling fly ash produced at the ANL steam plant. More than 700 metric tons per year is being converted into a by-product, saving \$40,000 to \$80,000 per year.

- The Savannah River Operations Office implemented the GeoSiphon Cell as a remediator of contaminated groundwater. This is an emerging technology developed on site, that is a reductive de-chlorination process, utilizing induced flow, to draw contaminated groundwater through a treatment cell. In addition to the positive effect on the environment there is a savings of \$1.20 per 1,000 gallons. A total of 12 chillers were replaced with 9 new, non-CFC chillers as part of a project to replace 37 major refrigeration units at the site.
- SPR has minimized biohazards by modifying its supply system. For example, aerosol spray painting has been banned. SPR eliminated the use of SPR-owned equipment containing polychlorinated biphenyls (PCBs). Also, the SPR completed an inventory of all utility-owned electrical equipment for PCB content. The amount of PCBs involved was documented, and plans have been developed to assure the PCBs are not introduced into the environment.
- ORNL replaced four chillers totaling 1,746 tons of rated capacity with more efficient, non-CFC chillers. The new chillers save approximately 20 percent in chiller energy. Four additional chillers will be replaced by FY 2003.
- Nevada Operations Office has replaced two 195-ton chillers. The Nevada Operations Office recycles all petroleum waste products at the Nevada Test Site by placing refined products back in service.

## **Energy Management Contact**

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## 5. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Health and Human Services reported a decrease in energy consumption in buildings of 14.6 percent in Btu per gross square foot compared to FY 1985.

**HHS Performance Toward Buildings Energy Reduction Goals**



**HHS Buildings Energy Use and Costs, FY99**

	BBtu	\$ (Thou.)
Electricity	1,112.2	19,654.0
Fuel Oil	206.3	1,339.0
Natural Gas	1,312.4	4,066.0
Propane	118.2	790.0
Coal	46.9	116.0
Purchased Steam	14.6	219.0
<b>Total</b>	<b>2,810.6</b>	<b>26,184.0</b>

While HHS is fine-tuning each of its operating components energy plans in order to fully meet Executive Order 13123 energy targets, further DOE funding for energy conservation projects would be very helpful to the success of the Departments program. Although HHS's estimates show that direct agency funding for projects in FY 2000 will be roughly 3.6 million dollars, this still falls short of the funding needed to meet the aggressive energy reduction goals. HHS will rely more on energy savings performance contracting (ESPC) and other alternative financing methods to meet its energy mandates. In FY 1999, four alternative financing agreements were signed to implement energy and water conservation projects that will save approximately \$1 million in annual energy costs. The outlook for FY 2000 is promising, as many more HHS facilities are expected to use ESPC or are in the process of investigating the benefits and impact of this contracting mechanism.

Preventative maintenance programs are widely used throughout HHS's Operating Divisions (OPDIVs) to maintain the highest efficiency output of mechanical equipment. The larger HHS facilities use energy management and control systems. These systems are continuously enhanced to increase their span of control and their energy saving capacity. The smaller facilities take advantage of stand-alone thermostatic controllers. Timers are used to start and stop HVAC equipment and control lighting.

The Indian Health Service (IHS) Albuquerque Area has a goal to replace existing pneumatic controls, in all Area hospitals with new direct digital controllers and computer-based energy management systems.

As of FY 1999, 30.2 percent of the HHS square footage has been audited. These audits have been performed by utility companies, energy service companies, in-house personnel, university engineering students, university Industrial Assessment Centers, and the DOE SAVEnergy Audits program. Approximately 30 percent of the total National Institutes of Health (NIH) space has been audited.

Energy and water conservation projects and initiatives performed during FY 1999 include:

- The Center for Disease Control and Prevention (CDC) Clifton Road facility in Atlanta, Georgia had a comprehensive audit completed as part of an ESPC. Several energy conservation measures were recommended including a lighting retrofit that will be completed in FY 2000.
- The Food and Drug Administration's (FDA) Winchester Engineering and Analytical Center (WEAC) in Winchester, Massachusetts implemented a lighting upgrade project.
- The FDA's National Center for Toxicological Research (NCTR) in Jefferson, Arkansas installed new cooling towers, fan and pump motors, variable frequency drives, and power factor corrections.
- An FDA laboratory in San Juan, Puerto Rico installed a new HVAC rooftop unit and energy-efficient lighting.
- The Indian Health Service (IHS) Albuquerque Area has installed a thermal groundwater-source loop system to a hospital that has both individual and rooftop heat pumps for heating and cooling.

- Several energy conservation measures were installed at various IHS facilities across the nation including lighting retrofits, boiler and chiller upgrades, HVAC system improvements, and window and building envelope upgrades.
- The Program Support Center's (PSC) Parklawn Building installed water conserving toilets and faucets and implemented a lighting retrofit. Expected annual savings are \$270,000 with a simple payback of five years.
- NIH is currently expanding its power plant to provide necessary utilities for new and existing buildings on its Maryland campus. During the design and construction phases of the facility renovation many energy conservation measures were installed. Annual estimated savings are \$1.59 million, or 6 percent of the annual energy costs.
- The NIH National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, North Carolina installed a new energy-efficient chiller.
- The NIH Rocky Mountain Laboratory in Denver, Colorado is undergoing a major renovation that will include energy-efficient equipment.
- The NIH Bethesda campus modified the chiller control software to allow the chillers to run at a reduced condenser water temperature of 65°F rather than 85°F during the off-summer months. The annual reduction in power use is estimated at 576 megawatts.
- The NIH's Gerontology Research Center (GRC) in Baltimore, Maryland saved approximately \$362,400 by adjusting building temperatures and turning off unused lights and equipment. A lighting retrofit is underway and a steam recovery unit is planned for installation in FY 2000.
- The Office of the Secretary (OS) plans to upgrade HVAC motors at the Hubert H. Humphrey Building during FY 2000.

#### **Solar and Other Renewable Energy**

In FY 1999, the HHS Energy Officer aggressively worked with the OPDIVs to explore the installation of renewable energy applications. The Assistant Secretary of Management and Budget wrote a memo to the OPDIV heads concerning the Million Solar Roofs Initiative and the importance of renewable energy to the

Federal government, taxpayers, and the environment. HHS continues to follow up on this memo with each OPDIV to ensure that the investigation of renewable technologies are included in all ESPC studies and analyses, comprehensive energy audits, and funding of energy efficiency projects.

IHS makes extensive use of renewable technologies. Examples include:

- An Aberdeen Service Area hospital installed a thermal protection system to prevent a dangerous overheating potential. This system cost about \$150,000 and was funded by the FY 1999 IHS non-recurring M&I funding.
- The National Renewable Energy Laboratory (NREL) awarded a grant to IHS to install four solar lights at the living quarters of the IHS Acoma-Canoncito-Laguna Hospital in New Mexico. NREL also awarded a grant to the Santa Fe Indian Hospital to study the refurbishment of a 20-year-old solar system.
- The IHS Billings Area is considering the installation of an experimental solar generator in Fort Washakie, Wyoming. The project was proposed by the local utility company.
- The IHS Phoenix Area is planning to install a flat plate heat exchanger at the San Carlos Indian Hospital, enabling the central cooling system to use chilled water directly from the cooling tower under certain weather conditions. Significant energy savings are expected.
- In FY 2000, the IHS Anchorage Area will install a groundwater source cooling system in the Alaska Native Medical Center (ANMC) to supplement the building chiller cooling capacity. The project will take 38°F groundwater through a heat exchanger to provide 44°F chilled water, in lieu of utilizing the existing three rotary screw chillers. The preliminary cost estimate for the project is approximately \$356,000 with a simple payback of 7 years. Savings will total more than \$50,000 per year.

Also in FY 2000, the PSC Parklawn Building will study the application of a solar wall to preheat combustion air for the house boiler. A roof-top PV collector system for domestic hot water heating will also be analyzed.

In addition, NIH will perform feasibility studies in FY 2000 to determine the potential application of renewable energy technologies at its sites.

### **Showcase Facilities**

The 1999 HHS showcase facility is the NIH Consolidated Laboratory Facility, Building 50 in Bethesda, Maryland. The energy-efficiency technologies installed at this site will save more than \$1 million annually, which is more than 40 percent of the potential energy use without the measures.

### **Personnel Development**

Six FY 1998 HHS Energy and Water Management Awards were awarded to HHS personnel for outstanding achievements in the conservation and efficient use of energy and water. The program is administered by the Division of Policy Coordination, located within the Office of Facilities Services, Assistant Secretary for Management and Budget.

Night-time audits were performed in three HHS facilities at the end of FY 1999. The audits were desk-to-desk with the purpose of increasing public awareness of energy efficiency in the workplace. Notes were left on employees' desks that either commended them for having all lights and office equipment turned off, or reminded them to do so. Stickers, magnets, and information cards were also placed at employees' desks and work areas.

There are two employee incentive programs at OS; the Special Achievement Award and On The Spot Awards. Employee excellence is recognized, including energy related performance. The HHS energy officer and contracting staff were awarded a 1999 Federal Energy and Water Management Award.

HHS energy and facility related personnel receive energy management training based on scheduling opportunities and available funding.

HHS held a one-day energy seminar in FY 1999. Energy managers and engineers from around the country attended the seminars to learn the latest on federal energy efficiency. Speakers from DOE, NREL, HHS, and private industry presented a wide array of energy efficiency topics including alternative financing using actual HHS case studies, renewable energy opportunities, water conservation, and new technologies.

The IHS energy coordinator continues to offer a one-week course for the IHS Area engineers and facility managers as well as other HHS personnel. At the

completion of this course, the attendees have the option of taking a four-hour exam administered by the Association of Energy Engineers for energy manager certification.

IHS and Washington State University teamed up to offer a 3-day hands-on HVAC training seminar at four IHS Portland Area facilities. The seminar discussed topics which will familiarize facility maintenance staff with energy efficient HVAC operations and maintenance and trouble shooting procedures.

### **Funding**

The HHS energy projects completed or began in FY 1999 have been funded by direct agency expenditures, through ESPCs and utility partnerships, and GSA delegated agency funding. Utility rebates were requested wherever possible. The total amount invested in energy and water efficiency projects in FY 1999 was \$4.8 million, which was more than twice the funding spent in FY 1998. In FY 2000, direct agency funding for energy and water projects is estimated at \$3.6 million.

OPDIV energy efficiency and water conservation project funding was reported as follows:

- CDC spent \$196,000 on energy conservation projects primarily consisting of HVAC replacements and upgrades. ESPC was used for lighting upgrades.
- Direct agency funding of \$265,000 was spent on FDA laboratory upgrades consisting of HVAC and lighting improvements. A power factor correction project was also directly funded at the FDA NCTR. The project cost was approximately \$35,000 and is expected to have a simple payback period of two years.
- IHS spent \$4 million on projects covering the full spectrum of energy efficiency measures. The projects included implementation of a thermal ground-source heat pump loop system to replacing large central boilers and chiller, lighting system upgrades, boiler and chiller replacements, building envelop improvements, building control system installations and upgrades, medical waste incinerator upgrade, domestic hot water heater replacements, air compressor upgrade, window replacements, HVAC system upgrades to energy efficient models fuel source conversions, free cooling system installation using flat plate heat exchanger, and energy auditing.

- OS used \$45,400 of direct agency funding to upgrade lighting systems, track utility consumption, improve HVAC equipment, and evaluate generator efficiency and operations. Major HVAC equipment cleaning was completed with \$70,000 of GSA delegated agency funding.

#### **Energy Savings Performance Contracts**

FY 1997 was the inaugural year for HHS involvement in ESP type-contracts, and since that time five ESP-type contracts have been signed. Seven more are expected to be signed in FY 2000.

- CDC facilities in Atlanta will begin a super ESPC in early FY 2000. This will be a contractor-identified delivery order and should result in a completed delivery order by FY 2001. The Interagency Agreement and Memorandum of Understanding (MOU) have already been signed by both CDC and DOE.
- The CDC office in Cincinnati has interviewed Sempra Energy regarding the use of a super ESPC. Several ideas were discussed such as lighting, boiler and chiller retrofits, along with reducing the demand change. The target date for having a delivery order in place is the 4<sup>th</sup> quarter of FY 2000 or the 1<sup>st</sup> quarter of FY 2001.
- The IHS Aberdeen Area and Seattle Engineering Services has signed an MOU with DOE for implementation of a Super ESPC delivery order at 28 facilities in North and South Dakota. The IHS ESPC Team has issued a Task Order to Johnson Controls to perform a detailed energy audit in order to verify energy saving opportunities prior to awarding a contract. The delivery order should be awarded in February 2000. The IHS Oklahoma City (OKC) Area is also investigating Super ESPC. The Area office has received a proposal for energy conservation measure at three hospitals and one health center. However, since many IHS hospitals and clinics are being turned over to the Tribes, the OKC Area is awaiting a decision from the Office of General Counsel on whether the agency should enter into long-term Super ESPC contract.
- The IHS Oklahoma Area is implementing a form of ESPC, without guaranteed savings, for the Creek Nation under a Performance Agreement for Comfort from Trade (PACT) Program. The detailed facility audit identified several energy conservation measures for the Creek Nation Community Hospital in Okemah and three nearby health clinics. Lighting upgrades, two new air-

cooled chillers, three new air handling units, a reduction in kitchen outdoor air quantity, and a new direct disposal control (DDC) system will be installed as a result of this audit.

#### **Utility Partnerships**

In FY 1997, the NIH Frederick Cancer Research and Development Center (FCRDC) located in Frederick, MD housed within the DOD Fort Detrick campus partnered with DOD in developing and signing a Basic Order Agreement (BOA) with the local utility (Allegheny Power). Implementation of the energy conservation measures began in FY 1999. The total cost of the targeted projects is \$2.3 million with a total savings of \$3.2 million and a payback of 10 years.

NIH is also analyzing the use of a GSA Area Wide Public Utilities contract with PEPSCO Services to perform energy audits and evaluate the energy conservation opportunities at buildings on its main campus. The National Library of Medicine is the first building to receive a comprehensive audit and a feasibility study on the identified energy conservation measures (ECM). Contractual negotiations are underway to implement the ECMs.

NIH has also established an electricity curtailment program with PEPSCO at a leased facility in Rockville, Maryland, and funded the installation of emergency generators using natural gas instead of fuel oil. These generators are used as peak shaving devices by generating electric power during PEPSCO peak use curtailment periods resulting in annual savings of \$18,000.

CDC in Atlanta, Georgia, has signed a GSA Area Wide with Georgia Power to perform energy efficient lighting upgrades at the Clifton Road Facility.

FDA is involved in three separate utility partnerships:

- The Winchester Engineering and Analytical Center in Winchester (WEAC) Massachusetts, financed a lighting replacement project through the local utility. The project was completed in January 1999, with estimated savings of approximately \$10,000 (a payback of roughly three years).
- The National Center for Toxicological Research (NCTR) in Jefferson, Arkansas, has entered into GSA Area Wide with the local utility company to complete several comprehensive energy projects including energy efficient lighting, building envelope improvements, HVAC upgrades, cooling plant improvement, energy management control

system replacement, and electricity and natural gas procurement. This contract will save an estimated one million dollars per year and reduce energy usage by approximately 25 percent.

- FDA contracts is currently reviewing ESPC with PEPCO Services for the Module One facility in Laurel, Maryland. This ESPC vehicle will cover projects such as chiller replacement and HVAC equipment and systems upgrades and is anticipated to be signed in FY 2000.

PSC has entered into a GSA Area Wide Public Utilities Contract with PEPCO Services at its Parklawn Building, in Rockville, Maryland. Two projects were selected for implementation in FY 1999 under this contract. The first project was a large lighting upgrade which replaced 26,200 fluorescent light fixtures with energy efficient T-8 fixtures and electronic ballasts. An additional 322 incandescent down lights were retrofitted with compact fluorescent kits. This project is expected to save \$211,000 annually and received a \$138,000 utility rebate. The second project involves the replacement of 360 toilets with water saving models, which will decrease annual water and sewer costs by \$58,000 and save roughly 6.3 million gallons of water each year. PSC reports the economic payback of these projects, including rebates, is approximately five years.

The Office of the Secretary is investigating a GSA Area Wide Public Utilities contract with Washington Gas Energy Services to implement a lighting project that involves both delamping and retrofits. The contract is targeted for signing in late FY 2000.

The PSC Parklawn Building purchased deregulated gas in FY 1998 from Washington Gas Energy Services, saving around \$17,000 for the year. The facility remained with Washington Gas in FY 1999, and in FY 2000 will investigate the procurement of natural gas through DOD's Defense Energy Service Center.

The IHS Oklahoma Area also signed a contract in FY 1998 to purchase deregulated natural gas. In FY 1999, annual savings totaled only \$3,400 due to a mild winter and rate bidding issues. Estimated annual savings, under standard conditions, should approach \$16,000.

#### **Procurement of Energy Efficient Products**

HHS contracts offices follow the guidelines as established in the Code of Federal Regulations when purchasing energy efficient equipment. OPDIVs have established separate procedures that address recycling paper, motor oils, fly-ash content in concrete materials, operations and maintenance products, ENERGY STAR®

computers, and many other products. When possible, HVAC equipment is purchased with the highest efficiency ratings to take advantage of utility rebates and is selected and sized near peak efficiency points. The handbook from the Federal Procurement Challenge that provided information on how to buy energy efficient products has been distributed to all HHS facility managers.

The OS procurement office is analyzing a model purchasing and procurement policy developed by DOE FEMP. In FY 2000, the policy will be reviewed and tailored for all HHS OPDIVs in order to meet Executive Order 3123 requirements on energy efficient products and services.

At the IHS Billings Service Area, new energy efficient products are reviewed by the Facilities Management Branch engineers using the "SweetSource" product information catalog. These computerized CD catalogs are updated and provided on a quarterly basis by the contracted vendor. The IHS Bemidji, Portland, and Tucson Service Area have written guidelines and specifications on the procurement of energy efficient equipment.

#### **Environmental Benefits of Energy Management**

Facilities in each HHS OPDIV have completed, planned, or are in the process of chiller replacement. New non-CFC chillers have been installed that not only adhere to the Clean Air Act Amendment of 1990 and the Clinton Climate Change Action Plan, but operate at increased efficiency, thereby saving energy. HHS facilities have also instituted CFC reduction programs for other HVAC equipment.

Lighting retrofit and upgrade projects in CDC, FDA, IHS, and PSC facilities resulted in the disposition of obsolete bulbs and ballasts in accordance with local Hazardous Waste Management codes and CERCLA (Comprehensive Environmental Response, Compensation and Liability Act). In some cases, the fluorescent light tubes were recycled. Estimates show that the PSC lighting project will eliminate 367 metric tons of carbon emissions.

The CDC water conservation project completed in FY 1998, is saving approximately 15 million gallons of water per year. This project involved the installation of a recirculating cooling tower to provide chilled water to HVAC water source cooling equipment. The system previously used cold chiller water that was dumped down the sewer drain after only one pass through the equipment.



The use of a thermal groundwater-source heat pump, closed-loop system for heating and cooling at the Albuquerque IHS hospital eliminated the need for natural gas boilers and centrifugal chillers, thus reducing the emissions of the boiler and chiller operation. A groundwater-source cooling system is also targeted for implementation in FY 2000 at an IHS hospital in Anchorage, Alaska. The project proposes to use groundwater from a drilled well adjacent to the energy plant, through a heat exchanger to provide chilled water, thereby eliminating the use of three 335-ton rotary screw chillers. Significant energy consumption and carbon emission reductions are expected.

The NIH Main Campus has made significant strides in reducing overall source emissions by converting the central boilers from petroleum-based fuel to natural gas and upgrading the control and burner systems for more efficient operation. From 1992 to 1996, the power plant's total boiler emissions were reduced from 866 to 144 tons (83 percent reduction). This includes reductions of nitrous oxide (NO<sub>x</sub>) from 252 tons to 105 tons over the same period through the installation of low-NO<sub>x</sub> burners on existing boilers. These emission reductions are being used as offsets against anticipated emissions from a proposed 23-megawatt cogeneration system for which the State of Maryland has issued an Air Quality Permit to Construct.

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## 6. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Housing and Urban Development reported a decrease in energy consumption in buildings of 9.1 percent in Btu per gross square foot compared to FY 1985.

**HUD Performance Toward Buildings Energy Reduction Goals**



**HUD Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	84.8	1,814.2
Natural Gas	0.3	2.7
Purchased Steam	21.2	317.5
Total	106.3	2,134.4

In order to meet the goal of 20 percent reduction per square foot by the year 2000 as required by the National Energy Conservation Policy Act, Section 543 (a), HUD plans to implement the following energy conservation measures (ECM's) during FY 2000:

- Lighting retrofit throughout building. Change T-12, 34 watt with magnetic ballast fluorescent lights with T-8, 32 watt lights with reflector and electronic ballast.
- Replace original existing cafeteria steam dishwasher, two hot top ranges, and one griddle top range with an energy efficient dishwasher, two open burner skeleton ranges, and a char broiler.

HUD follows the operations and maintenance (O&M) procedures as outlined in GSA's Building Maintenance Management Handbook and Energy Management Handbook. These handbooks are used to implement the rules and regulations for Federal Energy Property Management. In addition, updated

written guidelines are issued to the O&M contractor annually to ensure operating procedures for heating, ventilation and air conditioning (HVAC) coincide with newly implemented energy initiatives.

The HUD Headquarters Building currently uses FEDS software to perform energy audits when analyzing energy data to develop appropriate and cost effective energy conservation projects and initiatives. Highest priority is given to the energy conservation measures which show the quickest payback (10 years or less) and/or energy savings.

### Solar and Other Renewable Energy

The HUD Headquarters Building currently has no clear and renewable energy projects, however, HUD Headquarters plans to participate in these types of energy initiatives through DOE as they are available.

### Showcase Facilities

The HUD Headquarters Building is a DOE Government Showcase Facility. An audit will be performed during FY 2000 to incorporate advanced technologies and practices for energy efficiency, water conservation, and solar and other renewable energy sources.

### Personnel Development

HUD's energy coordinators have attended the ESPC workshop given through the DOE Federal Energy Management Program.

Three HUD employees continue to be recognized for their contributions for energy management programs through the Federal Energy Management Program (FEMP) "Y ou Have the Power" campaign.

### Funding

Funding for HUD's ECMs has been provided by the GSA Energy Conservation Program, by DOE, and through HUD's repair and alteration funds as they are available.

### Energy Savings Performance Contracts

HUD tried to enter into two ESPCs in the past. The first ESPC was canceled in FY 1991 when GSA decided to incorporate a lighting retrofit as part of the building wide Sprinkler Installation Project. The second ESPC was canceled in FY 1996 when GSA replaced HUD's main chillers as part of the chlorofluorocarbon (CFC) reduction program.

**Utility Partnerships**

During FY 1999, PEPCO and Washington Gas, two local utilities performed energy audits at the Headquarters building. The two energy conservation measures (total cost, \$1.1 million) scheduled for FY 2000 were identified in these audits and will be implemented using the GSA Public Utilities Area Wide Contract.

HUD also implements a self imposed load curtailment program and participates in PEPCO's Load Curtailment Program in order to maintain building demand at a predetermined level.

HUD will be contracting the local water utility to perform a water audit during FY 2000.

**Procurement of Energy Efficient Products**

The products purchased during FY 1999 were in compliance with all Federal recommendation regarding energy efficiency and were covered by the EPA/DOE ENERGY STAR® program.

**Environmental Benefits of Energy Management**

HUD Headquarters has implemented several environmentally friendly energy conservation measures which include the following:

- HUD currently recycles plastic, glass, paper, cardboard, and polystyrene.
- Replaced existing CFC chillers with non-CFC energy efficient chillers.
- Installed thermostatic controls on perimeter fan coil units throughout the building to maintain temperature standards in exterior offices.
- Installed solar film on 1,584 exterior windows to limit ultraviolet rays and for better control of interior temperatures.

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## 7. DEPARTMENT OF THE INTERIOR

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Interior Department reported a decrease in energy consumption in buildings of 15.7 percent in Btu per gross square foot compared to FY 1985.

**Interior Performance Toward Buildings Energy Reduction Goals**



### Interior Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	1,546.4	35,605.3
Fuel Oil	486.6	2,508.6
Natural Gas	1,352.3	4,863.0
Propane	348.5	2,390.7
Coal	0.7	0.4
Purchased Steam	31.6	470.1
Other	28.5	149.0
<b>Total</b>	<b>3,794.6</b>	<b>45,987.1</b>

The Interior Department Energy Management Plan for Buildings and Facilities, revised in June 1995 to meet requirements of EPACT and Executive Order 12902, provides guidance to its Bureaus in establishing and implementing energy management programs.

In FY 1999, the Department established a renewed emphasis on energy management through an Interior Management Leadership Program (EML). The Departmental Energy Conservation Committee developed recommendations for implementing energy efficiency and green energy-saving technology initiatives Department-wide.

The Bureau of Reclamation continued in FY 1999 to evaluate prioritization surveys to determine facilities for comprehensive audits. Energy conservation projects in Reclamation are usually financed via the operations and

maintenance funds identified for energy conservation as a working capital fund.

The Fish and Wildlife Service (FWS) nominated 27 sites for energy audits utilizing the SAVEnergy Audit program conducted through DOE's Federal Energy Management Program (FEMP). Through FY 1999, six of 27 nominated surveys were completed.

The U.S. Geological Survey accomplished preliminary audits at the Powell Building in Reston, Virginia and condition assessments at the Patuxent Wildlife Research Center, Maryland. A comprehensive audit has been completed for the EROS Data Center in South Dakota.

The National Park Service (NPS) formed an 'energy partnership' with James Madison University (JMU). The program enlisted students from JMU's Integrated Science and Technology Program to work with NPS engineers. Projects included energy surveys, developing an innovative database to track energy consumption and costs, and identification of a renewable energy project.

In April 1999, a memorandum of understanding was signed between DOE and the Department to further solidify the partnership between NPS and DOE. This new program is called the "Green Energy Parks Program: Making the National Parks a Showcase for a Sustainable Energy Future (GEPP)." The program promotes the use of energy efficient and renewable energy technologies and practices in the National Parks, and educates the visiting public about the cost and environmental benefits of energy improvements.

Preliminary audits were conducted in the Main Interior Complex which identified lighting opportunities. Other bureaus also reported using the FEDS Level II software to perform energy audits.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

#### Bureau of Reclamation:

- Xeriscaping was used at the newly constructed Centennial Job Corp Center in Nampa, Idaho.
- The Hungry Horse Field Office, Montana continued to retrofit their lighting system.
- New insulation, siding, double pane windows, and new doors were installed in the crew quarters at

Jackson Lake Dam, Wyoming.

- The Folsom Dam, California HVAC system was upgraded.
- Energy-efficient water heaters were installed at the Lake Berryessa dormitory. Also, a non-operational solar hot water system was evaluated for use.
- A lighting retrofit at two facilities in Boulder City, Nevada.
- The heating and cooling system at Carl Hayden Visitors Center has been replaced. The system is saving approximately 31,000 kilowatt-hours and \$24,000 per month during the cooling season and 20,000 kilowatt-hours and \$1,600 during the heating season.

Fish and Wildlife Service:

- The Mora National Fish Hatchery and Technology Center of the Southwestern Fisheries Technology Center in New Mexico has incorporated extensive water reuse into the design of the hatchery.

U.S. Geological Survey:

- At the John Wesley Powell Federal Building in Reston, VA, maintenance on existing equipment and systems was completed to maintain peak operating efficiency. The building automation system is utilized to operate systems in accordance with the building operating plan, reducing equipment run times, adjusting space temperatures, and shedding loads during peak periods.
- Projects to be completed at the EROS Data Center, Sioux Falls, South Dakota during FY 2000 include the replacement of an uninterruptible power supply and a lighting retrofit. Estimated annual savings are \$37,800.
- Various Biological Resources Division Science and Research Centers have undertaken to install several energy conservation measures including lighting retrofits, HVAC system upgrades, new fume hoods, boiler and chiller replacements, and installation of energy-efficient office equipment.

Bureau of Land Management:

- The Administrative Office Building for the Alaska Fire Service upgraded its insulation, replaced its roof, and conducted a lighting and HVAC retrofit.

- The Northern Field Office in Fairbanks, Alaska conducted a lighting retrofit and replaced the roof and insulation.
- Little Sahara and Fillmore Fire stations in Utah had a lighting retrofit and low-e windows installed.
- The Fillmore, Utah Field Office replaced a HVAC roof-mounted unit. Both the Lower Snake River District Office in Idaho and the Roseburg, Oregon District Office also upgraded their HVAC systems.
- The Colorado State Office installed a natural gas heating system and tinted window coverings.
- The Saguache Field Office improved insulation and air flow.

### **Solar and Other Renewable Energy**

The Department has become a leader in ground source heat pumps, with seven projects installed since 1994, including the \$11 million, 42,000 square foot Prairie Learning Center in Prairie City, Iowa, and the \$6.3 million, 22,000 square foot Visitor Center in the Wichita Mountains Wildlife Refuge, Oklahoma.

The NPS uses an innovative strategy to augment funding for a number of photovoltaic projects. Photovoltaic installations are used as training sessions to provide participants with hands-on training including site selection, assembly, battery connections and wiring, and maintenance. Training fees are used to subsidize the project cost. In FY 1999, this strategy was used to install photovoltaics at Horn Island, Gulf Shore National Seashore.

During FY 1999 photovoltaic projects were installed at the following 13 NPS sites:

- Grand Canyon National Park, Arizona;
- Alcatraz Island National Historic Site, California;
- Gulf Islands National Seashore, Florida;
- Hawaii Volcanoes National Park, Hawaii;
- Indiana Dunes National Lakeshore, Indiana;
- Isle Royale National Park, Michigan;
- Cape Lookout National Seashore, North Carolina;
- Round Top Mountain at Dinosaur National Monument, Utah;
- Rainbow Point, Bryce National Park, Utah;
- Manti-LaSal National Forest, Utah;
- Zion National Park, Utah;
- Lake Roosevelt National Recreation Area, Washington; and,
- USS Arizona visitor's site parking lot.

These projects included photovoltaic powered lights, trailer-mounted systems, power systems, and solar water heating systems.

During FY 1999, the Bureau of Indian Affairs installed several renewable energy systems:

- The Sherman Indian School in Riverside, California installed a new photovoltaic system that can supply 30 kilowatts of power and will be connected to the power distribution grid. The project will also be used as an educational and training resource.
- The Truxton Canyon Agency installed three photovoltaic systems at facilities in Supai, Arizona, on the Havasupai Indian Reservation. Power will be provided to the school, jail, and government housing. This will also be used for training.
- The Seba Dalkai school in Arizona installed a building-integrated photovoltaic system to help prevent blackouts and brownouts in the school's computer-based curriculum.
- The Fort Apache Agency installed five wind turbines in Arizona to provide reliable power for fire lookout towers in the White Mountains.

The Bureau of Reclamation's Mid-Pacific Region installed grid tied solar panels at the Water Education Center, Folsom, CA. Financial incentives and other services provided by utilities are utilized whenever possible to promote the use of renewables. For example, Sacramento Municipal Utility District and the Western Area Power Administration subsidized the cost of the solar panels installation at the Education Center and the donation of two electric buses from Sacramento County. Reclamation is also installing a solar lighting system for outdoor lights at Davis Dam, Arizona.

Reclamation, as the nation's sixth largest producer of hydroelectric power, is committed to provide hydro power in a cost effective manner and to protect the water resources necessary to produce this power.

In FY 1999 the Bureau of Land Management completed 11 photovoltaic projects. Six were for facility power, four for water pumping projects, and one for lighting.

The U.S. Geological Survey has installed 11 solar powered emergency telephones in parking lots in Reston, Virginia.

The Fish and Wildlife Service (FWS) installed several renewable projects during FY 1999:

- The Alchesay National Fish Hatchery in Arizona repaired a solar-powered early warning system. This system provides notice to downstream facilities of an impending flood.
- The Farallon National Wildlife Refuge in California completed a photovoltaic system which converted the diesel generator system to a 6.84 kilowatt photovoltaic system with generator back-up. Fuel usage fell from 5,000 gallons per year to 600 gallons. Operations and maintenance savings are estimated at \$82,000 annually. Annual energy savings are estimated at 61 million Btu.
- The Cusano Environmental Education Center installed a geothermal heat pump.
- The John Heinz National Wildlife Refuge in Pennsylvania included a geothermal system in the design of a new education/headquarters building.
- The Madison Wetland Management District in South Dakota replaced an existing solar system and heat pumps with a geothermal heat pump system.
- Five wind energy projects have been constructed at National Wildlife Refuges in Brazoria and Hagerman, Texas, Harris Neck, Georgia, Maxwell, New Mexico, and Hawaii. These are not currently operational due to high maintenance costs.

Proposed FWS renewable projects for FY 2000 include a photovoltaic power system at the Havasu National Wildlife Refuge in Arizona and a solar hot water system at the Imperial National Wildlife Refuge also in Arizona.

The Department continues to work with DOE and the Corporation for Solar Technology and Renewable Resources (CSTRR) on the purchase of 'green' electricity.

#### **Showcase Facilities**

The Department designated the National Conservation Training Center (NCTC) in West Virginia as a new construction energy saver showcase. Passive solar energy strategies and energy-efficient technologies and recycled materials were incorporated in the design and construction.

Two FWS buildings were recognized as showcases in 1998. The Wichita Mountains Visitor Center in Indianola, Oklahoma displays earth coupled heat pumps. The Prairie Learning Center in Prairie City, Iowa displays earth coupled heat pumps along with earth sheltering, celestary lighting, low-flow plumbing

and wetlands waste water treatment.

Reclamation has four showcase facilities. Glen Canyon Dam Visitor's Center demonstrates energy conservation within a hydroelectric generating facility. Lighting retrofits and occupancy sensors are being installed throughout the facility. Toilets were replaced with low-flush units, single pane windows with insulated glass, and the existing solar hot water heating system was repaired.

The Denver Federal Center showcase facility is a joint effort between Reclamation, GSA, DOE, EPA, the local water utility, and four manufacturers of water-saving devices. This 2-year project demonstrates and evaluates water conservation technologies and provides a learning center for other Federal agencies, private organizations, and the general public. The project will also document the performance of water conservation devices, determine life-cycle cost savings, and determine if improvements are needed before deployment in the Federal sector. An irrigation control system was also installed, and a xeriscape garden has been planted.

Reclamation's Pacific Northwest Region showcase facility is the new Centennial Job Corps Center in Nampa, Idaho. A dedication ceremony for the new center was held in October 1997. Included at the October dedication ceremony was an exhibit that featured the energy-efficient and water-conservation technologies.

The Davis Dam Building in Bullhead City, Arizona, highlights lighting and electric savings opportunities.

NPS's showcase is the Golden Gate Club at Golden Gate National Recreation Area in California. The U.S. Geological Survey's EROS Data Center's Mundt Building in South Dakota exhibits mechanical upgrades. No new showcases were identified in FY 1999.

#### **Personnel Development**

Several bureaus have developed energy management workbooks and training packages covering the various energy-efficiency and renewable energy technologies. These are helpful in raising awareness and providing educational opportunities for employees and have resulted in the sharing of ideas and promotion of energy conservation management.

Energy managers involved in building energy efficiency and water conservation have attended workshops offered by DOE's Federal Energy Management Program. Several have also attended training offered by other organizations such as GSA, EPA, the Association

of Energy Engineers, public utilities, and Bureau energy coordinators meetings. Energy managers are encouraged to attend as much training as local funding will allow.

Both the NPS and the FWS were recognized for excellence in the area of renewable energy at the 1999 Federal Energy and Water Management Awards.

#### **Funding**

The Department funded \$1.73 million in retrofit and capital equipment for FY 1999. Estimated project funding for FY 2000 is \$900,000 and \$700,000 for FY 2001. As in previous years, the Department funding for retrofit and capital improvements result from expenditures from the Bureaus' operations, maintenance, construction, and rehabilitation funds.

During FY 1999, NPS committed the following to support the Green Energy Parks program: \$500,000 to fund the planning and implementation of sustainable energy parks in 20 parks around the country, and \$75,000 to jointly fund with FEMP a university-based audit program that will conduct audits in 14 parks by September 30, 2000.

DOE committed nearly \$1 million in FY 1999 to the Green Energy Parks program. The Clean Cities and Regional Biomass programs contributed \$500,000 to fund acquisition of alternative fuel vehicles. FEMP contributed \$100,000 to fund energy projects, and \$75,000 to the university audit program. FEMP also provided a minimum of \$150,000 in technical assistance to for the implementation of energy projects.

In FY 1999, the National Renewable Energy Laboratory provided \$35,000 in funding for renewable energy opportunity assessments on 20 FWS field stations. The assessments will be made using the Federal Renewable Energy Screening Assistant software and other analysis methods.

The Fish and Wildlife Service also applied for FEMP Renewable Energy Project Funding for two projects (a 10 kilowatt wind generator at Erie National Wildlife Refuge in Pennsylvania and a 40 kilowatt wind generator in Prime Hook National Wildlife Refuge in Delaware) in FY 1999. The projects were not selected for funding.

#### **Energy Savings Performance Contracts**

ESPCs currently in place are lighting projects at the National Park Service's Statue of Liberty and Ellis Island National Monument, and three Bureau of Reclamation sites including Weber Basin Job Corp Center, Colbran Job Corp Center, and the Provo Area

Office.

The use of the indefinite delivery, indefinite quantity contracts developed by NPS in conjunction with DOE is expected to increase familiarization with ESPCs and hopefully increase the number of ESPCs in the Department.

Presently, at the Lake Mead National Recreational Center in Nevada, NPS is exploring the possibility of building five park entrance stations that would be powered by photovoltaics and heated by ground source heat pumps. NPS is very interested in using DOE's technology-specific, photovoltaic Super ESPC to complete this project.

#### **Utility Partnerships**

NPS and the Pacific Gas and Electric Company negotiated an innovative demand side management contract that pays NPS for energy saved. Now in its fifth year, savings are approaching \$1 million.

Each Reclamation office is encouraged to periodically check with their utility to determine if any incentives are being offered.

The U.S. Geological Survey, as an ongoing part of their energy and water management program, consults with servicing utilities at least annually to ensure that each facility has the lowest possible rate schedule. Utilities are consulted about incentive and rebate opportunities. High energy-use systems are scheduled to take advantage of off-peak rates.

Fish and Wildlife Service field stations also maintain contact with their local utilities in order to obtain any available demand-side management services.

#### **Procurement of Energy Efficient Products**

The Department is currently making every effort within budgetary limitations to implement applicable rules and regulations regarding procurement of energy-efficient goods and services.

#### **Alternative Fuel Vehicles**

The Bureau of Land Management introduced a fleet of 75 bicycles that are used in lieu of motor vehicles at Fort Wainwright, Alaska. The bicycles save thousands of dollars in fuel and maintenance, and provide exercise for employees. At other bureau sites, the use of mass transit and car pooling is encouraged, and a proposal to reduce fuel consumption was presented to bureau Deputy State Directors for Administration.

During FY 1999, NPS established a several initiatives in partnership with the Department of Transportation,

including:

- Grand Canyon National Park; natural gas and electric transit vehicles, bike trails, and a fixed rail system.
- Zion National Park; propane buses.
- Yosemite National Park; two electric buses with plans for a multi-modal system.
- Golden Gate National Recreation Area currently has an electric tram and is pursuing a multi-modal system including water-based transit.
- Cape Cod National Seashore acquired two hybrid electric buses to replace aging vehicles.

#### **Environmental Benefits of Energy Management**

Environmental and energy education efforts are being implemented on a daily basis and include information about energy and water conservation needs, purchase of energy-efficient equipment, replacing lighting and plumbing fixtures with energy/water efficient equipment, and entering into demonstration projects and partnerships with others.

At the request of the Department of the Interior's Management Council, a task force of bureau energy managers was convened to develop recommendations for implementing energy efficiency and green energy-saving technology initiatives Department-wide. The recommendations help provide energy management leadership and will be incorporated into the Departmental Energy Management and Water Conservation Plan for Buildings and Facilities.

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## 8. DEPARTMENT OF JUSTICE (DOJ)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Justice reported a decrease in energy consumption in buildings of 40.5 percent in Btu per gross square foot compared to FY 1985.

**Justice Performance Toward Buildings Energy Reduction Goals**



**Justice Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	3,224.1	53,471.5
Fuel Oil	104.4	639.8
Natural Gas	4,393.4	19,681.3
Propane	10.6	4.5
Coal	62.9	123.0
Purchased Steam	249.6	2,734.7
Other	2.0	0.0
<b>Total</b>	<b>8,047.0</b>	<b>76,654.8</b>

The Bureau of Prisons (BOP) funded and completed six energy audits in FY 1999, bringing its total number of completed audits to 70. An additional four audits will be funded in FY 2000. The remaining institutions which have not been surveyed are primarily institutions that have been activated within the past five years and already include energy conservation design features.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

Bureau of Prisons:

- Federal Correctional Institution (FCI) Sandstone, Minnesota. This project entails the installation of an energy management system. Projected annual energy savings are in excess of 48 billion Btu with

the expected payback of the initial investment projected to be in the second year of operation.

- United States Medical Facility for Federal Prisoners, Springfield, Missouri. Project elements include the replacement of an air conditioning unit with an energy-efficient model, and a lighting retrofit. Projected annual savings in electrical consumption are estimated at 400,000 kilowatt-hours with an associated cost savings of more than \$15,000. Simple payback is expected to occur in four years.
- FCI Florence, Colorado. Lighting controls were installed and are expected to reduce electrical consumption by over 1 million kilowatt-hours per year, with associated electrical charges expected to decrease by approximately \$45,000 annually. Payback is expected in year two. Also at FCI Florence, water saving devices for showers and faucets were installed. Natural gas consumption will decrease by more than 96,000 terms annually, with attributable annual cost savings of more than \$18,000. Savings from the decrease in water consumption are estimated to be in excess of \$290,000 per year. Payback will occur in one year.
- FCI Englewood, Colorado. A lighting retrofit will produce estimated annual savings of more than 740,000 kilowatt-hours and \$37,000. Simple payback will occur in the sixth year.
- United States Penitentiary (USP), Leavenworth, Kansas. New HID high mast lights were installed with projected energy savings of more than 200,000 kilowatt-hours and \$17,000 per year. Simple payback will occur in year five.
- Federal Detention Center, Miami, Florida. A lighting retrofit will produce estimated annual savings of more than 300,000 kilowatt-hours and \$20,000. Simple payback will occur in year five.
- FCI Seagoville, Texas. A lighting retrofit will produce estimated annual savings of more than 640,000 kilowatt-hours and \$25,000. Simple payback will occur in year three.
- Metropolitan Detention Center, New York, New York. A lighting retrofit will produce estimated annual savings of more than 75,000 kilowatt-hours and \$8,000. Simple payback will occur in year seven.
- FCI Allenwood, Pennsylvania. A lighting retrofit

and the replacement of exit signs with LED signs will produce estimated annual savings of more than 125,000 kilowatt-hours and \$9,000. Simple payback will occur in year ten.

- USP Marion, Illinois. Energy-efficient windows were installed with annual energy savings in excess of nine tons of coal. Payback will occur in year eight.
- Federal Prison Camp, Yankton, South Dakota. A HVAC system upgrade and improvements to the energy management system will produce estimated annual savings of more than 54,000 kilowatt-hours with an annual reduction in utility charges and maintenance. Payback will occur in year 11.

#### Federal Bureau of Investigation (FBI):

- In addition to the \$1.8 million energy management system contract to be awarded in FY 2000, the FBI is implementing additional energy conservation projects at FBI Headquarters in Washington, DC. These include installing new high-efficiency lighting in garages, installing high-efficiency motors and variable-speed drives for pumps, and the installation of a new air handler with a high efficiency motor for the gymnasium. An energy conservation program was also installed to centrally shut off perimeter office lighting during non-office hours.
- Equipment at the FBI Academy in Quantico, Virginia that used number 2 fuel oil is being converted to natural gas. Also, chillers are being replaced with more efficient units.
- The Strategic Information and Operation Center at FBI Headquarters has been designed and constructed using variable frequency drives on chilled water pumps, high efficiency compressors and dimmable electronic ballasts.

Six new energy-efficient refrigerated rooms are planned to replace existing equipment at the FBI Headquarters cafeteria, and new, more efficient, escalator motors are to be installed in 2004. Funding has been requested for replacement of the original Headquarters elevator generators in FY 2000.

#### Drug Enforcement Administration (DEA):

- DEA is conducting a lighting retrofit at its Headquarters facility that should be completed during FY 2000.
- 320 500-watt sodium vapor lamps have been

replaced with eight-foot, energy-efficient, high lumen output fluorescent fixtures in the DEA garage facility. The new fixtures have been placed on timers that activate every third fixture from 6:00 PM to 6:00 AM daily instead of lighting the entire garage 365 days per year, 24 hours each day.

#### Solar and Other Renewable Energy

The BOP ESPC discussed below utilizes solar power to provide hot domestic water to a prison in Arizona.

The FBI will include renewable energy sources in future designs wherever feasible. So far, budget constraints have prevented the use of active solar or other renewable technologies in new FBI construction projects, but passive solar design has been incorporated. The FBI has identified sites that would be cost-effective for active solar energy retrofits.

#### Showcase Facilities

INS will attempt to showcase three facilities in FY 2000:

- The Batavia, New York Federal Detention Facility was completed in FY 1999; its design incorporates energy-efficient materials and equipment, and the facility has entered into a national fuels contract to purchase natural gas at less than market price, saving thousands of dollars annually. Electric power is supplied by an INS-owned transformer rather than the local utility, saving more than \$60,000 annually.
- The Krome Service Processing Center in South Florida is being designed with energy-efficient materials and equipment, including solar technologies.
- A Border Patrol Station in Remey, Puerto Rico is being designed with the use of energy-efficient materials and equipment, including solar power backup.

DOJ will establish a goal of designating at least one facility from each of its bureaus in FY 2000 as a showcase facility.

#### Personnel Development

DOJ periodically conducts meetings with its Bureaus to disseminate information and provide guidance and assistance. In FY 1999, DOJ made arrangements with DOE representatives to present alternative energy strategies and methods of funding to the major Bureaus.

Energy conservation has been a topic at the bi-annual Facilities Management training course. The course generally has 25 participants from throughout the Bureau of Prisons. Topics include such items as review of the energy program and required documentation for requesting energy projects. A life-cycle costing workshop has been provided at some of the more recent courses.

Efforts in promoting energy conservation can be recognized in performance evaluations of BOP personnel involved with the energy conservation program. The in-house engineering staff of the FBI is responsible for energy management activities and the position descriptions and performance evaluations for these engineers reflects that proper energy and water conservation methods be used in job performance.

Bureaus will be encouraged to establish separate award programs for energy and water conservation. However, existing employee award programs are sufficiently broad to recognize these types of contributions. Employees are nominated for Federal Energy and Water Management Awards annually.

#### **Funding**

Energy conservation projects have been funded in the amount of \$1,529,000 during FY 1999. These projects have an estimated annual energy savings of over 70.7 billion Btu.

#### **Energy Savings Performance Contracts**

Operation commenced during FY 1999 on the ESPC at FCI Phoenix in Arizona. Under this ESPC, a solar hot water system has been installed that will provide a large percentage of the domestic hot water for the prison. The ESPC became operational in February 1999; as of June 1999, total savings were \$33,070. Additional savings of \$500 per month result from decreased required maintenance.

#### **Utility Partnerships**

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 lighting and HVAC system improvements. The Drug Enforcement Agency (DEA) will also be addressing these issues with Virginia Power as part of its energy audit procedure.

The FBI Headquarters and the Main Justice Building participate in the PEPCO energy curtailment program during peak cooling periods in the summer months.

#### **Procurement of Energy Efficient Products**

The BOP's policy requires the selection of energy-consuming equipment be made on the basis of life cycle cost analysis.

#### **Alternative Fuel Vehicles**

DOJ's Justice Management Division (JMD) is currently working with a major automobile manufacturer to acquire two compressed natural gas (CNG) sedans and an electric pickup truck to support the motor pool in Washington, DC.

The BOP is in the process of locating compressed natural gas vehicles at several of their prison facilities. CNG refueling pumps and vehicles have been funded and currently are on order.

The U.S. Marshals Service purchased seven methanol flex-fuel vehicles when the infrastructure was expected to increase. Since this expectation was not met, it will pursue other types of AFV.

JMD staff is serving on a government-wide committee that has chosen six U.S. cities to create pilot programs that will assist in the development of alternate fuel vehicle (AFV) markets by increasing local infrastructures to support AFV use. In addition, the GSA is sponsoring a similar program in Washington, DC. These cities will be targeted for vehicle placement, fueling infrastructure, and combining with local government fleets to create an AFV market.

#### **Environmental Benefits of Energy Management**

BOP and FBI include energy and water conservation criteria in their position descriptions and performance evaluations for relevant staff members.

DOJ encourages its Bureaus to establish separate award programs for energy and water conservation. Employees are also nominated for the annual Federal Energy and Water Management Awards.

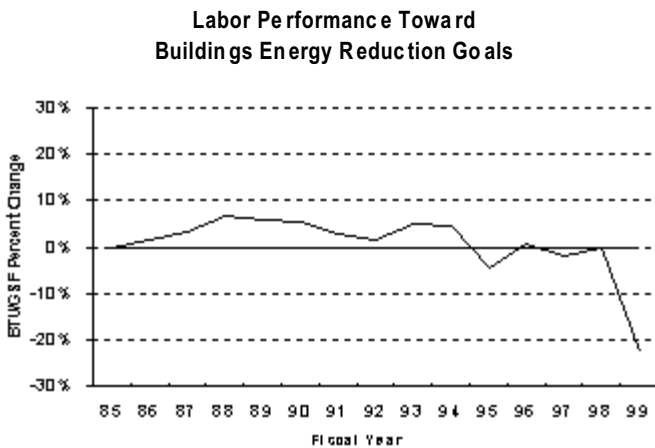
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## 9. DEPARTMENT OF LABOR (DOL)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Labor reported a decrease in energy consumption in buildings of 22.5 percent in Btu per gross square foot compared to FY 1985.



### DOL Buildings Energy Use and Costs, FY99

	BBtu	\$(Thou.)
Electricity	630.0	12,092.8
Fuel Oil	159.0	535.7
Natural Gas	856.7	4,419.0
Propane	29.9	191.2
Purchased Steam	22.3	333.8
<b>Total</b>	<b>1,697.9</b>	<b>17,572.5</b>

DOL's steep decline in Btu/GSF during FY 1999 is partially attributable to incomplete reporting. Labor reported consumption in only 2.0 million square feet of buildings space in FY 1999. This is compared to 18.6 million square feet in FY 1998. While not all data was reported during FY 1999, DOL's building inventory remains at approximately 19 million square feet.

In compliance with the Executive Order 13123, Job Corps Program has developed a strategic plan to fulfill the requirements of this order and to reduce energy consumption in all its facilities using a combination of energy savings performance contracts (ESPCs), area-wide utility contracts, and direct agency funding. In addition, many Job Corps Centers (JCCs) have developed a no-cost/low cost energy conservation program to reduce the facility energy consumption.

Facility energy audits finalized during FY 1999 included Gary, IN; Pittsburgh, PA; Kittrell, NC; Inland Empire, CA; and Sacramento, CA Job Corps Centers.

Building envelope improvements, HVAC and electrical system upgrades, lighting retrofits, and water conservation efforts have been implemented at the following JCCs during FY 1999:

- Albuquerque,
- Clearfield,
- Delaware Valley;
- Guthrie,
- Kicking Horse,
- Kittrell,
- Penobscot,
- Ramey;
- Tongue Point,
- Tulsa, and
- Turner.

Future projects under consideration include:

- Conduct EPA Green Lights Program. This program is designed to promote energy efficiency by implementing cost effective programs to maintain or improve the quality of safety of the workplace.
- Conduct a survey and monitor energy use each week for three months. The survey will provide a source of energy use information, and recommendations for a director of best practices can be identified from survey results.
- Review light practices and recommend proposals for lighting, e.g., if you don't need it, turn it off. There are a significant savings available with improved lighting control. Find out what information is available from the "Watts-On" program from PEPCO.
- Other Projects. Develop a quarterly information exchange bulletin. Conduct annual energy management seminar. Schedule events throughout the year with continuous emphasis applied to the energy management program to educate employees within the organization.

### Solar and Other Renewable Energy

San Diego JCC utilizes solar energy for domestic water heating. Plans to upgrade and recommission an existing non-functional solar water heating system at the Gary Job Corps Center are underway as part of ESPC discussed below.

### Showcase Facilities

The variation of function among the typically small

buildings of Job Corps facilities limits the choice of suitable candidate buildings. In addition, the limited public exposure of Job Corps buildings further diminishes the potential benefits of showcase construction. As a result, no showcase facilities have been constructed.

#### **Personnel Development**

Plans to attend the ESPC, Super ESPC and other energy management workshops are underway for designated energy managers.

#### **Energy Savings Performance Contracts**

Job Corps is currently involved with two projects utilizing DOE's Regional Super E SPCs:

- The DOE Central Region selected the Gary JCC as one of two federal facilities to be included in their RFP solicitation. Sempra Energy services, the selected energy services company, has developed a report of all applicable energy conservation measures and financing. The project scope includes lighting upgrades, installation of programmable thermostats, replacement of HVAC equipment in several buildings, water measures, and the refurbishment and decommissioning of a currently non-operational solar hot water heating system. It is anticipated that the Gary delivery order will be signed soon.
- ERI Services has prepared a scope for both the Inland Empire JCC and Sacramento JCC as a bundled ESPC project. The project incorporates lighting upgrades. DOL signed the delivery order and construction should be completed in December 1999.

#### **Utility Partnerships**

Job Corps is currently working on two projects which utilize GSA Area-Wide Contracts:

- Kittrell JCC completed negotiations with Carolina Power and Light (CP&L) for an energy conservation project. CP&L has commenced the design/retrofit phases and the lighting retrofit work will be complete by the end of this calendar year.
- Pittsburgh JCC initiated an energy conservation retrofit project with Equitable Gas, the natural gas supplier for the center. The preliminary project proposal submitted by the utility company is currently being reviewed by DOL. It is anticipated that funds to implement this project will be paid up front by DOL as opposed to using a financing option. The proposal includes a center-wide lighting retrofit and modification of the current

natural gas rate schedule.

Job Corps has also taken steps to take advantage of electricity deregulation. An agreement has been made between DOL and GSA, Mid-Atlantic Region to purchase electricity at a competitive rate for Pittsburgh, Keystone, Red Rock and Edison JCCs. Through this agreement, the lowest rates available will be obtained.

#### **Alternative Fuel Vehicles**

The DOL vehicle fleet consists of approximately 4,000 GSA Fleet vehicles and 190 agency owned or leased vehicles. In compliance with Executive Order 13031 - Federal Alternative Fueled Vehicle Leadership, the DOL has acquired vehicles in the following categories: ethanol flex fuel, dedicated methanol, compressed natural gas and electric vehicles.

#### **Environmental Benefits of Energy Management**

All agencies are required to recycle white paper, newspaper, glass, and aluminum can. Containers have been placed throughout DOL buildings for employees to recycle. Funds from recycling are given to the DOL Child Development Center for tuition subsidies for DOL employees and improvements to the Center.

Contractors that provide goods and services to the DOL are encouraged to use recycled goods and environmentally-preferable products.

The Atlanta Regional Office is partnering with the State of Georgia in support of the Partnership Initiative for a Smog Free Georgia. Several environmental activities which comply with mandates of the Clean Air Act have also been implemented.

As part of an education and awareness program a Recycled Products Fair is being planned. Vendors will be invited to sell environmental preferable products and services, to display their merchandise, and to provide an opportunity for employees to become aware of what types of goods and services are available.

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## 10. DEPARTMENT OF STATE (DOS)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of State reported a decrease in energy consumption in buildings of 7.0 percent in Btu per gross square foot compared to 1985.

**State Performance Toward Buildings Energy Reduction Goals**



**State Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	1,553.0	33,243.2
Fuel Oil	1,098.0	3,883.9
Natural Gas	349.0	2,060.2
Purchased Steam	12.3	646.7
Total	3,012.2	39,834.0

The extreme fluctuations in the State Department's Btu/GSF is a result of the inclusion of energy consumption and square footage from the Foreign Buildings Operations for certain years. During FY 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included these estimates in their data for the years 1985, 1990, 1991, 1998, and 1999.

State will continue the energy audit and energy conservation opportunity identification program to pursue maximum energy efficiency of its facilities. To date, all major facilities (over 300,000 square feet) have been audited through comprehensive audit method. As new technologies are developed, re-audits are done to assess applicability for installation. Smaller facilities are audited by walk-through or partial comprehensive method.

State has determined certain technologies should be

installed as a normal course of maintenance where funds are available:

- Energy-efficient motors and variable speed drives;
- T-8 and T-5 electronic lighting;
- Ultrasonic or thermal motion sensors;

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- Sensor water faucets and toilets were installed in the Main State building and the National Foreign Affairs Training Center (NFATC) in Arlington, Virginia.
- At the Main State building, steam consumption has been reduced by 22 percent.
- The Main State building implemented a lighting retrofit and installed an energy management system and motion sensors in corridors and public spaces.

GSA is replacing the four main refrigeration machines in the Main State building. GSA also began an extensive renovation of the Main State building during FY 1999. This will entail the replacement of all electrical and mechanical systems; first will be the replacement of chillers. The renovation will be complete in FY 2012.

During FY 1999, comprehensive surveys were performed at the following U.S. Embassies:

- Santiago, Chile;
- Rome, Italy;
- Kingston, Jamaica;
- Tokyo, Japan;
- Kuala Lumpur, Malaysia;
- Managua, Nicaragua;
- Oslo, Norway;
- Riyadh, Saudi Arabia;
- Singapore, Singapore;
- Paramaribo, Surinam; and,
- Montevideo, Uruguay.

Comprehensive surveys were also performed at the following Consulate Generals:

- Hamburg, Germany; and,
- Munich, Germany.

Three rate and metering surveys were performed at:

- U.S. Embassy Port Louis, Mauritius;
- U.S. Embassy Belize City, Belize; and,
- U.S. Consulate General Guayaquil, Ecuador.

#### **Solar and Other Renewable Energy**

State has signed a memorandum of understanding with the Geothermal Heat Pump Consortium for application of geothermal technology.

State dedicates 10 percent of foreign building energy conservation measure implementation funding to renewable energy projects. More than 350 solar hot water systems have been installed at State foreign buildings worldwide, including FY 1999 installations of solar hot water systems at residences in Bridgetown, Barbados; Nassau, Bahamas; and Port Louis, Mauritius. Additional FY 1999 renewable energy activities include installation of a 10-kilowatt wind turbine generator at the Port Louis residence, and installation of daylighting in a Jakarta warehouse.

#### **Energy Showcases**

State has designated the Florida Regional Center as a Federal solar energy showcase facility, the first technology-specific showcase. A solar audit of the facility will be implemented.

Designs were initiated or ongoing during FY 1999 for a new office building in Tashkent, Uzbekistan, and for housing in Shanghai, China, which are designated showcases. The Chancery Office Building and Deputy Chief of Mission Residence are designated showcases in Port Louis.

#### **Personnel Development**

State will include successful implementation of Executive Order 13123 provisions in the position descriptions and performance evaluations of the agency energy team, principal program managers, heads of field offices, facility managers, energy managers, and other appropriate employees.

State will ensure that all appropriate personnel receive training. State is attempting to develop overseas resident energy managers or, at a minimum, to encourage energy awareness through the Overseas Facilities Manager Program. Twenty-one additional FBO staff became trained energy managers through a five-day Association of Energy Engineers course.

#### **Funding**

During FY 1999, the Office of Foreign Buildings Operations (FBO) committed \$1.2 million to overseas

posts; this is expected to yield annual energy cost savings of \$230,000. In addition, \$347,000 has been committed to support energy efficiency improvements in future construction projects. This is expected to yield an additional \$35,000 annual saving.

#### **Energy Savings Performance Contracts**

FBO has one ongoing ESPC at the U.S. Embassy in Mexico City. Cumulative cost and energy savings over the nine year contract term will be \$603,000 and 6.6 million kilowatt-hours.

FBO has also negotiated two additional international ESPC efforts, with the local host governments and utilities, to install natural gas fuel cell power plants at U.S. Embassy Tokyo, Japan, and U.S. Consulate General Frankfurt, Germany. These unique contracts form international energy partnerships among the U.S. foreign mission, the host local government, an American energy service company, and often the local utility. Delivery orders are expected in the first quarter of FY 2000.

#### **Utility Partnerships**

State has attempted to enter into one utility energy efficiency service agreement.

FBO will continue to work with local utilities to develop energy efficiency strategies.

#### **Procurement of Energy Efficient Products**

State will select, where life-cycle cost-effective, ENERGY STAR® and other energy efficient products when acquiring energy-using products. For product groups where ENERGY STAR® labels are not yet available, State will select products that are in the upper 25 percent of energy efficiency as designated by FEMP. State will incorporate energy efficient criteria consistent with ENERGY STAR® and other FEMP designated energy efficiency levels into all guide specifications.

#### **Alternative Fuel Vehicles**

State has acquired three alternative fuel natural gas vehicles and one fleet bus. State included diplomatic security pursuit units in the acquisition request for 100 percent natural gas units. The aim of the alternative fuel program is to convert all bus fleet units to 100 percent natural gas consumption and obtain an all alternative fuel motor pool with a fuel-re-supply station at NFATC.

#### **Environmental Benefits of Energy Management**

State promotes ride-sharing programs in coordination with GSA and disseminates information on government-wide ride-sharing programs. Vanpools automatically receive parking permits. State has been involved with the Council of Governments network to

expand and enhance ride-sharing.

FBO will continue to develop and implement energy conservation measures through its Architectural and Engineering Guidelines and Criteria for New Embassy Buildings.

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## 11. DEPARTMENT OF TRANSPORTATION (DOT)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Transportation reported a decrease in energy consumption in buildings of 26.7 percent in Btu per gross square foot compared to FY 1985.

**DOT Performance Toward Buildings Energy Reduction Goals**



**DOT Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	1,994.4	40,068.9
Fuel Oil	791.9	4,681.2
Natural Gas	895.1	5,058.9
Propane	32.0	309.0
Purchased Steam	9.2	119.2
<b>Total</b>	<b>3,722.6</b>	<b>50,237.2</b>

Operations and maintenance procedures are decentralized within DOT. Basic procedures include securing HVAC equipment, unnecessary lighting, and office equipment during unoccupied hours. The Federal Aviation Administration (FAA) even reduces runway lighting when it will not compromise safety.

DOT has completed more than 100 audits. These audits identified energy and water conservation opportunities with an estimated implementation cost of more than \$20 million. During FY 1999, the U.S. Coast Guard (USCG) implemented energy related projects costing \$6 million. USCG currently estimates that it has an \$18 million backlog for projects, audits, and metering. FAA currently estimates it has a project backlog of more than \$60 million.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- The Federal Highway Administration (FHWA) replaced old inefficient cooling towers with new more efficient units with variable frequency drives and electric water level controls.
- The Maritime Administration (MARAD) installed waterless urinals and new energy-efficient windows at the U.S. Merchant Marine Academy.
- MARAD installed dual fuel boilers using interruptible gas service thereby reducing fuel oil use by 80 percent.
- The St. Lawrence Seaway Development Corporation (SLSDC) replaced roofs and windows for better insulation on their maintenance facilities.

### Solar and Other Renewable Energy

The FAA Southwest Region has an ongoing project to install photovoltaic panels and batteries at remote and unmanned sites. Six remote communication link sites in the Western Pacific Region received panels in FY 1999. The FAA Alaskan Region received a grant from the National Renewable Energy Laboratory (NREL) and installed two wind turbine generators.

During FY 1998 and FY 1999, USCG received funding from DOE to help purchase and install a solar hot water system for housing units in Hawaii. USCG continues to pursue financing options to make up the shortfall. The DOE grant completed a limited portion of the whole project, and USCG is looking into using DOE's Technology-Specific Super ESPC to complete the rest. When completed, the project will make a significant contribution to achieving the Million Solar Roof Initiative.

Both USCG and SLSDC continue to use photovoltaic powered buoys.

### Showcase Facilities

DOT's headquarters building was designated as a showcase in 1995. Energy improvements avoid \$1 million in cost each year.

### Personnel Development

Each personnel office and operating administration has been advised of the requirement for energy and water efficiency to be included in performance evaluations.

The FAA has established an energy and water conservation category within their environmental excellence award program. Operating administrations are strongly encouraged to nominate employees for the

annual Federal Energy and Water Management Awards.

During FY 1999, the USCG energy program sponsored three training sessions; subjects included the USCG facilities energy program and ESPCs. All FAA regional energy managers and center energy managers have been trained in the use of ESPCs.

The FAA's Mike Monroney Aeronautical Center (MMAC) has developed its own manager's energy conservation guidelines handbook that has been distributed to all managers and energy coordinators.

#### **Funding**

DOT leverages funding for surveys and audits. The USCG and the FAA have both used DOE FEMP's SAVEnergy program and utility company incentive programs.

In FY 1999, MMAC received \$65,000 earmarked for energy projects, all of which was used on a hanger lighting retrofit project.

#### **Energy Savings Performance Contracts**

There are currently six ESPCs in place within DOT. The USCG expects to sign ESPC delivery orders at its Air Station Cape Cod and Support Center Elizabeth City under DOE's Northeastern and Mid-Atlantic Super ESPC's in the very near future. The FAA has been actively working towards three additional Super ESPC delivery orders for award in FY 2000.

Annual cost savings after the term of the contract from the four ESPCs awarded during FY 1998 will be in excess of \$1,438,000, with annual energy savings in excess of 100 billion Btu, which is more than one percent of DOT's primary facilities energy consumption in FY 1998. As savings are realized from ESPCs they will be reinvested in new energy projects.

#### **Utility Partnerships**

The FAA received over \$209,000 in incentives from various utilities around the country during FY 1999. The USCG also received \$680,000 in incentives which were used to shorten the term of the ESPC at the USCG Academy in New London, Connecticut.

#### **Procurement of Energy Efficient Products**

DOT purchases 'best practice' products that are practical and cost-effective and in the upper 25 percent of energy and water efficiency. The FAA has provided its energy managers, purchasing agents, and contracting officers with the DOE FEMP publication *Buying Energy Efficient Products*.

#### **Environmental Benefits of Energy Management**

USCG's energy program has actively engaged in the development of a number of ENERGY STAR® Buildings. EPA is providing guidance and DOT is in the process of assessing performance. These buildings have all undergone comprehensive audits and are in various stages of development.

#### **Energy Management Contact**

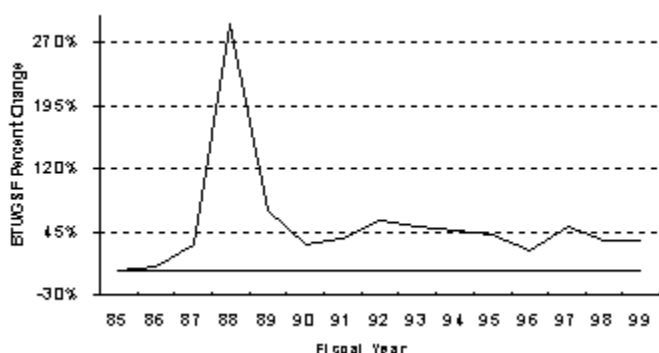
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## 12. DEPARTMENT OF THE TREASURY (TRSY)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of the Treasury reported an increase in energy consumption in buildings of 34.9 percent in Btu per gross square foot compared to FY 1985. This statistic is misleading in that it has not been adjusted to account for a quadrupling of energy usage, over the 1985 base year, which occurred in 1988 when the General Services Administration (GSA) delegated to Treasury the energy reporting responsibility for 35 buildings. Of the 35 buildings that GSA delegated, 32 were Internal Revenue Service (IRS) facilities.

**Treasury Performance Toward Buildings Energy Reduction Goals**



**Treasury Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	1,123.4	23,324.1
Fuel Oil	39.9	157.3
Natural Gas	466.2	1,806.2
Propane	3.4	25.5
Purchased Steam	68.7	1,013.8
<b>Total</b>	<b>1,701.6</b>	<b>26,326.9</b>

Over the next two years the U.S. Mint will have a significant increase (45 percent) in energy consumption due to the Commemorative Quarter Program and the new dollar coin. Although the Mint strives to meet the goals and objectives of EPA 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.

The following energy and water conservation audits and initiatives were under way or completed during FY 1999:

- The Internal Revenue Service's (IRS) Andover Service Center, Massachusetts continued its upgrade program with their three chillers being interconnected allowing for better load management. This will save approximately \$4,000 and 165,000 cubic feet of water annually.
- The Main Treasury building rehabilitation work began. The Treasury Building & Annex Renovation and Restoration (TBARR) project will incorporate a lighting retrofit, window replacement, motor upgrades, installation of an energy management and control system, new energy-efficient chillers, upgrade of the cooling towers, and a dramatic reduction in water consumption. The project will also separate the sanitary and storm drain systems.
- The Office of Thrift Supervision (OTS) upgraded their direct digital controls, installed new motor control centers, and a new high-pressure steam reducing station which is expected to reduce usage by 15 percent.
- The Financial Management Services (FMS) replaced motors and tube bundles at their steam/water converter with expected steam and cost reduction of 15 percent, and recalibrated their pneumatic controls with an expected 10 percent steam consumption saving.
- The Federal Law Enforcement Training Center (FLETC) in Glynco, Georgia completed a lighting retrofit in two buildings and expects to finish retrofitting three additional buildings in FY 2000.

### Personnel Development

During FY 1999, Treasury sent eight employees to energy management training courses. DOE FEMP courses were used whenever possible due to their low cost and high quality.

### Energy Savings Performance Contracts

The U.S. Secret Service entered into a second ESPC for their Beltsville, Maryland training facility. The ESPC with Baltimore Gas and Electric covered a lighting retrofit in all buildings and installation of daylighting in five buildings. Savings are expected to be \$39,000 annually. The installation of the oil to gas conversion under the FY 1997 ESPC with Washington Gas was completed. Savings of \$15,000 per year began with the November 1998 bill.

The Mint has awarded three ESPCs in the last two

years, producing estimated savings of 3.913 billion kilowatts, more than 3 million gallons of water, and \$410,000 annually.

The Bureau of Engraving and Printing is discussing the possible development of an ESPC with PEPCO.

#### **Utility Partnerships**

The IRS's Andover Service Center entered into a GSA Area-wide contract in June 1999 to purchase electricity. Savings are expected to be \$100,000 per year. The facility also switched to the Massachusetts Electric Company's interruptible rate schedule, saving \$4,500 per year. IRS's Brookhaven Service Center participated in the commercial peak reduction program with their local utility, resulting in a reimbursement of an estimated \$90,000 per year.

The Mint entered into a GSA Area-wide contract in January 1999 to purchase electricity. The Mint saved \$102,000 in FY 1999. The Mint also renegotiated its contract with the steam utility in Philadelphia for a saving of \$100,000 in FY 1999.

#### **Funding**

Treasury bureaus spent \$1.495 million to install energy and water conservation measures during FY 1999. This figure does not reflect GSA's expenditure in buildings delegated to Treasury. Anticipated savings from the FY 1999 investments total \$107,000 per year.

The bureaus plan to spend \$1.1 million in FY 2000, to implement energy efficiency measures. The bulk of this spending will be at the Main Treasury building and Mint facilities.

#### **Procurement of Energy Efficient Products**

Treasury is committed to the purchase of products in the top 25 percent of energy efficiency. Copies of DOE's *Energy Efficient Product Guide* have been provided to energy managers and procurement personnel.

#### **Alternative Fuel Vehicles**

The AFV fleet number at the Bureau of Alcohol, Tobacco, and Firearms (ATF) has reached 9 percent of its total. FLETC has six with two being police packages used on the pursuit training course. The IRS added its first AFV during FY 1999.

#### **Environmental Benefits of Energy Management**

The bureaus have implemented driver awareness programs aimed at getting employees to drive in the most fuel efficient manner possible. Treasury is developing a telecommuting policy that will allow for work at home, satellite facilities, and hotels.

#### **Energy Management Contact**

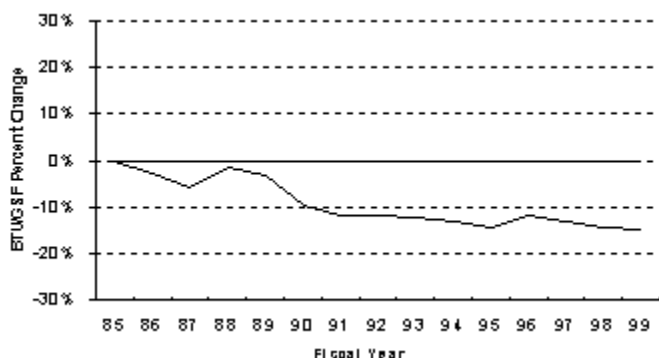
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### 13. DEPARTMENT OF VETERANS AFFAIRS (VA)

#### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Department of Veterans Affairs reported a decrease in energy consumption in buildings of 14.9 percent in Btu per gross square foot compared to FY 1985.

**VA Performance Toward Buildings Energy Reduction Goals**



**VA Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	9,411.0	165,400.7
Fuel Oil	952.6	3,512.0
Natural Gas	14,270.3	50,317.0
Propane	2.2	19.3
Coal	139.7	142.1
Purchased Steam	1,209.0	9,529.7
Other	150.0	635.2
<b>Total</b>	<b>26,134.8</b>	<b>229,556.1</b>

During FY 1999, VA concentrated heavily on research for and the development of cost-effective methods such as utility rebates and ESPCs.

The design criteria for all new construction and retrofits now include the use of the most energy-efficient lighting fixtures that have savings potential of up to 45 percent. Energy management and control systems with direct digital controls are specified as part of new construction as well as retrofits.

Two medical centers have recently completed projects using a thermal storage system using incentives from local utility companies.

#### Solar and Other Renewable Energy

Some medical centers are evaluating the use of solar and other renewable energy projects as part of their ESPCs.

#### Personnel Development

VA conducted a national survey to determine how many energy managers at the medical centers qualify as trained energy managers. Survey results were submitted to DOE who determined that many would need some training before they could qualify as trained energy managers. Staff have been informed of relevant DOE and Association of Energy Engineers classes they need to take. Many took advantage of these during FY 1999 and will continue to do so in the future.

#### Funding

VA's funding for energy conservation cost-effective retrofits and capital improvement projects was approximately \$10.5 million for FY 1999.

#### Energy Savings Performance Contracts and Utility Partnerships

VA completed its first ESPC in 1993. Since then, VA has issued guidance to all medical centers regarding their use of ESPCs. The following projects have been completed:

- Medical Center, Lake City, Florida, completed a lighting retrofit.
- Medical Center, Dallas, Texas, completed the installation of a thermal water storage system.
- Medical Center, Richmond, Virginia, completed the installation of cooling towers.
- Medical Center, Portland, Oregon, completed a lighting retrofit, including installation of occupancy sensors.
- Medical Center, Atlanta, Georgia, completed a lighting retrofit.
- Medical Center, West Los Angeles, California, completed a comprehensive energy retrofit.

As of the fourth quarter of FY 1999, the Veterans Integrated Service Networks (VISNs) are in various planning stages for ESPC implementation. The following number of facilities have progressed in implementation efforts and have decided the ESPC method they are planning to use:

Station level contracts - 13 facilities  
DOE-based contracts - 42 facilities  
DOD-based contracts - 56 facilities  
GSA Area-wide based contracts - 14 facilities

Contractor investment of \$54.53 million will generate \$8.99 million in savings to VA in operating and utility cost avoidance during the life of these projects.

**Procurement of Energy Efficient Products**

VA's acquisition and material management service has issued guidelines for the medical centers to purchase energy-efficient products whenever they meet VA's performance requirements, and they are cost-effective.

**Energy Management Contact**

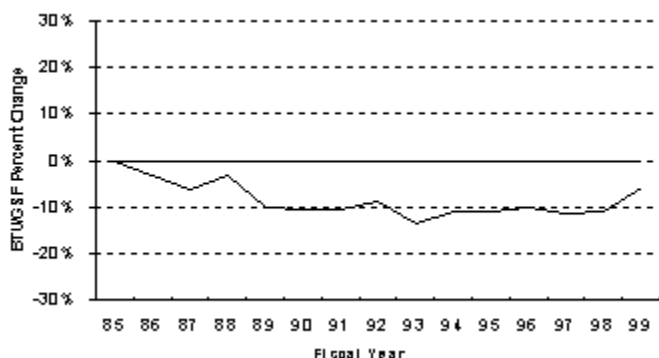
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## 14. ENVIRONMENTAL PROTECTION AGENCY (EPA)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Environmental Protection Agency reported a decrease in energy consumption in buildings of 5.7 percent in Btu per gross square foot compared to FY 1985.

**EPA Performance Toward Buildings Energy Reduction Goals**



**EPA Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	463.4	7,084.8
Fuel Oil	19.3	74.7
Natural Gas	639.9	2,453.7
Propane	0.7	9.2
Purchased Steam	46.9	579.6
<b>Total</b>	<b>1,170.1</b>	<b>10,202.0</b>

The main objective of EPA's Energy and Water Conservation Program is to effectively and efficiently use natural resources when designing, constructing, and maintaining EPA facilities and facility systems.

Although EPA could have exempted all of its facilities from reporting because as laboratories they all fall under the original industrial facility exclusion, EPA established and met the 10 percent energy reduction goal in 1995 as required by EAct for nonindustrial facilities. EPA will continue to strive to meet the more ambitious 30 and 35 percent reduction goals of EAct and Executive Order 13123.

While implementing its energy program, EPA has learned that its largest energy conservation opportunity is within the HVAC system of its laboratories. Due to energy-intensive health and safety requirements for one-pass air for a laboratory, EPA's energy consumption is extraordinarily high. To address this, EPA is

aggressively pursuing energy-efficient upgrades at several of its laboratories.

Excluding new facilities, EPA's water consumption decreased 6.3 percent in FY 1999. Several facilities reduced water consumption by more than 20 percent including Narragansett, Rhode Island; Gulf Breeze, Florida; Duluth, Minnesota; Las Vegas, Nevada; and, Manchester, Washington. EPA expects significant reductions in water consumption at its facilities by installing ground source heat pumps.

Descriptions of facility energy and water reduction activities worked on during FY 1999 include:

- Athens, Georgia. A biomass feasibility study has been completed with the help of DOE, Tennessee Valley Authority, USDA, University of Georgia, and Georgia State Forestry. The next project phase will determine what equipment is suited to the Athens laboratory. Also, a solar hot water heater was installed at the on-site day care center, and has contributed to the 17 percent decrease in energy consumption at the facility from 1997 to 1999.
- Ada, Oklahoma. The Ada Facility decreased energy consumption by 15.5 percent from FY 1997 to FY 1999. To further streamline its energy usage, the laboratory will soon undergo a comprehensive energy efficiency upgrade of its HVAC system. The upgrade will include installation of a ground source heat pump system, complete variable air volume system for air supply and fume hood air exhaust, and an integrated direct digital control system for HVAC, energy, fire, and security management.
- Cincinnati, Ohio. Energy-efficient projects for this facility included installing a closed-loop glycol cooler tower, energy-efficient elevator motors, boiler controls, a revolving door to help maintain temperature and building pressure, a new HVAC system, improved windows and insulation, adopting the Green Lights program, and a new energy-efficient boiler.
- Ft. Meade, Maryland. EPA completed occupancy of its new laboratory facility at the Ft. Meade Army base in the spring of 1999. The facility was designed with a variety of advanced energy components including variable air volume technology.

- Houston, Texas. This facility conducted air system modifications and upgraded an existing direct digital control (DDC) system. It incorporated a cooling tower condensate return system to reduce water consumption and operating costs and to enhance environmental conditions. Without this system, large volumes of water would have to be supplied by the local water utility.
- Narragansett, Rhode Island. EPA is designing an HVAC system upgrade that will use geothermal heat pumping and latent energy recovery technologies. In addition, EPA is researching the purchase of green power for this facility as well as a wind-powered electric generator for the site.
- Golden, Colorado. EPA incorporated a variety of energy-efficiency components including a DDC system to monitor operating conditions of HVAC systems. By monitoring equipment in this way, the facility is saving time, money, and energy by fixing problems immediately. Further, EPA applied for a DOE renewable energy project grant to build a transpired solar collector panel for the south wall of the facility's hazardous materials building. In addition, EPA is currently negotiating with NREL to purchase wind power to serve 20 percent of its electricity needs.
- Gulf Breeze, Florida. EPA installed timers on approximately 20 electric water heaters and is installing nodal direct digital controls (NDDCs). The NDDCs will improve building controls to minimize energy waste and monitor building security, fire protection, and indoor environmental quality.

#### **Solar and Other Renewable Energy**

By partnering with Virginia Alliance Solar Electricity (VASE), Solarex, PowerLight, and the Department of Energy (DOE), EPA successfully arranged for \$500,000 in financial assistance for a partially solar-powered computer center at EPA's Research Triangle Park (RTP) facility. When construction on the National Computer Center is completed, it will mark the opening of one of the largest photovoltaic (PV) installations on the east coast. The 100-kilowatt, integrated roof power system will convert the sun's light into energy, feeding it directly to the building and supplementing the main power utility. Among one of the largest single PV systems in a Federal facility, the RTP computer center not only gives EPA the opportunity to demonstrate the effectiveness and marketability of an alternative technology, but it also serves as a powerful example of the Agency's commitment to sustainable energy principles. In addition, the PV system supports the

Million Solar Roofs initiative, which challenges American businesses and communities to install solar systems on one million roof tops by 2010. More specifically, the RTP installation supports President Clinton's 1997 commitment that the Federal Government alone will install 20,000 solar rooftop systems by 2010.

EPA recently installed three solar energy water-heating systems at its Edison, New Jersey facility that are now the primary source of hot water in their respective facility areas. All three solar heating systems consist of a preheat tank and various numbers of roof-mounted, single glazed, liquid evacuated tube collectors. To date, energy savings results are significantly higher than expected.

EPA's leased laboratory facility in Richmond, California is in the planning stages of a third party financing agreement for energy efficiency improvements to be provided by the owner of the facility. In addition, 100 percent of the electricity for the laboratory is green power provided by landfill methane gas.

#### **Personnel Development**

EPA's Office of Administration (OA) has instituted a semi-annual conference entitled "Laboratories for the 21<sup>st</sup> Century" for agencies pursuing energy upgrades in Federal laboratories. EPA and DOE partnered in this effort. The 1999 conference was held in Cambridge, MA. Almost 200 participants attended the conference, which was open to both Federal and non-Federal participants for the first time.

#### **Energy Savings Performance Contracts (ESPCs)**

An Energy Savings Performance Contract (ESPC) to conduct a complete energy upgrade at the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan was awarded in the Spring of FY 1998. The new energy system currently being installed will guarantee at least a 66 percent reduction in energy consumption. The planned energy upgrade will establish NVFEL as an energy and environmental showcase facility by reducing source emissions, energy consumption, energy costs, and incorporating renewable technologies. Installation of a real-time demand meter will help the facility reduce its electrical demand peak. The project will be completely operational in the summer of 2000.

EPA is planning to use ESPCs to finance comprehensive energy upgrades at the following facilities: Narragansett, Rhode Island; Manchester, Washington; Gulf Breeze, Florida; Athens, Georgia; and Ada, Oklahoma. EPA expects to achieve a 50



percent reduction from current energy consumption levels for each facility undergoing a comprehensive upgrade paid through an ESPC.

#### **Acquisition of Alternative Fuel Vehicles (AFVs)**

EPA made significant progress in increasing its acquisition percentage of Alternative Fuel Vehicles (AFVs) during FY 1999. EPA expects that this success increase in meeting the AFV acquisition targets set forth by Executive Order 13123 will continue. Already, EPA has been able to increase from a 14 percent acquisition rate in FY 1997, to 35 percent in FY 1998, and has been able to achieve 56 percent in FY 1999.

#### **Environmental Benefits of Energy Management**

EPA has developed personnel performance standards to rate staff efforts toward achieving energy and water conservation program objectives—outstanding, satisfactory, and unsatisfactory. Implementation of these standards helps ensure that personnel will consider energy-efficient opportunities.

OA has a steering committee to organize EPA's integrated pollution prevention management program, that includes EPA energy and water conservation efforts.

EPA is committed to purchasing best-practice energy-efficient and water-saving products that are in the upper 25 percent of all products in that category. EPA is also committed to purchasing emerging technologies and products that offer greater energy-efficiency, water savings, or use of renewable resources than products now commercially available.

EPA is committed to accelerating the acceptance of cleaner power alternatives and has established a pilot project at its Richmond, California facility. In May, 1999, EPA, the National Renewable Energy Laboratory, and GSA awarded a renewable energy contract to the Sacramento Municipal Utility District (SMUD). SMUD now provides the Lab with 100 percent renewable electricity from a landfill gas plant. Purchasing renewable electricity at the Region 9 Lab reduces greenhouse gas emissions associated with fossil fuel-based power by more than 2.3 million pounds per year. This is equivalent to reducing the number of automobile miles driven annually in California by two million miles. The project also makes EPA the first government entity to implement the use of green power at one of its facilities.

The Agency also plans to implement green power purchasing at its Chelmsford, Massachusetts, and Golden, Colorado, facilities. When these transactions are completed, the Chelmsford facility will purchase

100 percent of its electricity from renewable power sources and the Golden facility will purchase 35 percent. In addition, EPA is supporting a biomass combined heat and power system at the U.S. Department of Agriculture field station in Athens, Georgia. This project could reduce EPA's Athens-ORD facility's reliance on traditional electricity energy sources by 100 percent.

A series of energy awareness posters have been developed, illustrating energy-efficient HVAC systems, ESPCs, and pollution prevention. These posters are displayed at all EPA functions.

EPA continues to produce and distribute its quarterly newspaper, *Greening EPA*, formerly *Conservation News*. Articles in this newspaper provide the basis for facility managers to implement campaigns to conserve energy and at the same time inform the general public about EPA-specific conservation activities. EPA's Web site also offers a great opportunity to spread the energy and water conservation word, and includes the latest issue of *Greening EPA*.

#### **Energy Management Contact**

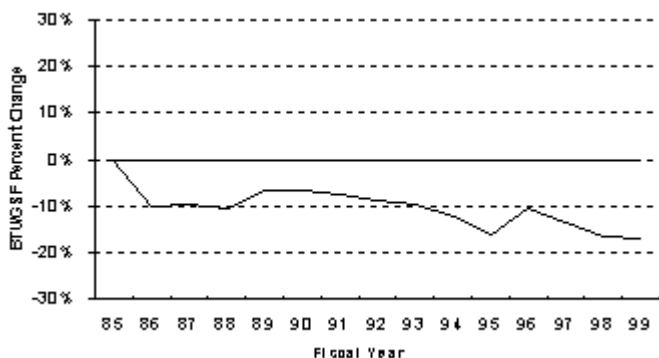
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## 15. GENERAL SERVICES ADMINISTRATION (GSA)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the General Services Administration reported a decrease in energy consumption in buildings of 17.0 percent in Btu per gross square foot compared to FY 1985.

**GSA Performance Toward Buildings Energy Reduction Goals**



**GSA Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	8,814.6	181,734.3
Fuel Oil	68.4	248.7
Natural Gas	2,841.2	13,288.9
Purchased Steam	1,359.8	19,760.5
Total	13,083.9	215,032.4

GSA has had an energy reduction plan since 1991. The plan was updated in 1998, which coincided with GSA's creation of an Energy Center Of Expertise and reflects the new approved business plan. The Energy Center of Expertise will reduce utility costs by promoting optimal energy use while protecting the environment and ensuring a quality workspace for GSA clients.

The Energy Center will have approximately 25 staff, plus regional associates. There are five people in Kansas City, Missouri; seven in the Public Utilities Center in Washington, DC; seven in the National Energy and Water Management Center in Fort Worth, Texas; and one or two regional associates in each of GSA's 11 regions.

Over the past few years, GSA has been installing state of the art building automated control systems, occupancy sensors, variable speed drives, efficient lighting, and other energy savings technologies. GSA has partnered with the National Institute of Standards

and Technology in testing ASHRAE's BACNet standard, an open communication protocol for building automated controls. This testing was continued in 1999 with an \$800,000 addition to the BACNet project.

GSA's Energy Center of Expertise has several objectives:

- Optimize utility management and life-cycle costs and enhance building operations efficiency;
- Establish GSA as the Government's provider of choice for utility commodities and services;
- Encourage advocacy and partnering; and,
- Provide leadership and promote energy efficiency and renewable energy.

In order to respond to the needs of Federal agencies, the Energy Center provides:

- Area-wide contracts for the procurement of utilities and for the acquisition of value-added services, such as utility financing of energy conservation projects;
- Aggregate purchasing of natural gas and electricity in deregulated markets;
- Energy use and analysis data; and,
- Advocacy in the public policy arena to include renewable power sources as part of its energy portfolio.

GSA performs audits on 10 percent of its building inventory each year in accordance with GSA's 10-year audit plan, which is updated annually. Comprehensive audits are performed by a variety of agents: in-house personnel, utilities, DOE-FEMP's SAVEnergy contractors, and A/E contractors. Some audits are obtained at no cost from utilities, some are obtained through DOE's SAVEnergy audit program, and the rest are funded by GSA. As funding permits, GSA will implement all life cycle cost-effective projects with a payback of 10 years or less that are identified by these audits.

GSA has traditionally encouraged a reduction in the use of petroleum-based fuel as far back as the 1973/1974 oil embargo. 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 both owned and leased buildings. From 1985 to 1999, GSA petroleum-based fuel use in buildings dropped by 89 percent, from 7.6 million to 842.1 thousand gallons.

### Solar and Other 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 sources to be considered in the proposed design.

GSA is a participating agency in the Million Solar Roofs initiative. GSA developed a plan to install 220 solar roof projects as defined by DOE under the initiative by the year 2010.

### **Showcase Facilities**

GSA has the first Federal building to receive an ENERGY STAR® Building designation—its property at 290 Broadway, New York City, New York. GSA has been working with EPA and has uploaded information regarding over 700 GSA buildings into the EPA ENERGY STAR® Building web site. GSA is in the process of field verifying the data and will be applying for ENERGY STAR® Building designations as appropriate.

### **Personnel Development**

Under Sec. 156 of the Energy Policy Act of 1992, GSA is required to hold five energy management workshops for Federal, state, local and tribal communities. In 1999, GSA held seven workshops in partnership with Federal agencies and state governments.

These workshops included the following dates, locations and activities:

- April 6, 1999 “Water Conservation in Public Buildings” in Denver, CO with 65 attendees
- August 23-25, 1999 “Energy/Water Conservation and Utility Deregulation” in Orlando, FL with 1,100 attendees
- January 27-28, 1999 “Utility Deregulation in NY and NJ” in Albany, NY with 125 attendees
- January 4-5, 1999 “Utility Deregulation in Northeast States” in Arlington, VA with 300 attendees
- June 15-18, 1999 “Utility Deregulation” in San Diego, CA with 65 attendees
- November 16-17, 1998 “Border States Energy Forum” in Chihuahua, Mexico with 270 attendees
- December 2, 1998 “Data Gathering for Deregulation” in New York with 25 attendees

- January 29, 1998 “Deregulation in New York City” in New York, NY with 325 attendees

GSA continues to train its own personnel in all aspects of energy and water management and conservation. GSA currently has 28 trained energy managers on staff. Routine training includes such topics, among others, as:

- Industrial Energy Processes and Building Analysis
- ASHRAE 90.1
- Energy Management Techniques
- Building Life Cycle Costing

Energy reduction and utility cost reduction goals are tracked as part of GSA’s performance evaluation to the President. Senior management and regional senior management executives have energy performance included as part of their performance evaluation. In each region, Regional Energy Coordinators’ performance evaluation and position descriptions included a full range of energy efficiency, water conservation, and renewable projects in their descriptions.

GSA annually participates in the DOE Federal Energy and Water Management Awards program and received nine awards at the October, 1999 program. GSA internally honors each one of the DOE award recipients with a ceremony and monetary award.

### **Funding**

Funding for projects has been lower than needed to meet GSA’s energy reduction goals. GSA had planned to invest \$50 million per year from 1994 through 2000 in order to meet the 20 and 30 percent reduction goals. The actual appropriation, after recessions, has averaged \$16.8 million over 6 years. GSA is able to fund some energy audits at no cost through utilities, or through DOE’s SAVEnergy Audit Program. Other programs, such as GSA’s annual Repair and Alterations Program, as well as the Chloro fluorocarbon (refrigerant) Chiller Replacement Program, also invest in energy efficient facilities and equipment. However, the sum of these investments may not be sufficient for GSA to meet the energy reduction goals.

### **Energy Savings Performance Contracts (ESPCs)**

GSA's Regional Energy Coordinators in each region identify energy conservation opportunities and opportunities for Energy Savings Performance Contracts (ESPCs). The Coordinators assemble and manage the project team, which may include a contracting officer, legal council, a project manager, or others as necessary. The Energy Center of Expertise coordinates congressional notification, provides guidance and information of best practices, and promotes the use of ESPCs. The Office of Finance pays the contractor and implements GSA accounting procedures.

GSA is currently pursuing 6 active projects to be funded through ESPCs although only 2 have been awarded.

In FY 1999, GSA is negotiating with Honeywell, Inc. for a \$1,500,000 contract for energy conservation measures at the Leo O'Brien Federal Building in Albany, NY.

In FY 1999, GSA Region 4 is working with 3 Super ESPC contractors in 3 different states to consider contractor identified energy conservation opportunities. To date, only 1 contract will be signed late this fiscal year. GSA is currently waiting for the congressional notification time period to expire prior to signing the contract. This project includes a \$9 million chiller plant replacement at the Richard B. Russell Federal Building and Courthouse.

The annual savings anticipated from GSA's ESPCs and utility contracts currently in place are 52,298 million BTU and \$1.73 million.

### **Utility Partnerships**

In 1999, GSA used area wide utility contracts and basic ordering agreements to obtain utility financing of energy projects as follows:

- In Vermont, GSA completed construction and started payments on four utility financed projects at U.S. Border Station facilities that were awarded in 1998. These projects consisted of installing energy efficient T-8 lighting and electronic ballast retrofits. Total project costs were \$4,872, with an expected annual savings of \$3,735 and 153.71 MMBtus.
- In Florida, a \$235,226 project financed through the GSA utility area wide contract started payments in September, 1998.
- In GSA Region 4, a \$1,102,128 project is

scheduled to start payments in October, 1999.

- GSA Region 11 started payments on a \$1,589,884 utility financed project. Also, Region 11 is working with the utility company to implement a \$20 million utility financed cogeneration project.

### **Procurement of Energy Efficient Products**

GSA continues to support the procurement of energy efficient products through a number of activities. GSA provides product supply schedules that promote energy efficient and environmentally preferable products and mandates the purchase of ENERGY STAR® computers and office equipment. GSA is a signatory to and an active participant in the "Procurement Challenge," a DOE FEMP interagency program designed to identify the most energy efficient products and to increase the purchase of these projects.

### **Environmental Benefits of Energy Management**

GSA continued advocating Planet GSA, which calls attention to four key areas in which GSA already plays a significant role: "buying green," "building green," "driving green," and "saving green." GSA is working on these four areas while pursuing its mission of creating great workplaces.

- *Buying Green.* GSA manages a nationwide recycling program for 650,000 Federal employees in 1,100 Federal buildings. GSA is going paperless in the procurement process and using electronic billing and payment systems. GSA products are advertised on the Internet at <http://www.gsa.gov>. GSA's Environmental Products Guide carries over 3,000 products and services that are environmentally oriented.
- *Building Green.* GSA will implement sustainable design principles in designing, constructing, modernizing, and disposing of its buildings. In FY 1998, GSA funded experts to design the Denver Courthouse projects to serve as a model for its sustainable buildings program. GSA chooses products with recycled content, for example: insulation, cement and concrete, latex paint, carpets, shower dividers, and restroom partitions. GSA installs water-saving devices and plumbing fixtures. GSA reduces the amount of construction waste it produces.
- *Driving Green.* GSA bought 24,000 alternative-fuel vehicles (AFVs) for the nationwide Federal fleet GSA manages. AFVs can run on ethanol, methanol, natural gas, or electricity thereby reducing reliance on foreign oil; they also create less pollution than gasoline engines. The Energy

Policy Act of 1992 requires that within the largest cities in 1998, 50 percent of all new vehicles must use alternative fuel. GSA's objective for FY 1999 is that 75 percent of such vehicles will be AFVs. To help meet the challenge, GSA has waived lengthy justifications to upgrade from a compact sedan to a mid-size AFV.

- *Saving Green.* GSA follows the Energy Center of Expertise business plan that includes installing the most energy efficient equipment to operate its building mechanical systems. In New York and San Francisco, GSA is testing new lighting technologies and lighting-control strategies. In the Northeast, GSA has awarded a contract that can provide "green power" for up to five percent of Federal needs. GSA is a recognized leader in energy conservation. GSA has contracted on behalf of EPA to purchase 100 percent green power for EPA's Richmond, CA lab.

GSA has signed the DOE and EPA MOU for ENERGY STAR® Partnerships and received a charter member designation for the Foley Square Federal Building at 290 Broadway in New York City. This was the only Federal Building to receive and ENERGY STAR® Building designation. GSA worked with EPA to upload data about GSA's building inventory into the Benchmarking tool web site. Over 700 buildings have been preliminarily evaluated and it appears that over 200 will qualify as ENERGY STAR® Buildings. GSA will take actions to increase the number qualifying buildings.

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## 16. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

### Energy Efficiency Performance and Implementation Strategies

During FY 1999, the National Aeronautics and Space Administration reported a 28.9 percent reduction in buildings energy consumption in Btu per gross square foot compared to FY 1985.

**NASA Performance Toward Buildings Energy Reduction Goals**



**NASA Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	2,433.4	35,502.0
Fuel Oil	78.5	281.0
Natural Gas	1,221.0	4,113.0
Propane	4.6	30.0
Purchased Steam	110.3	3,089.0
<b>Total</b>	<b>3,847.8</b>	<b>43,015.0</b>

NASA manages nine Centers, one Federally Funded Research and Development Center (FFRDC), and several component facilities and off-site program facilities from its Washington, DC, Headquarters.

NASA's mission variable and industrial facilities, although exempt from NECPA requirements, are the Agency's biggest energy consumers, representing over 60 percent of total facility energy costs. For this reason, NASA has established an internal goal to improve the energy efficiency of mission-variable buildings by 10 percent by FY 2000 compared to FY 1985 levels, where cost-effective and without adversely affecting mission performance.

From FY 1991 through FY 1999, NASA completed energy audits for 74.4 percent of its total building square footage, including 74.3 percent of non-exempt square footage, and 74.5 percent of exempt and industrial square footage.

Dryden Flight Research Center requested DOE SAVEnergy audits for seven buildings totaling 420,000 square feet. The comprehensive audits will be conducted in early FY 2000.

Langley Research Center initiated a survey of approximately 32 laboratories to determine where once-through cooling watersystems exist. These systems will be replaced with alternate cooling systems where cost-effective.

During FY 1999, NASA implemented several projects identified during energy efficiency audits. Glenn Research Center completed a project to install new HVAC units, water lines, and lighting in its Building 14. The project is expected to save \$52,300 annually. The Center initiated a project to rehabilitate the mechanical system in Building 77 with new four-pipe fan coil units and lighting. This project is expected to save \$26,400 annually. The mechanical and electrical systems in Building 302 are also being rehabilitated with new exhaust fans and office fan coil units, modern office lighting, and replacement windows. This project is expected to save \$62,200 annually.

Langley Research Center initiated various maintenance augmentation tasks including roofing and HVAC replacement projects at a cost of \$2.2 million. These projects will save \$446,000 annually.

Goddard Space Flight Center initiated HVAC and lighting system upgrades in various buildings that will reduce energy costs by \$59,000 annually. The Center also continues to expand the control capabilities of its direct digital control energy management control system to additional buildings.

Kennedy Space Center initiated several energy efficiency projects in FY 1999. The HVAC system in the M7-351 Training Facility is being replaced with a state-of-the-art system using chilled water from the central plant, wrap-around water transfer coils, a carbon dioxide demand ventilation control, and direct digital controls. The new system eliminated use of CFC 12 refrigerant, demonstrates new technologies, and will reduce energy costs by about \$13,000 annually. The Center also replaced lighting fixtures and lamps as part of the facility rehabilitation project for the M7-657 Parachute Refurbishment Facility. The project will save \$8,000 annually. Use of parabolic louvers increases illumination at working surfaces and reduces glare from bright white parachutes. Another project was initiated to replace or retrofit lighting in the Launch Control Complex with energy efficient fixtures. The project will

reduce energy costs by \$70,000 annually by incorporating T-8 lamps with electronic ballasts and occupancy sensors. A project was completed in Building M6-342 that replaced 3-way chilled water valves with 2-way valves and installed a variable speed pumping system to reduce pumping costs. The project also installed direct digital controls to reduce overcooling and reheat, saving \$9,000 annually.

Kennedy Space Center completed a project to reuse wash and rinse water from the solid rocket booster parachute cleaning process. The reclaimed water is pumped to the Industrial Area Chiller Plant where it is reused as make-up water for the plant's cooling towers. The system reclaims 50,000 gallons of water per shuttle flight or approximately 300,000 gallons annually. This innovative project was selected to receive a 1999 Federal Energy and Water Management Award.

The Michoud Assembly Facility expanded its natural gas metering system by installing electronic natural gas meters on a number of buildings. The meters are connected to the central energy monitoring and control system. The project cost totaled \$50,000. The meters will be used to track gas consumption and calculate air emissions from industrial process equipment.

In FY 1999, the Merritt Island Launch Annex replaced a motor generator set serving an antenna with solid-state technology. Also at Merritt, installed air conditioning capacity was reduced in one building by 7.5 tons due to changes in building operations. These measures will reduce energy costs by \$2,000 annually.

NASA continues to make significant progress in reducing the use of petroleum-based fuels in buildings and facilities. Petroleum, including fuel oil and liquefied petroleum gas, represents 10 percent of NASA fuel consumption in fixed facilities and 3.6 percent of total fixed facility energy usage.

#### **Solar and Other Renewable Energy**

NASA Headquarters continued its partnership with the DOE National Renewable Energy Laboratory (NREL) to identify opportunities for increasing NASA's use of renewable energy technologies. The effort produced a draft Million Solar Roofs Implementation Plan and a guide specification for terrestrial photovoltaic power systems.

NREL also assisted several NASA Centers in developing renewable energy projects, including providing assistance to the Dryden Flight Research Center in determining the feasibility of a hybrid/modular gas-fired boiler heating system. The study concluded that solar ventilation preheat is viable

for use in reducing natural gas utilization for space heating, however, the reduction in boiler size to "right size" the units was the most cost-effective approach. NREL also completed a comprehensive renewable energy opportunities study for the Center using the Federal Renewable Energy Screening Assistant (FRESA) software. The study identified nearly \$2 million in potentially cost-effective renewable energy projects including wind generation, daylighting, and lighting controls, and other technologies.

NREL assisted the Kennedy Space Center in determining the feasibility of a solar thermal pre-heating system that will reduce electricity consumption at a photographic film storage facility that must maintain low humidity conditions. The system will use 640 square feet of solar collectors to pre-heat the reactivation air stream for the facility's desiccant dehumidification equipment. The \$85,000 project will be jointly funded by the DOE Million Solar Roofs Program, NASA, and the Florida Solar Energy Center.

Ames Research Center plans to install a small wind-driven water pump in a remote area of the Center as part of a Super-ESPC delivery order planned for award in FY 2000. The system is expected to pay for itself in two years.

Johnson Space Center is currently working with DOE/FEMP to develop a follow-on Super-ESPC delivery order to install a solar water heating system for the astronaut training pool at the Sonny Carter Training Facility.

Marshall Space Flight Center plans to install a solar ventilation preheat system at the Building 4760 Surface Treatment Facility. Due to the large tempered make-up air requirement of the building, this \$100,000 project will save \$14,000 annually in steam heating costs.

#### **Showcase Facilities**

The Marshall Space Flight Center Project Engineering Facility, Building 4203, was designated as a NASA showcase facility. The facility features many state of the art energy efficiency environmental quality measures such as tinted windows, a variable air volume HVAC system, non-CFC chillers, an automated energy management system with direct digital controls, self-illuminating exit signs, and a radon venting system. The building is heated with steam from the Army's Redstone Arsenal steam distribution system, which is connected to the City of Huntsville's solid waste-to-steam plant.

#### **Personnel Development**

In FY 1999 NASA energy managers attended numerous energy training courses offered by DOE/FEMP, the

Department of Defense, professional associations, trade organizations, and educational institutions. The DOE's regional Super ESPC Delivery Order Workshops were particularly well attended by NASA energy personnel. The majority of NASA energy managers also attended a NASA-sponsored working meeting held in April 1999 in Cleveland, Ohio. The purpose of the meeting was to discuss ESPC contracting, the requirements of the proposed Executive Order on Greening the Government through Efficient Energy Management, and the new energy reporting capabilities of the NASA Environmental Tracking System (NETS). NETS is an agency-wide database application that supports the collection, aggregation, analysis, and reporting of environmental information required for agency-level reporting to other Federal agencies and organizations, agency-wide metrics, and functional management.

NASA is in the process of developing an energy and water conservation training course for Center energy managers and facility professionals. The course will be a four-day program offered through NASA's Academy of Program and Project Leadership.

NASA Headquarters and Center personnel also participated in various energy awareness activities throughout the fiscal year. These activities centered around the DOE/FEMP You Have the Power programs, Earth Day observances, and community outreach programs, including alternative community and transit programs.

The Kennedy Space Center Base Operations Contractor established the Energy Achievement Goals for Life and Environment awards program. The award recognizes employee contributions to energy and water efficiency and environmental improvement. During FY 1999, an award was given to an employee for reducing unneeded hot water heating. This employee's actions will reduce electricity use by more than 200,000 kilowatts per year and save \$9,400 in annual energy costs.

**Funding**

NASA-funded facilities energy conservation projects are divided into two categories. The first consists of minor capital improvement projects (under \$500,000) that can be achieved with Center funds. The second consists of major capital improvement projects (over \$500,000) requiring Construction of Facilities (CoF) program funding. Energy conservation projects must compete with all other construction projects for CoF funding. Life-cycle costing is the primary tool for analyzing energy retrofit projects.

It is not possible to accurately break out the cost of energy efficiency and water conservation measures

from the overall budgeted amount for CoF discrete, repair, and rehabilitation and modification projects. The following estimate of FY 1999 and FY 2000 direct agency expenditures for energy efficiency and water conservation improvement projects and audits is based on data reported by the Centers and Component Facilities:

	<b>FY 1999</b>	<b>FY 2000</b>
Direct Agency Expenditures	\$18,509K	\$20,162K

**Energy Savings Performance Contracts (ESPCs)**

In FY 1999, NASA made major strides in implementing ESPC contracts. NASA's first Energy Savings Performance Contract (ESPC) delivery orders were awarded at three different Centers, including the largest delivery order awarded to date through a DOE Regional Super ESPC. Up to nine additional ESPC delivery orders are planned for FY 2000.

Ames Research Center, Mountain View, CA, has received a delivery order proposal for projects that will reduce energy consumption and related operations and maintenance costs at the Center. The work involves the installation of energy-efficient lighting systems in buildings, variable speed drives on chilled water and hot water pumps, and an automated building energy management and control system. Annual savings of \$380,000 are anticipated, and final negotiations are currently in progress. The delivery order is scheduled for award through the DOE Western Region Super ESPC contract in early FY 2000.

Goddard Space Flight Center, Greenbelt, MD, established its own multiple award indefinite delivery/indefinite quantity (IDIQ) ESPC contracts with two Washington, DC-area small, disadvantaged energy service companies. Both IDIQ contract vehicles were awarded in May 1998. Each has a maximum value of \$5 million. These contract vehicles will provide for the installation of energy-efficient equipment in various buildings at Goddard Space Flight Center and Wallops Flight Facility, Wallops Island, VA, including replacement of light fixtures, installation of motion sensors, LED exit signs, and other energy savings technologies. The first delivery order for lighting upgrades in Building 8 was issued in early FY 1999. A second delivery order for lighting upgrades in Building 28 was issued in late FY 1999. Together, these two projects will save \$50,000 per year in energy costs.

Johnson Space Center, Houston, TX, awarded the largest delivery order to date under a DOE Super ESPC contract. The comprehensive delivery order involves work in five different areas at the Center with a total capital investment of over \$20 million. The work includes installation of energy-efficient lighting



systems, variable speed drives on chilled water and hot water pumps, synchronous belt motor drives, low-flow aerators on restroom fixtures, low-flow flush valves on urinals and water closets, and an automated building energy management and control system. It is estimated that the project will save more than \$2 million annually, and was featured in the June 1999 TeleFEMP VII satellite broadcast.

Kennedy Space Center, Florida, is working with DOE to award a minimum purchase project under the DOE Southeast Region Super ESPC contract. The project will provide energy-efficient lighting and HVAC system modifications for eight buildings. Annual energy savings of \$368,000 are anticipated. Kennedy Space Center is also working with the Air Force 45<sup>th</sup> Space Wing to include NASA buildings in the scope of a new Air Force ESPC project planned for the Cape Canaveral Air Station. The project will reduce energy consumption and bring natural gas to Cape Canaveral Air Station via a pipeline extension from Kennedy Space Center under the Banana River.

Glenn Research Center at Lewis Field awarded a minimum purchase delivery order to Duke Solutions, Inc., under the DOE Midwest Region Super ESPC contract. The work involves lighting system upgrades and lighting controls for 15 buildings and installation of a boiler economizer and lower drum steam heating coil in Building 12. The project will save \$240,000 annually.

#### **Utility Partnerships**

NASA Centers received no utility rebates or other incentives in FY 1999. However, several NASA Centers and component facilities continued to receive utility cost credits by voluntarily shedding electrical loads or operating standby generation capacity when requested by their local utility companies. Centers have also received large reductions in energy costs through negotiations with utility suppliers or by taking advantage of cost savings programs.

For example, Ames Research is saving \$400,000 annually on electrical demand charges associated with wind tunnel operations by joining Pacific Gas and Electric's Real Time Pricing program. Michoud Assembly Facility, New Orleans, LA, negotiated a lower electrical rate with its local utility company and the state utility regulators. The new rate will save NASA \$240,000 annually in energy and demand charges. Stennis Space Center, MS, initiated discussions with its local utility company to install power factor correction capacitors through a utility energy efficiency service contract. Annual savings of \$192,000 are anticipated.

In addition, Kennedy Space Center issued a delivery order to Florida Power and Light (FPL) to finance and construct the upgrade of the LC-39 Emergency Generator Plant. Construction was completed in FY 1999 and the plant is now being used for emergency backup and peak shaving under FPL's Commercial/Industrial Load Control (CILC) program. The \$6.83 million project will be repaid over a period of 15 years using electricity service rate savings, which is projected at \$770,000 annually.

#### **Procurement of Energy-Efficient Products**

NASA Centers and component facilities are actively procuring energy efficient goods and products that are the most life cycle cost-effective. In FY 1999, NASA Centers and Component Facilities continued to install high efficiency electrical products such as variable frequency drive systems for fans and replacements for incandescent bulbs, light emitting diode (LED) and other low power consumption exit lights, and occupancy sensors. Procedures have also been adopted to procure ENERGY STAR® personal computers whenever possible.

Several roof-top package air conditioning units and heat pumps were replaced at Kennedy Space Center in FY 1999 with smaller and more efficient units. These measures will result in savings of \$4,000 annually. The Center also installed more than 1,300 motion sensors to control lighting systems and purchased 400 ENERGY STAR® compliant computers.

#### **Environmental Activities**

Several Centers have established fluorescent tube and PCB ballast recycling programs, or specify only low-mercury "green" fluorescent lamps as replacements since they may be disposed as non-hazardous waste.

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## 17. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

### Energy Efficiency Performance and Implementation Strategies

The National Archives and Records Administration (NARA) owns and operates 13 separate facilities dedicated to the preservation, storage, display, and use of historical documents and artifacts. Because stringent storage requirements are very energy-intensive and preclude major changes in operational parameters to conserve energy, all of the NARA facilities are excluded from the energy reduction requirements of the National Energy Conservation Policy Act (NECPA).

NARA's yearly energy usage figures from FY 1999 show a continued reduction in energy use and are a reflection of the implementation of NARA's Energy Plan. Examples of measures taken to reduce the energy consumption during this time period are:

- Participation in electrical companies' load curtailment programs;
- Load-shedding policies at individual facilities;
- Lamp and ballast replacement projects;
- LED exit light retrofit projects;
- Installation of a cooling tower with VFDs to control the fan motors;
- Modification of AHU ATC sequences so that the discharge temperature is reset based on the return air temperature;
- Operational modifications made to reduce energy consumption;
- Installation of lighting controls;
- Replacement of existing equipment with new high-efficiency equipment.
- Operation of the emergency generator at specific times to reduce the electrical peak demand rate charge; and
- Modification of the AHU discharge air temperature set point based on heating/cooling seasons.

NARA's policy is to continue to maximize the operational efficiency of its buildings and minimize energy consumption. Items that are being planned for FY 2000 are:

- Continued implementation of energy conservation policies;
- Replacement of chillers at one of NARA's library facilities;
- Implementation of an ESPC at one of NARA's library facilities;
- Replacement of lighting systems with efficient lamps and ballasts; and
- Continuing a joint energy purchasing agreement at one of NARA's library facilities with other Federal agencies in the area.

In addition, energy and water surveys are continuing to be done in conjunction with NARA's building assessments and evaluations.

### Showcase Facilities

NARA is currently reviewing its facilities to determine if any qualify to be showcase facilities.

### Personnel Development

NARA has an overall incentive award program that includes an award for exceptional performance in energy conservation.

### Energy Savings Performance Contracts

An energy audit and the negotiation of an ESPC was recently completed at one of the NARA facilities. The work has begun and will result in an energy savings of \$34,057 annually.

### Procurement of Energy Efficient Products

NARA's agency wide policy is to purchase and specify energy efficient equipment whenever it is feasible and cost economical.

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## 18. NUCLEAR REGULATORY COMMISSION (NRC)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Nuclear Regulatory Commission's (NRC) One White Flint North (OWFN) building reported a 3 percent decrease in energy consumption compared to FY 1989, the first full year the building was occupied. Two White Flint North reported a 2 percent increase in consumption compared to its 1995 base year.

#### NRC Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	86.0	1,959.0
Natural Gas	1.0	8.0
Total	87.0	1,967.0

The energy management strategies implemented for both the OWFN Building and the Two White Flint North (TWFN) building in FY 1999 are:

- Utilization of an automated energy management system to maximize energy efficiency of HVAC equipment;
- Implementation of an employee awareness program that includes turning off lights when not in use;
- Utilization of occupancy sensors to control interior lighting;
- Utilization of HVAC free cooling using heat exchanger technology;
- Reduced chiller operations;
- Energy-efficient design technologies in construction and space renovations;
- Quality Assurance inspections and Quality Control to identify wasteful and/or good operating practices;
- Enhanced water treatment and filtering to improve energy-efficient equipment operations;
- Utilization of water management and conservation technology; and
- Implementation of commercial facilities management contract requirements to conserve energy by prudent equipment operating procedures

and maintenance.

### Showcase Facilities

Security restrictions limit public access to OWFN and TWFN, thereby reducing their availability as showcase facilities. However, upon completion of noteworthy energy reduction projects, NRC will request that DOE publish a case survey in its FEMP Focus newsletter.

### Personnel Development

NRC is an active participant in the Interagency Energy Management Task Force. Members have attended seminars, workshops, and conferences sponsored by the Task Force.

Appropriate personnel have been trained and instructed to procure ENERGY STAR® and other energy efficient equipment. The building operating contractor has received training in the goals of the energy conservation program and specific guidance on meeting these goals.

Implementation of energy conservation projects are included as elements in the position descriptions and performance plans of NRC facility managers.

### Energy Savings Performance Contracts

Initiatives are underway to meet the requirements of Executive Order 13123 with regard to using Energy Savings Performance Contracts (ESPCs). A technical support team has been designated to expedite and encourage the use of these contracts as a financing mechanism to accomplish energy reduction projects.

NRC's strategy is to use the DOE Mid-Atlantic Super ESPC. Meetings have been held with DOE officials to discuss program requirements. The Interagency Agreement and Memorandum of Understanding will be signed during the first quarter of FY 2000. A comprehensive energy audit and life-cycle cost analysis of OWFN will be completed in the second quarter of FY 2000 by the DOE contractor. The audit will identify potential energy reduction projects and determine the payback period of the projects. If the DOE contractor identifies economically feasible projects, NRC will enter into an ESPC with DOE.

NRC will establish a contract for a separate comprehensive energy audit for TWFN that will establish recommendations similar to those anticipated under the ESPC program for OWFN.

### Procurement of Energy Efficient Products

NRC has acquired desktop computers and monitors that are ENERGY STAR® certified. NRC will continue to use

the ENERGY STAR® certification as a selection criteria for other energy-using products. Additionally, the specifications for OWFN and TWFN building operation and management services require the contractor to operate and maintain the facilities in accordance with the National Energy Conservation Policy Act and Federal Supply Product Standards.

NRC also has an ongoing program to purchase goods and products containing recycled materials, and to recycle aluminum cans, paper, cardboard, glass bottles, and laser toner cartridges.

#### **Utility Partnerships**

During FY 1999, TWFN building participated in the Potomac Electric Power Company's (PEPCO) voluntary load curtailment program.

#### **Workforce Transportation**

NRC has implemented several initiatives to reduce gasoline consumption including:

- A video conferencing program which reduces the number of employees traveling;
- A transportation program which promotes the use of car and van pools and provides priority parking at the NRC site to employees who use them;
- A subsidy program for employees who use public transit;
- Bicycle racks and shower facilities are provided for employees who commute by bicycle;
- A partnership agreement with a local transportation organization provides free transportation home when an employee who commutes by car or van pool or public transit has an emergency; and
- Use of other incentives such as flextime and compressed work schedules to reduce employee trips.

These strategies have enabled NRC to reduce daily vehicle trips by 227 to the NRC Headquarters site.

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## 19. RAILROAD RETIREMENT BOARD (RRB)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the Railroad Retirement Board reported an increase in energy consumption in buildings of 3.1 percent in Btu per gross square foot compared to FY 1986, the year it was delegated authority to operate its building by GSA.

#### RRB Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	19.7	493.5
Natural Gas	24.2	83.4
Total	44.0	576.9

The headquarters building in Chicago, Illinois, is the only building over which RRB has operational control. RRB operates and maintains the building under a delegation of authority agreement with the General Services Administration (GSA).

RRB updated its energy conservation plan in March 1993 to incorporate the requirements of NECPA, Executive Order 12759, and EPACT.

A facility energy audit of the headquarters building was conducted by consultants in 1994, using life cycle cost analysis. Partly as a result of this audit, RRB has invested in energy-efficient equipment and items such as T-8 lamps, electronic ballasts, compact fluorescent bulbs, light sensors, air controllers, new energy-efficient motors on all air handling units, timers on water fountains, automatic faucets in six rest rooms, new caulk on the inside of windows, and re-insulation of steam and water pipes which have helped reduce energy and water consumption. Also, RRB operating procedures have been refined further to achieve the maximum energy savings, including a significant reduction of staff hours worked on Saturday.

### Personnel Development

This agency does not meet the definition of an executive department under section 101 of Title 5 and therefore is not subject to the energy management training provision of the Energy Policy Act (EPAct). However, personnel responsible for energy management will receive the additional training that is to be provided by GSA under the EPAct requirements.

### Funding

RRB utilizes building operation funding for energy conservation measures. Between \$10,000 and \$20,000 per year of building operating funds are available for such measures. GSA, as the Government owner of the RRB building, has the responsibility to fund projects over \$50,000 and has future projects planned but not funded.

### Energy Savings Performance Contracts

RRB has not entered into any energy saving performance contracts. The comparatively small size of potential contracts available to RRB at a \$50,000 limit because of the delegation of authority agreement with GSA is not practical for this type of procurement.

### Utility Partnerships

RRB will be joining other area businesses in curtailing electricity use during the summer's peak demand periods. Upon notification, an energy action plan will be implemented—a predetermined checklist of electrical equipment and/or circuit breakers that can be switched off. These curtailment efforts are not expected to impact comfort or safety. Each agency will pay the contract price for electricity, which will be time-of-day and load-sensitive. GSA will provide assistance in purchasing the necessary meters. RRB has submitted its energy requirements to GSA for participation in this program, but was not selected. RRB will attempt to be included in a utility contract at another time.

### Procurement of Energy Efficient Products

RRB has developed procedures to ensure procurement of energy-efficient products whenever cost-effective.

### Environmental Benefits of Energy Management

New electric chillers installed by GSA utilize approved R-22 refrigerant. All obsolete fluorescent ballasts have been and will continue to be disposed of safely. Older CFC drinking fountains are being replaced with new energy-efficient, non-CFC refrigerant fountains.

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## 20. SOCIAL SECURITY ADMINISTRATION (SSA)

### Energy Efficiency Performance and Implementation Strategies

#### SSA Buildings Energy Use and Costs, FY99

	BBtu	\$ (Thou.)
Electricity	639.8	11,864.0
Fuel Oil	3.5	10.4
Natural Gas	132.0	1,137.3
Purchased Steam	26.4	358.5
Total	801.8	13,370.2

SSA has aggressively pursued GSA funding to install energy efficient systems and equipment. SSA invested \$2.3 million of its own funds in energy efficient lighting conversions in FY 1998 and \$750,000 in FY 1999. These renovations should yield \$800,000 in annual energy and maintenance savings. By the year 2001, SSA will have implemented all energy and water conservation projects in its delegated buildings, not scheduled for a prospectus project.

SSA has developed building action plans for each of its federally-owned delegated buildings. These plans list feasible energy and demand savings projects. Each project listing includes the payback period, and projected energy savings.

While SSA's energy initiatives will produce significant energy consumption and cost efficiencies, substantive changes in the way SSA does business have affected the use of its facilities and related energy costs. These changes include:

- Significantly increasing automation at SSA. Prior to 1985, SSA had few personal computers or associated equipment. Now with the introduction of local area networks (LANs), systems include personal computers, scanners, printers and other peripherals as the baseline of support for all SSA's programmatic and operational activities.
- Expanding hours of operation. To achieve the world-class public service for which SSA is known and to provide a worker-friendly workplace, SSA opens its buildings for 12 hours a day, frequently extended to 14 hours a day, plus 8 to 16 hours each weekend. This level of service to the public and commitment to flexibility for its employees increases energy consumption and impacts its energy reduction efforts.
- Consolidating employees into government-owned

space. SSA has improved space utilization in many of its larger buildings. Recently, 400 SSA employees formerly housed in prime leased space in San Francisco moved to its Western Program Service Center (WNPSC) building in Richmond, California. The energy these employees consume is now a part of SSA's baseline data.

SSA has implemented projects at all of its delegated buildings to meet the required 10-year payback established in EPACT.

Each of SSA's government-owned delegated buildings has an energy action plan. These plans identify critical systems, outline the most cost effective way to operate the building and identify energy/water conservation projects. The projects are based on information provided in the comprehensive energy and water audits performed at its facilities.

SSA's strategy for meeting the goals established in the Energy Policy Act of 1992 (EPACT) and Executive Order 13123 are being carried out through a combination of energy audits, energy conservation projects and prospectus level projects throughout its delegated space. Prior to August 1986, the General Services Administration (GSA) was responsible for all SSA-occupied space. Since then, GSA has delegated to SSA the operational and maintenance responsibility for 9,380,000 gross square feet of space, part of a total of 26,807,000 gross square feet of space occupied by SSA nationwide.

In conjunction with GSA, SSA has completed or expects to complete in excess of \$67 million in renovations to its delegated buildings between Fiscal Year (FY) 1997 and FY 2000. The vast majority of these renovations are GSA-funded prospectus level projects. These projects, while not exclusively energy projects, will significantly affect its energy baseline by installing: 1) energy efficient central heating and air conditioning plants; 2) energy efficient windows and doors; 3) new central computer-based energy management systems; natural day lighting; and, 4) lighting controls.

SSA recently conducted comprehensive energy audits of its entire inventory of federally-owned delegated space. Audited facilities include:

- Northeast Program Service Center, New York, New York;
- Mid-Atlantic Program Service Center, Philadelphia, Pennsylvania;

- Wilkes-Barre Data Operations Center, Wilkes-Barre, Pennsylvania;
- Woodlawn Headquarters Complex, Woodlawn, Maryland;
- Western Program Service Center (WNSPC), Richmond, California; and,
- Great Lakes Program Service Center, Chicago, Illinois.

These audits covered 90 percent of SSA's delegated space; the remaining 10 percent is leased space.

Energy efficiency projects completed in FY 1999 include:

- Energy-efficient lighting, Operations Building, Woodlawn, Maryland;
- New Cooling Towers, Mid-Atlantic Program Service Center, Philadelphia, PA;
- Automatic Revolving Doors, Mid-Atlantic Program Service Center, Philadelphia, PA;
- Water Conserving Fixtures, Mid-Atlantic Program Service Center, Philadelphia, PA; and,
- Energy-efficient Lighting, Wilkes-Barre Data Operations Center, Wilkes-Barre, PA.

In FY 1999 comprehensive energy and water audits were completed at SSA delegated facilities, which had not been previously audited. SSA expects to implement projects identified in these comprehensive audits. SSA has budgeted for this work and may use ESPCs or area wide utility contracts for those projects for which SSA does not have sufficient funding. SSA anticipates using area-wide utility contracts in New York, Baltimore and Chicago to implement energy conservation and demand side management projects identified in comprehensive audits performed by local utility companies.

SSA has audited all of its government-owned delegated space as indicated above. From the six comprehensive energy audits conducted in FY 1999 SSA has initiated five projects. SSA is completing a feasibility study for a comprehensive heating and cooling plant upgrade at its building in New York. SSA does not have sufficient funds to accomplish this work, but has established a team to implement a performance contract through an existing area-wide utility contract.

A major water conservation project was completed at its WNSPC, in Richmond, California in December 1999 to use water from an underground stream for:

- irrigation;
- gray water for flushing water closets; and,
- make up water for cooling towers.

SSA has taken several steps to reduce its need for petroleum products. At the Security West leased facility in Baltimore, Maryland, SSA has converted the existing boiler from oil to natural gas. At the NCC, SSA installed a new chiller and boilers that operate on dual fuels (natural gas and oil) to allow for flexibility in the operation of the plant and use of the lowest cost fuel.

In cooperation with GSA, SSA has purchased competitive power as utility markets are deregulated. SSA now purchases competitive power for its delegated buildings in Pennsylvania. In FY 1999 SSA saved approximately \$120,000 in electric utility expenses.

SSA operates its facilities according to the energy conservation guidelines established in the Federal Property Management Regulations (FPMR) in the Code of Federal Regulations, including the latest revisions for space temperatures. SSA trains its mechanical staff and requires contractors to train their staffs to operate and maintain energy efficient equipment and systems installed in its buildings and to enhance the efficient use of new technologies.

GSA's area-wide utility contracts include all its delegated buildings and SSA is designated as an ordering official on these contracts. SSA has used them to perform energy audits and energy conservation lighting projects.

#### **Solar and Other Renewable Energy**

SSA has analyzed a variety of solar and renewable energy technologies for its headquarters buildings, but their costs keep them from being viable options. Solar lighting was installed at its NCC as a demonstration project. SSA explored installing daylighting in some of its warehouse space, but it was not economically feasible when compared with energy efficient lighting technologies. SSA is incorporating renewable technology such as natural daylighting into its prospectus level renovations.

While solar technologies (solar hot water and solar lighting) have not proven as economically viable as energy projects, SSA is evaluating the use of solar preheating for outdoor ventilation air and ground source heat pumps as renewable technologies. SSA believes that these systems can potentially be incorporated into designs of existing and new buildings.

The SSA/GSA prospectus for a new childcare facility at its headquarters in Woodlawn, Maryland, includes renewable technologies in its design. This project has been approved for construction. Renewable technologies to be incorporated into the design of showcase facility include:

- Ground source heat pumps;
- Natural day lighting; and,
- Passive solar design.

### **Showcase Facilities**

SSA is renovating existing buildings with energy efficient technologies such as thermal storage, efficient lighting, cogeneration and passive solar technology. GSA has submitted and received approval for a prospectus project to build a new, standalone childcare facility at SSA Headquarters in Woodlawn, Maryland.

### **Personnel Development**

Building managers and staff have attended a variety of training classes and conferences: life cycle cost (LCC) analysis, alternative fuels, lighting controls, and demand side management practices. SSA staffs attend GSA regional conferences to become familiar with current strategies in GSA's program to reduce energy consumption. In FY 1998, SSA participated in a Department of Energy (DOE) interactive training program to ensure the presence of a trained energy manager in each of its delegated facilities. SSA has scheduled additional training designed to help energy managers track energy usage and cost.

SSA's Agency Energy Management Team has been established. In addition to working on implementation of Energy Savings Performance Contracts (ESPCs), SSA has used this team as a means of educating its employees about the benefits of energy conservation and methods they can use to help conserve energy.

SSA has a designated agency energy manager who meets with DOE representatives on energy conservation issues affecting SSA. SSA has a building/facilities manager at each of its delegated facilities responsible for evaluating energy use and implementing energy conservation measures. All personnel responsible for tracking energy performance have been trained in energy conservation.

SSA has incorporated energy evaluation and analysis responsibilities into Building Management Specialist positions. SSA has ensured that facilities managers in all its facilities are aware of energy regulations and guidelines. Managers monitor energy consumption and savings.

While SSA has not established an incentive program for employees implementing EPC and Executive Order 13123, SSA does award employees whose job descriptions require energy management skills and whose overall performance or individual acts are exceptional. SSA also recognizes individual contributions to energy savings through its on-the-spot and suggestion awards programs. In FY 1999, its Chief

Energy Manager's efforts were recognized when he received a 1999 Federal Energy and Water Management Award from the Department of Energy.

### **Funding**

While GSA's energy conservation funds for delegated agencies have been its primary funding source, those funds are no longer available. SSA has funded many projects itself to keep energy projects moving and achieve additional savings. For example, in FY 1998 SSA awarded \$2.3 million in lighting and lighting controls projects for SSA's Headquarters Operations and Supply buildings.

Since there are no energy conservation funds available through GSA, SSA has included funding for energy conservation measures identified in the audits in its operating plan for FY 2000 and 2001. SSA is using both agency and delegations funds to accomplish energy conservation projects.

### **Energy Savings Performance Contracts (ESPCs)**

SSA has not initiated ESPCs because many of the ideal candidate projects (primarily lighting) either have been accomplished or will be through prospectus work. To date, SSA has used direct funding for its energy conservation projects.

SSA may be able to perform some smaller projects through an ESPC, e.g., converting the remaining lighting and motors to energy efficient technologies. Other projects (variable frequency drives for pumps, elevators, and air handlers) can be accomplished through an ESPC. All projects will need to have an adequate return on investment for potential bidders to have sufficient interest in performing the work.

### **Procurement of Energy Efficient Products**

SSA selects 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, and electric motors. Before large capital equipment is installed, various types of equipment are analyzed, through energy audits, for the lowest life cycle cost. Examples of equipment analyzed are: pumps, air handlers, heating and cooling equipment. SSA's facility managers recognize the need to conserve energy and actively reduce energy consumption through smart management of its facilities.

Procurement of energy efficient goods has been one of the topics for action at the kick-off meeting of SSA's Agency Energy Management Team. The use of government credit cards for micro-purchases have



empowered many employees. SSA is enhancing training for employees and micro-purchasers to assure they are purchasing energy efficient products.

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Fax: 410-966-0668

#### **Environmental Benefits of Energy Management**

SSA has reduced its stock of CFC equipment dramatically. SSA has a total of 12 central plants. Three central plants are located in leased facilities, and are not within SSA or GSA's purview to replace. SSA is working with GSA on the construction of new leased space for its operations in Albuquerque and possibly in Birmingham. The new space will be CFC compliant and energy efficient.

In FY 2000 SSA will convert another central plant into new ice generating CFC compliant chillers. SSA will then have seven of its nine government-owned plants converted to new equipment. In the two remaining plants SSA is moving to install new equipment.

The central plant in the Northeastern Program Service Center, delegated to SSA in FY 1997 is not CFC compliant. In this plant, SSA intends to install new equipment through a utility energy-efficiency service contract. In its plant in the Metro West facility SSA is evaluating the feasibility of connecting to a district chilled water system and removing the old chillers. SSA will continue to address the compliance issue.

It is SSA's routine practice to recycle both lamps and ballasts. SSA has incorporated this requirement into its contracts. SSA prefers to recycle polychlorinated biphenyl (PCB) containing ballasts, as it has done for three years. All existing motors, which SSA has replaced with energy efficient motors, have been recycled. This saves landfill space and better uses limited resources.

SSA will realize additional benefits as energy conservation projects are completed. The projects initiated in FY 1999, when completed, should provide annual savings of approximately 14,764,051 Kilowatt hours. The fossil fuel required to produce this amount of electricity would have discharged 14,291 pounds of carbon dioxide, 54,334 pounds of sulfur dioxide, and 43,115 pounds of nitrogen oxides into the atmosphere. These gases are known to contribute to depleting the ozone layer and creating acid rain.

#### **Energy Management Contact**

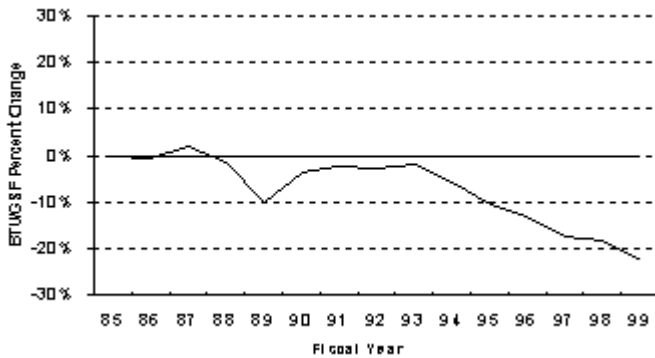
Mr. Ed Harmon  
Office of Realty Management  
Social Security Administration  
1-B-25 Operations Building  
6401 Security Boulevard  
Baltimore, MD 21235

## 21. TENNESSEE VALLEY AUTHORITY (TVA)

### Energy Efficiency Performance and Implementation Strategies

During FY 1999, the Tennessee Valley Authority reported a decrease in energy consumption in buildings of 22.8 percent in Btu per gross square foot compared to FY 1985.

**TVA Performance Toward Buildings Energy Reduction Goals**



**TVA Buildings Energy Use and Costs, FY98**

	BBtu	\$(Thou.)
Electricity	644.0	8,493.9
Fuel Oil	2.9	20.2
Natural Gas	3.8	36.7
Total	650.8	8,550.8

TVA's Energy Plan ensures the efficient use of energy in the operation, maintenance, and design of TVA buildings and facilities. During FY 1999, TVA implemented energy conservation opportunities costing \$1.49 million with a potential annual savings of more than \$650,000. This is an average payback of 2.27 years.

To meet the challenge of surveying more buildings, the DOE Facility Energy Decision System (FEDS) building energy analysis program is used to identify and evaluate potential energy conservation opportunities (ECOs). Cost effective ECOs are identified through the FEDS software, allowing manpower to be used more effectively and efficiently for implementation of measures.

The following are energy conservation projects completed during FY 1999:

Lighting and lighting control systems were upgraded at TVA facilities under SWAP II. The concept of SWAP II is to visit a facility, perform an evaluation, consider

upgrades on the lighting controls, and install controls in applications that meet a prescribed threshold. The average payback period for upgrades during FY 1999 was less than one year.

At the Cherokee Dam Reservation, non-working street lights were replaced with low pressure sodium light fixtures.

At the Chickamauga Power Service Center, restroom exhaust fans were hooked to existing motion sensors. The cost to install the technology was \$500, while the potential annual savings is more than \$1,000.

A variable frequency drive was installed on the air handler in Monteagle Place Building. The cost of the retrofit was \$9,000 and the potential annual savings is \$400 per year for energy use with a one time maintenance savings of \$10,000.

Upgrades of electrical service, heating equipment, and roof insulation were conducted at the Norris Dam Visitor Building.

More energy efficient central air conditioning systems were installed in 12 new switchhouses this year as opposed to traditional, less efficient window units.

The Natural Resource Building had an excessively complex system to control the cooling tower and electric heaters for the water loop heat pump system. This was replaced with a simpler, more efficient system.

TVA has installed energy management systems at more than 25 other facilities.

### Solar and Other Renewable Energy

To save energy and periodic maintenance costs, solar panels have been installed to power FAA warning lights at four locations.

TVA has developed a project in which it is following the development of technologies for wind turbines and for solar PV and thermal. TVA is evaluating sites within the Tennessee Valley for potential wind farm siting. The status of this project is as follows:

- The wind monitoring program has been completing and identifying potential wind sites.
- Recommendations to conduct advanced monitoring are under consideration right now.
- The solar technology following program will continue to assess technology advances and pricing trends.

- A PV installation to support green pricing will be a visible demonstration of this technology.

#### **Showcase Facilities**

The 738,500 gross square foot Knoxville Office Complex (KOC) in Knoxville, TN continues to be TVA's building showcase, as a new showcase facility was not designated for FY 1999. With over 20 energy-efficient and environmentally friendly measures implemented, building energy use in the KOC was reduced by 23 percent.

#### **Personnel Development**

TVA provides training for employees in order to accomplish objectives for the Internal Energy Management Program (IEMP). TVA provides updates on current Federal requirements and regulations for employees, managers, and TVA customers, when requested. Ongoing energy management training is provided to managers of facilities. Building energy monitors are appointed and trained for all primary corporate buildings. TVA also educates staff in both energy and environmental related topics through the TVA University.

#### **Funding**

Funding procedures for energy management and related environmental projects are reviewed through the IEMP and through the AEMC. Recommendations and comments are submitted to the proper organizations. 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.

#### **Energy Savings Performance Contracts (ESPCs)**

TVA considers the use of Energy Savings Performance Contracts (ESPCs) when cost effective for TVA and its customers. During FY 1999, TVA did not enter into any ESPCs.

#### **Procurement of Energy-Efficient Products**

TVA's affirmative procurement policy includes a statement that energy management and efficiency will be considered along with environmental impacts when new or replacement equipment is purchased.

TVA continues its efforts to buy materials that have positive environmental qualities. In FY 1999, TVA purchased \$1.5 million of materials that met requirements of the Resource Conservation and Recovery Act (RCRA), and \$1.4 million of other recycled content materials. TVA also purchases

materials which meet sustainable architecture criteria (materials which are non-toxic, have recycled content and whose creation, use, and disposal do not damage the environment). TVA's total environmental purchases exceeded \$6.1 million in FY 1999.

#### **Utility Partnerships**

TVA continues to support electrical demand-side management activities in lieu of building additional generation. This is achieved through good working relationships with retail power distributors and large industrial customers.

TVA partners with power distributors to provide direct load control by utilizing cycling switches on water heaters and air conditioners. These switches allow for reduction of peak demands during critical load periods.

TVA has entered into rate incentive contractual arrangements with power distributors and industrial customers to provide for interruption of industrial loads during peak demand situations.

#### **Vehicles**

As a major supplier of electricity, TVA is particularly interested in supporting the use of electric vehicles (EVs). TVA continues to incorporate EVs into its fleet operations, and continues to support power distributors and local communities with EV technology demonstrations.

TVA's alternative fueled vehicle (AFVs) fleet consists of 20 EVs, which are: one van, nine sedans, and 10 pickup trucks. In FY 1999, TVA entered into an agreement with a major auto manufacturer for five leased EVs to add to its current fleet.

#### **Environmental Benefits of Energy Management**

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 and pick-up routing schedules and just-in-time delivery was expanded throughout TVA. This coordinated effort avoids double handling, multiple trips to the same sites, and reduces deadheading.

During Federal Energy Awareness Month, an energy exhibit was displayed for a week at each of TVA's major corporate locations. The exhibit informed TVA employees about Federal energy requirements, the steps TVA is taking to meet those requirements, and encouraged employees to help reduce energy use. The display showed how much energy each piece of equipment in an office uses in one year and also how much energy the appliances and lighting in a typical home uses each year. This allows the employees to

realize how much they can contribute to energy savings through their wise use of equipment and appliances and by turning off energy-consuming equipment when not in use.

In May 1999, TVA established a Public Power Institute to help new ideas and technologies get into the electric industry marketplace. The Institute is located in Muscle Shoals, Alabama, and will focus on development, demonstration, and deployment of technologies in the areas of sustainable and clean energy, environmental emissions reductions, environmental end-use technologies, and improvements in energy use.

TVA has committed to offer a green power product to selected areas of the Tennessee Valley by summer of FY 2000. A group of TVA employees, power distributors, and environmental constituents has designed a product comprised of new renewable sources from solar, wind, and landfill gas. The product is intended to be offered in incremental blocks to consumers.

**Energy Management Contact**

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## 22. UNITED STATES POSTAL SERVICE (USPS)

### Energy Efficiency Performance and Implementation Strategies

In FY 1999, the U.S. Postal Service reported a decrease in energy consumption in buildings of 18.0 percent in Btu per gross square foot compared to FY 1985.

**USPS Performance Toward Buildings Energy Reduction Goals**



**USPS Buildings Energy Use and Costs, FY99**

	BBtu	\$(Thou.)
Electricity	14,236.2	301,767.0
Heating Oil	821.7	3,220.0
Natural Gas	7,500.1	38,240.0
Other	569.0	4,645.0
<b>Total</b>	<b>23,127.0</b>	<b>347,872.0</b>

In the past, energy prioritization surveys have been completed to determine potential energy savings opportunities at more than 36,000 postal facilities nationwide. The pace of completing additional comprehensive facility audits will be determined on the basis of the USPS's ability to implement subsequent energy conservation projects. USPS plans to focus its audit priorities on processing and distribution facilities and customer service facilities that are more than 10,000 square feet in size. The main audit strategy is to conduct audits in conjunction with alternative financing projects.

USPS is committed to the goal of minimizing the use of petroleum as a fuel source. Many postal facilities have begun using natural gas in lieu of heating oil. Because of this conversion, USPS is reducing the inventory of underground storage tanks and their potential leakage problems. The consumption of heating oil is declining but the consumption of natural gas is increasing as a result.

### Solar and Other Renewable Energy

USPS has entered into a partnership with DOE in supporting further development and commercial application of solar and other renewable energy sources. The Block Island Post Office of Rhode Island has installed photovoltaic demonstration project. Seven additional photovoltaic projects are planned for postal facilities in Southern California. The USPS will participate in DOE's effort by jointly developing projects and providing pilot cases where these projects and concepts could be tested.

### Showcase Facilities

USPS has designated three buildings as "Showcase for Energy" facilities. These facilities are located in Portland, Oregon; St. Paul, Minnesota; and, Ft. Lauderdale, Florida. Energy audits have been completed at all three facilities and various retrofit projects are scheduled for completion. These projects include installing T-8 with electronic ballasts, upgrading central HVAC systems, and installing better energy management controls. USPS also installed pilot sulfur lamps at Portland and Ft. Lauderdale facilities.

### Personnel Development

Training materials have been developed to emphasize the role and responsibility of contracting officers in complying with energy and environmental regulations.

USPS participated in the "You Have the Power" campaign, distributing more than 10,000 posters throughout 36,000 postal facilities. Seven USPS energy champions are featured among these posters.

A series of training seminars on Shared Energy Savings (SES) contracts, energy program management, and utility procurement strategies, was developed in FY 98. Newly appointed energy managers and procurement officials responsible for buying utilities and awarding energy retrofit projects attend these training classes. USPS will continue to provide additional training in energy management as the need is identified.

### Funding

USPS prioritizes energy projects based on operational needs, safety and health issues, and environmental benefits, in addition to energy savings and economic analysis. The local and area office budgets or Headquarters may provide funds for implementation of energy retrofit projects.

In FY 1999, USPS Headquarters funded \$15.3 million for the purpose of improving energy efficiency; \$3.2 million for expense projects; and \$12.1 million for capital improvement projects. This ongoing energy

retrofit program identifies and implements high return on investment projects. Headquarters funds for energy retrofits are made available for projects that are prioritized based on return on investment.

USPS developed a program to replace chlorofluorocarbon (CFC) refrigerant-based chillers. USPS allocated \$22 million in FY 1998 to this program, and funding priority is based on the energy efficiency gains, age of equipment, and scheduling of companion projects. Recovered CFCs are transferred to the Department of Defense for their use in critical weapon systems where phasing out CFCs is technically and fiscally not feasible.

#### **Energy Savings Performance Contracts (ESPCs)**

USPS manages Shared Energy Savings (SES) contracts, equivalent to DOE's Energy Savings Performance Contract (ESPC) program. Since the first SES contract in 1987, USPS has made significant progress in overcoming skepticism of the SES concept. Now, USPS has 33 SES contracts in place for 1,157 facilities; the total estimated investment value is more than \$79 million and the expected total energy savings are \$7 million per year.

#### **Procurement of Energy-Efficient Products**

USPS's overall "best value" buying philosophy is a perfect fit with the procurement of energy efficient goods and products. Under this philosophy, USPS recognizes that price and price-related factors are not the only key elements in a buying decision. Other factors, such as energy consumption, energy efficiency and other life cycle costing factors relating to energy conservation should carry as much or more weight in determining contract awards. USPS developed and published the Environmental Products Guide promoting purchases of energy efficient products.

#### **Environmental Benefits of Energy Management**

In FY 1999, USPS built a post office in Fort Worth, Texas, incorporating its Green Building Design criteria. During the design process, an architect and engineering firm were required to perform an energy analysis of the design. The design analysis must demonstrate that energy efficiency meets or exceeds stringent design targets stipulated in the design criteria.

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**APPENDIX A**  
**LIST OF AUTHORITIES**

ENERGY POLICY AND CONSERVATION ACT (Public Law 94-163), December 1975  
SECTION 381 - FEDERAL ENERGY CONSERVATION PROGRAMS

DEPARTMENT OF ENERGY ORGANIZATION ACT (Public Law 95-91), August 1977  
TITLE III - TRANSFERS OF FUNCTIONS

NATIONAL ENERGY CONSERVATION POLICY ACT (Public Law 95-619),  
November 1978

FEDERAL ENERGY MANAGEMENT IMPROVEMENT ACT OF 1988 (Public Law 100-  
615), November 1988

ENERGY POLICY ACT (Public Law 102-486), October 1992

EXECUTIVE ORDER 12759, April 17, 1991  
FEDERAL ENERGY MANAGEMENT

EXECUTIVE ORDER 12902, March 6, 1994  
ENERGY EFFICIENCY AND WATER CONSERVATION AT FEDERAL FACILITIES

OFPP POLICY LETTER NO. 76-1, August 6, 1976  
FEDERAL PROCUREMENT POLICY CONCERNING ENERGY POLICY AND  
CONSERVATION

SUPPLEMENT NO. 1 TO OFPP POLICY LETTER 76-1, July 2, 1980

**OTHER FEDERAL REGULATIONS**

FEDERAL ACQUISITION REGULATION  
48 C.F.R. §§ 23.201-203 (1995)

FEDERAL ENERGY MANAGEMENT AND PLANNING PROGRAMS  
10 C.F.R., Part 436 (1996)

FEDERAL PROPERTY MANAGEMENT REGULATION  
41 C.F.R., Part 101-25 (1996)

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## APPENDIX B DATA COLLECTION

### Buildings and Facilities

#### Excluded Buildings/Process Operations

The Federal agencies that own or control buildings are required to report the energy consumption in these buildings to FEMP 45 days 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 buildings which have been delegated by GSA to other agencies, 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: megawatt hours 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

In addition, the Federal agencies annually report to FEMP the gross square footage of their buildings and the cost of their buildings' energy.

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.

## Vehicles and Equipment

Federal agencies are required to report the energy consumption of their vehicles and equipment to FEMP within 45 days 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:

Automotive 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

Missing data and anomalies are addressed in the same fashion as those described previously in this appendix.

## Calculation of Estimated Carbon Emissions

Carbon emissions were calculated by multiplying energy consumption for each fuel type by an associated carbon coefficient shown below. These coefficients are derived from DOE/EIA-0573(98), *Emissions of Greenhouse Gases in the United States, 1998*, October 1999; Tables 11 and B1.

Carbon coefficients are calculated by dividing the carbon content of a particular fuel (for example, 0.85 metric tons of carbon per ton of fuel) by the energy content of that fuel (say, 43 million Btu per metric ton), producing an emissions coefficient (in this example, 19.8 million metric tons of carbon per quadrillion Btu (quad), which is the same as 19.8 metric tons per billion Btu). The different coefficients result from differences in the amount of carbon released when the various fossil fuels are burned. The amount of carbon released depends, in turn, on the density, carbon content, and gross heat combustion of the fuel in question.

The coefficients used in this report are as follows:

<b>Energy Type</b>	<b>Metric Tons/Billion Btu (Site-Delivered)</b>
Electricity	48.17
Fuel Oil	19.95
Natural Gas	14.47
LPG/Propane	16.99
Coal	25.63
Purchased Steam	35.63
Auto Gas	19.35
Diesel	19.95
Aviation Gas	18.87
Jet Fuel	19.33
Navy Special	21.49

The electricity coefficient is based on 1995 carbon emissions from electric utilities per 1995 site-delivered electricity consumption. (Table 11, DOE/EIA-0573(98) and Table 8.1, DOE/EIA-0384(98), Annual Energy Review 1998.) This coefficient of 48.17 metric tons per billion Btu (or million metric tons per quad) is applied to site-delivered Btu consumption of electricity. It is equivalent to a coefficient of 14.12 metric tons per billion Btu used for primary Btu consumption of electricity and reflects a generation mix of electricity consumption of approximately 51 percent coal, 15 percent natural gas, 2 percent fuel oil, 20 percent nuclear, and 12 percent hydro/renewables.

The purchased steam coefficient applies the coefficient for coal to the primary energy Btu (converted from site-delivered Btu by using a factor of 1.39).

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**APPENDIX C**  
**FEDERAL ENERGY EXPENDITURES,**  
**FY 1985 THROUGH FY 1998**

**TABLE C**  
**FEDERAL ENERGY EXPENDITURES,**  
**FY 1985 THROUGH FY 1998 (CONSTANT 1998 DOLLARS)**

Year	Annual Energy Use (BBTU)	Annual Energy Cost (\$ MILLION)	Annual Energy Cost (\$/MMBTU)	Change in Energy Costs from 1985 <sup>1</sup> (\$ MILLION)
<b>Buildings &amp; Facilities</b>				
1985	470,996.2	5,732.004	12.169	0.000
1986	447,121.7	5,187.856	11.603	-544.148
1987	468,780.3	5,188.398	11.068	-543.607
1988	443,827.0	4,712.353	10.618	-1,019.651
1989	440,744.8	4,305.996	9.770	-1,426.008
1990	441,376.1	4,786.415	10.845	-945.589
1991	404,488.9	4,350.590	10.756	-1,381.415
1992	413,383.9	4,129.214	9.989	-1,602.790
1993	403,399.0	4,304.976	10.671	-1,427.028
1994	385,920.2	4,100.330	10.625	-1,631.674
1995	366,747.0	3,816.736	10.407	-1,915.268
1996	358,736.0	3,740.690	10.427	-1,991.314
1997	349,675.0	3,592.137	10.273	-2,139.867
1998	349,402.4	3,530.307	10.104	-2,201.697
<b>Vehicles &amp; Equipment</b>				
1985	934,333.0	8,700.327	9.311	0.000
1986	924,833.7	5,254.680	5.681	-3,445.647
1987	958,904.3	5,561.290	5.799	-3,139.037
1988	846,896.1	5,259.686	6.211	-3,440.641
1989	959,994.5	5,890.057	6.136	-2,810.271
1990	926,994.8	6,340.348	6.840	-2,359.979
1991	970,454.3	7,816.240	8.054	-884.087
1992	783,122.4	4,634.151	5.918	-4,066.176
1993	772,633.7	4,868.846	6.301	-3,831.481
1994	722,790.8	3,485.969	4.823	-5,214.358
1995	687,143.4	3,593.288	5.230	-5,107.039
1996	675,111.3	3,528.602	5.226	-5,171.725
1997	665,385.6	4,073.332	6.122	-4,626.995
1998	627,729.9	4,346.405	6.924	-4,353.922
<b>Energy Intensive Operations</b>				
1985	39,575.5	582.260	14.713	0.000
1986	38,167.9	538.387	14.106	-43.872
1987	38,532.6	529.509	13.742	-52.751
1988	69,488.5	871.060	12.535	288.801
1989	63,735.5	706.719	11.088	124.459
1990	65,020.5	790.869	12.164	208.609
1991	83,406.1	917.224	10.997	334.964
1992	97,762.4	1,010.311	10.335	428.051
1993	70,536.3	659.400	9.348	77.140
1994	70,457.9	684.471	9.715	102.211
1995	75,575.3	614.855	8.135	32.596
1996	73,855.8	649.676	8.796	67.416
1997	65,501.1	674.260	10.294	92.000
1998	65,930.5	621.337	9.424	39.077

<sup>1</sup>Changes 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 D  
BUILDINGS EXEMPTED FROM NECPA'S  
PERFORMANCE GOAL IN FY 1998**

Section 543(a)(2) of NECPA states, "An agency may exclude from the requirements of paragraph (1) any building, and the associated energy consumption and gross square footage, in which energy intensive activities are carried out. Each agency shall identify and list in each report made under section 548(a) the buildings designated by it for such exclusion." These buildings are not included in the calculations for determining performance toward the buildings Btu/GSF reduction goals. Instead, they are included under the category of excluded buildings/process energy. The energy consumed in these buildings is included on tables and figures which show total consumption (buildings and facilities, vehicles and equipment, and excluded buildings/process).

**Department of Commerce**

*National Institute of Standards and Technology*

413 Temp. Ofc  
415-418 Temp. Ofc  
419 Temp. Childcare

Gaithersburg, Maryland Sites

101 Administration  
102 Gate House  
202 Eng. Mech.  
205 Fire Research  
206 Concr. Mtrls.  
220 Metrology  
221 Physics Lab  
222 Chemistry  
223 Mtrls. Test.  
224 Polymers  
225 Technology  
226 Building Research  
230 Fluid Mech.  
231 Industrial  
233 Sound  
235 Reactor CNRF  
236 Hazards  
237 Non-magnetic  
238 Non-magnetic  
245 Radiation  
301 Supply and Pln.  
302 SCWPG Cooling TWR  
303 Service  
304 Instr. Shops  
305 Switchgear  
306 Elec. Sub.  
307 Chemical Waste  
308 Bowman House  
309 Grounds  
310 Hazards Strg.  
311 Grounds Strg.  
411 TRF  
412 Temp. Ofc

Boulder, Colorado Sites

1 Radio  
1A Radio Building  
1B Radio Building  
1C Radio Building  
1D Radio Building  
2 Cryogenics  
2A Cryogenics - Annex A  
3 Liquifier  
3A Liquifier - Annex A  
4 Camco  
5 Camco Annex  
8 Mesa Test Site  
9 Gas Meter  
11 Ionospheric Observatory  
14 Field Strength  
21 Maintenance Garage  
22 Warehouse  
24 Plasma Physics  
24A Plasma Physics - Annex A  
25 Maintenance Shops  
26 Day Care Facility  
27 High Frequency

*National Oceanic and Atmospheric Administration*

AKWO11 E.T. Shop  
AKW129 Elec. Storg. Bldg. & Fac.  
AKW130 Marine Warehouse  
ARM004 WFO  
CAW072 SW Fisheries Cntr  
CAW107 WSO

CA4486 WSFO  
 COC004 WSFO  
 COM017 Optics Bldg & Fac.  
 COM018 Lab. Bldg  
 COM019 Lab. Bldg  
 COM053 Lab. Bldg  
 CTE005 Chem. Storg. Bldg. & Fac.  
 FLE078 Port of Miami  
 FLM024 WSO  
 HIW015 WSO  
 LAM048 Ofc. Bldg  
 MAE032 Morris Island Observ  
 MEE00S NWS Forecast Ofc  
 MOC036 WSFO  
 MOC037 NEXRAD Bldg  
 MSM011 WFO  
 MTW006 Radar Bldg  
 MTW0119 Balloon Infltn. Bldg  
 NCC001 Dive Locker & Fac.

NEC008 Balloon Infltn. Bldg. & Fac.  
 NMM021 WFO  
 NVW016 Balloon Infltn. Bldg  
 NY5451 30 Rockefeller Plaza  
 ORW012 Fire Station/WSO  
 ORW065 WSO  
 PAE013 Storage Bldg. & Fac.  
 TNM006 WFO  
 TXM029 WSO  
 UTW004 Balloon Infltn. Bldg  
 VAE014 Antenna Deck & Fac.  
 WAW052 Behavior Lab. & Fac.  
 WVE002 NW S Bldg

*Bureau of Census*

Charlotte Computer Center

**Department of Defense**

Process energy use at Department of Defense (DOD) facilities, or “buildings” under the definition of PL 100-615, is separately identified from the building and facilities energy use reported under the goal of section 543. Some DOD facilities have both building and facility use, and process energy use. DOD actively manages process energy facilities in such a manner as to achieve a 10 percent energy efficiency improvement goal by FY 1995. The following lists those facilities which report process energy and are exempt from NECPA's performance goal.

Army

Cold Region R&E Lab, Hanover, NH  
 Stratford Engine Plant, CT  
 21st SUPCOM, Germany  
 Lima ARMODCTR, OH  
 Tobyhanna ARDEP, PA  
 Scranton AAP, PA  
 Radford AAP, VA  
 Redstone Arsenal, Huntsville, AL  
 V Corps, Frankfurt, Germany  
 Holston AAP, Kingsport, TN  
 Pine Bluff Arsenal, AR  
 Dist. Engr., New Orleans, LA  
 Louisiana AAP, Shreveport, LA  
 Sunflower AAP, Laurence, KS  
 Detroit Arsenal, Warren, MI  
 Lake City AAP, Independence, MO  
 Fort Leonard Wood, Waynesville, MO  
 Mississippi AAP, Picayune, MS

NSY, Portsmouth, VA  
 NSC, Norfolk, VA  
 NSY, Charleston, SC  
 NSY, Mare Island, CA  
 NSC, Oakland, CA  
 NSC, San Diego, CA  
 NSY, Puget Sound, WA  
 NSY, Pearl Harbor, Hawaii  
 NAVSUBASE, Pearl Harbor, Hawaii  
 NSC, Puget Sound, WA  
 NSC, Pearl Harbor, Hawaii  
 NSC, Charleston, SC  
 NSY, Long Beach, CA  
 NAPC, Trenton, NJ  
 NSRF Guam, Marianas Islands  
 NSSPO, Magna, UT  
 NARF, Alameda, CA  
 NARF, Jacksonville, FL  
 NARF, Norfolk, VA  
 NARF, San Diego, CA  
 NARF, Pensacola, FL  
 NARF, Cherry Point, NC  
 NSPASURSTA, Chula Vista, CA  
 NSPASURSTA, Maricopa, AZ  
 NSPASURSTA, Truth or Consequences, NM  
 NSPASURSTA, Archer City, TX

Navy

NSY, Portsmouth, NH  
 NSY, Philadelphia, PA  
 NAC, Indianapolis, IN



NSPASURSTA, Lewisville, AR  
NSPASURSTA, Hillandale, MS  
NSPASURSTA, Wetumpka, AL  
NSPASURSTA, Hawkinsville, GA  
NSPASURSTA, Savannah, GA  
NWIRP, Toledo, OH  
NIROP, Rochester, NY  
Grumman Aerospace, Bethpage, NY  
NIROP, Pittsfield, MA  
NIROP, Minneapolis, MN

NIROP, Sunnyvale, CA  
Allegany Ballistics Lab, Pinto, WV  
NIRP, St. Paul, MN  
NWIRP, Bloomfield, CT  
NIROP, Pomona, CA  
NWRIP, Bedford, MA  
Grumman Aircraft Eng., Calverton, NY

DLA  
DCSC, Columbus, OH

## Department of Energy

### *Los Alamos National Laboratory*

Equipment Test Lab  
Lab Meson Facility  
Operations Bldg  
Service Corridor  
Accelerator Tec Bldg  
LANSCE/WNR Bldg  
Proton Storage Ring  
High Res Beam Facility  
General Purpose Lab  
WNR Lab Support Facility  
Warehouse  
Proton Storage Staging Ring  
FMIT Bldg  
Accelerator Tec Bldg  
Development & Testing  
Computer Maintenance  
Data Analysis Center  
Accelerator Maintenance Bldg  
Sub-Stockroom/Wjse  
JCI Craft Shop  
Proton Storage Ring Eqp  
Experimental Area  
Neutron Scattering Exper  
NPB Technical Support  
Shop & Storage Bldg  
Office Bldg  
Warehouse  
Office Bldg  
Med Resolution Spect  
Neutron Exper Service  
GTA Facility  
ML Neutron Scattering  
322 Trailers, Transportables & Small Service Sheds

### *Kansas City Plant*

Industrial Wastewater Pretreatment Facility

### *Pantex Plant*

16-4/Paint and Sand Blast  
16-10/Vehicle Wash  
Security Lighting

### *Sandia National Laboratories, Albuquerque (Site No. 0112)*

Building 880  
Building 827  
858/Microelectronics Development Lab  
878/Process Development Lab

### *Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming*

Maintenance Shop  
LTS Gas Plant Main Compressor Building  
Steam Generator #1 Facility  
Warehouse Quonset  
Water Treatment Facility  
Field Core Facility  
Steam Generator #2 Facility  
Steam Generator #3 Facility  
Steam Generator #4 Facility  
Steam Generator #5 Facility  
Field Operations Office  
Environmental, Safety, and Health Office  
Water Treatment Facility Expansion  
UPS Building  
LTS Gas Plant Office  
Water Disposal Facility  
LTS Gas Plant Shop  
Polymer Plant  
LTS Gas Plant PAMCO Building  
LTS Gas Plant Lab  
LTS Gas Plant Pump House  
Fireflood Pump Building  
South Terminal Main Building  
South Gate Guard Shack

*Idaho Operations*

Utility Building  
Laboratory  
Transportation Complex  
Service Building Powerhouse  
New Waste Calcining Facility  
Coal-Fired Boiler House  
Coal Plant Unloading Building  
Liquid Effluent Treatment and Disposal Facility  
Hot Shop/Manufacturing and Assembly  
SMC Manufacturing and Assembly  
ATR Building  
ATR Cooling Tower Pumphouse  
Deep Well Pump-House #4  
Diesel Generator Building  
Waste Heat Recovery Building

*ICF Kaiser, Hanford Site*

Riggers Loft  
Tritium Vault  
Tritium Laboratory  
6 Reactor Facilities  
Decon Station Foundation  
4 Effluent Water Outfall Structures  
3 Retention Basins  
Filter Plant Power Operation Facility  
Mechanical Development Lab (D&D in prog-'94)  
Main Pump House  
Fresh Metal Storage  
Development Laboratory (D & D in Prog-'94)  
Main Pump HSE-Includes North and South Annex  
Biology Laboratory  
ERDS Towers On Hanford Site  
Warehouse  
Mobile Office @105H  
Change Room Trailer @ 105H  
Mobile Office (FKA:1131N)  
Mobile Office @ 105H  
Gas Recirculation Building  
2 Exhaust Air Sample Building  
Power Control Building Columbia River Monitorin  
Effluent Water Treatment Pilot Plant  
Water Studies Semiworks Facility  
Offices and Telephone Exchange  
Filter Plant Head House, Chlorine  
11 Office Buildings  
Badge House Temporary  
3 Carpenter Shops  
Change Room Building  
Crib Effluent Iodine Monitoring Facility  
9 Storage Buildings  
Demineralization Plant Building  
Fuel Oil Storage Tank and Unloading Platform  
Vehicle Gate Inspection Bldg

Patrol Boat House  
Rivr Guard Tower  
Mobile Office W. of 1167A  
Process Facility  
Tank Farm Waste Support Facility  
Gas Preparation Building  
Underground Waste Storage Tank Farm  
Waste Disposal Tank Farms (4)  
Tank  
Tank and Vault  
Radioactive Particle Research Laboratory  
Cask Loading Building  
Guard Station for 209E  
Office Administration and Gate House  
Office Administration Building  
Paint Storage Building  
Critical Mass Storage  
Office Machine Storage  
Field Mobile @ Slab Yard  
Canine Facility  
Fabrication, Mockup Shop Building  
Warehouse Essential Materials, NO. Of Purex  
Solvent Handling Building  
Filter Building  
Fanhouse  
Mobile Office @ 4th & Baltimore (57B)  
Graphics Facility @ 284E (ATT TO MO931)  
Survey Mobile Office @ 4th & Baltimore (2910E)  
Change Room Trailer @ 284E  
Mobile Office @ 202A (ATT'D TO MO948)  
Mobile Office @ 202A (ATT'D TO MO542)  
Mobile Office @ 202A (ATT'D/ID'D MO355)  
Mobile Ofc @ Baltimore N/O 4th  
2 Mobile OFC @ Baltimore N/O 4th  
1 Janitorial Storage @284E  
2 Mobile Office @200 Area ETF  
Mobile Office @ Baltimore N/O 4th  
Mobile Office @ 4th & Baltimore  
Lunchroom Trailer @ Slab Yard  
Mobile Office @ 4th & Baltimore (AKA: 2910E)  
Graphics Trlr @ 284E (ATT MO203)  
4 Mobile Office @ 4th and Baltimore (AKA:2911E)  
Mobile Office @ Purex  
Mobile Office @ 202A (ATT'D/D'D AS MO347)  
Mobile Office @ 224B  
Office Administration Building  
Office and Laboratory Building  
Concentration Facility, U03 Plant  
Calcination Facility  
Electrician Shop  
Pipefitter Storage  
Pipefitter Small Shop  
Gas Bottle Dock  
Pipefitter Small Shop  
Sheetmetal Shop  
Material Storage

Insulator Shop  
 Paint Storage(W-25)  
 Laborer Storage  
 Non-Tracable Bench Stock Storage  
 Ice House  
 Heavy Equipment Operator Shack  
 Paint Mixing Shop  
 Paint Shop  
 2 Paint Storage  
 Mask Laundry and Office Building  
 Materials Engineering Laboratory  
 Waste Incinerator Facility  
 Plutonium Concentration Facility  
 Exhaust Filter Building  
 Change House  
 Coal Handlers Shelter  
 First Aid Station and Offices  
 Office and Service Building  
 PU Storage  
 Welding Laboratory Building  
 D&D Female Change Trailor @ 271T  
 Chemical Storage Warehouse  
 Power House Steam Plant  
 Packaged Boiler  
 Water Tower  
 Exhaust Fan Control House and Stack  
 Jet Pit House  
 Acid Recovery and Gas Treatment Building  
 2 Mobile Office @2704w  
 Mobile Office @222T  
 SWP Changeroom Trailer@211U  
 Decon Trailer@242S  
 Material Evaluation Laboratory  
 Material Storage Building  
 Waste & Material Storage  
 Uranium Oxide Facility  
 Uranium Concretion Facility  
 Uranium Concretion Change Room  
 Electrician and Pipefitter Shop  
 Storage  
 Materials Development Laboratory  
 2 Fuel Development Laboaratory  
 SP-100 Ges Tesr Facility  
 Emergency Storage, Part if 309 Building  
 N Fuel Manufacturing Support FAX.  
 Engineering Development Laboratory  
 Stress Rupture Test Facility  
 Hydromechanical/Seismic Facility  
 Model Heat Loop, Part of 321 Building  
 Mechanical Properties Laboratory  
 Chemical Engineering Building  
 Stack Sampling Facility  
 Post Irradiation Test Laboratory  
 Virology Laboratory  
 Dog Kennel  
 Animal Resources Storage Building

Packaging Test Facility  
 N Fuel Building  
 Waste Acid Storage Building  
 Waste Neutralization Facility  
 Waste Retention Building  
 Maintenance Shop  
 Communication and Documentation Services  
 Change House  
 Radioanalytical Laboratory  
 Organic Chemistry Laboratory  
 Spare Parts Warehouse  
 Materials Archive Building  
 Laboratory Equipment Central Pool Building  
 Sodium Storage Facility  
 Chemistry and Metal Sciences Laboratory  
 Classified Incinerator Facility  
 Fabrication Shop  
 Solvent and Acid Storage Building  
 Emergency Air Bottle Bldg(ATT to 3701d)  
 Classified Vault  
 Geotechnical High-Bay  
 Gamma Irradiation Facility Laboratory Equipment  
 Central Pool  
 Graphite Machine Shop  
 Paint Storage Building  
 Radiological Calibrations and Standards  
 Electron Accelerator Facility  
 Irradiation Physics Building  
 Conference Training Building  
 Technical Security  
 Offices  
 Laboratory  
 Mobile Office 329 T.2  
 Mobile Office 329 T.1  
 Mobile Office (377 Trl 1)  
 Mobile Office 3760 T.1  
 Mobile Office (3745 Trl 1)  
 Mobile Office 326 T.2  
 Mobile Office 306W T.2  
 Mobile Office 328 T.5  
 Mobile Office (3705 Trl 1)  
 Mobile Office (318 Trl 3)  
 Mobile Office 331 T.5  
 Mobile Office (323 Trl 2)  
 Mobile Office (333 Trl 1)  
 Mobile Office 306W T.6  
 Mobile Office (366 Trl 4)  
 Mobile Office (3770 Trl 2)  
 Mobile Office (3770 Trl 1)  
 4 Mobile Office  
 Mobile Office 318 T.2  
 Mobile Office @ FMIT  
 Mobile Office 325 T.1  
 Mobile Office 320 T.2  
 Mobile Office (FMIT TRL 3)  
 Mobile Office (FMIT TRL 5)

Escort Trailer  
 Mobile Office to be Excessed 7/94  
 Mobile Office Also Known As 377 Trl 2  
 HPT Office @ 340  
 Mobile Office 306W T.5  
 Mobile Office Shop (306 Trl 7)  
 Mobile Office (FMIT Trl 9)  
 Mobile Office N/O 4 th & Buffalo (A Fam)  
 Mobile Office (FMIT Trl 4)  
 Mobile Office 3760 T.3  
 Mobile Office (FMIT Trl 10)  
 Mobile Office (3763 Trl 1)  
 Mobile Office to be Excessed 10/94  
 Mobile Office @ ESML Constr. Site  
 Radio Maintenance Shop(655W-AVE)  
 X Ray Facility  
 Sand Blast Facility  
 Telephone Exchange (959FIRSTST)  
 Hevy Equipment Repair Shop and Office  
 Oil Storage  
 Bottled Gas Storage  
 Fabrication Shop  
 Compressor Shop  
 Warehouse and Safety Hall  
 Combustible Material Storage  
 Administration Building  
 Administration and Engineering Office Bldg  
 Office Building (2770U-Ave)  
 Consolidated Personnel Building  
 Telecommunication Shop @1154(2671W-Ave)  
 Telecommunications Office @ 1154 (2675W-Ave)  
 Mobile Office Near 1262 Building (2730U-Ave)  
 Restroom Trlr @ 1209 Bldg Gate  
 Telecommunications Office @ 1154 (2665W-Ave)  
 Men's Restroom Trailers S. Of 1226  
 Previously Called Trl. 4 Near 1301  
 Mobile Office Att to 1154-Formerly TrlF 7  
 Mobile Office Near MO-850(2726U-AVE)  
 Field Changeroom Trailer S of 1226  
 2 Telecommunications Parts Storage @1154  
 Mobile Office @1154 (2667W-AVE)  
 Mobile Office (2735U-AVE)  
 Mobile Office Near 1226(2648W-AVE)  
 Mobile Office @ EMSL Site EMSL Tr.1  
 Visitor's Center  
 Training Facility  
 Maintenance and Storage Facility (MASF)  
 Former Guard Station, Kentucky Blvd  
 Guard Station, Grant Ave.  
 Guard Station, Hayes St.  
 Security Maintenance Shop  
 400 Area Fire Station  
 400 Area Site Support Office  
 Medical Aid Station  
 Site Service Maintenance Shop  
 Warehouse (Special Tools)

Warehouse  
 Mobile Office Of W. Of 4706  
 Mobile Office (Trl 100) W. Of 4706  
 Mobile Office (Trl 102) W Of 4706  
 Field Trailer W. Of 4706  
 Mobile Office W. Of 4706  
 Patrol Utility Building  
 Radioecology Field Laboratory, Rattlesnake SPRI  
 Space Science Laboratory  
 Pump House  
 Lysimeter Preparation Building  
 Ale Field Storage Building  
 ALE Laboratory 11  
 Pump House  
 Fallout Laboratory  
 Fire Protection Pump House  
 Mobile Office @ Grout  
 Escort Trailer @ Gate 814  
 Mobile Office s/o 622G  
 Portable GEN/Water Tank @ CTRL Landfill  
 Mobile Office @243G  
 Boar House/Storage Building

*Savannah River Operations Office*

3 Pumphouses  
 4 Reactor Buildings  
 4 Area Cooling Water Pumphouses  
 4 Area Fuel Unloading Facilities  
 4 Emergency Diesel Generator/Fuel Oil Storage Facilities

*Brookhaven National Lab*

Accelerator Storage  
 Medical Research Reactor  
 AGS Switchhouse  
 Pumphouse, Cooling Tower  
 Valvehouse  
 Equipment House  
 NAT Synchrotron Light Source  
 Gamma-Ray Beam Reactor  
 High Flux Beam Reactor  
 Cold Neutron Facility  
 Fanhouse  
 Dynam Van De Graaff  
 Cyclotron  
 Machine Shop  
 Tandem Van De Graaff  
 Magnet Development  
 Magnet Assembly  
 Electricians Work Area  
 Cryogenic Test Facility  
 Pett VI  
 Heavy Ion Power Supply A

Heavy Ion Power Supply B  
 Heavy Ion Beam Tunnel  
 AGSE xperimental Halls  
 Mechanical Equipment  
 AGS Tunnel  
 Fan House A  
 Fan House B  
 Fan House C/A-10 House  
 Fan House D  
 Fan House E  
 Proton House D18  
 Proton House E18  
 Proton House F18  
 Proton House G18  
 Proton House H18  
 Proton House I18  
 Proton House J18  
 Proton House K18  
 Proton House L18  
 Booster Equipment House L18A  
 Proton House A18  
 Proton House B18  
 Proton House C18  
 H-10 Equipment House  
 Booster  
 Warehouse  
 7 Works Building  
 E-10 Power Supply  
 Exp. Power Supply Building G-2  
 Scientific Assembly  
 Works Building  
 N. Experimental Tunnel  
 MG Power Supply  
 RF Power Supply  
 200 MEV Linac  
 Irradiation Facility (Cliff)  
 Isotope Producer (BLIP)  
 F-10 House Equipment  
 Radiation Effects Tunnel  
 On-Line Data Facility  
 Booster Tunnel  
 Blip Pump House  
 4 Storages  
 Dead Storage  
 Experimental Computer/Electrical Building  
 Compressor Building  
 Electronic Equipment Repair  
  
*Strategic Petroleum Reserve*  
  
 41 Field Instruments Buildings  
 5 Foam Storage Buildings  
 6 Control Center Buildings  
 Maintenance Building  
 Foam Storage A Building  
 Potable Water Building

5 Sky Switchgear Building  
 Maintenance Strg equipment Building  
 3 Soc Building  
 Main Guard House Building  
 3 Property Warehouse Buildings  
 4 Flammable Storage Buildings  
 3 Foam Deluge Building  
 Rwis Pump Hpuse Building  
 2 Gun Cleaning Building  
 Weld Shop Building  
 Grass Maintenance Equipment Building  
 2 Foam Generator Buildings  
 Maintenance Facility Building  
 Radio Repairer Building  
 Skva Supr Bloc F & G  
 1 Firewater Pumps  
 6 Administration Buildings  
 Fire Pumps on Trucks Building  
 Paper Recycling Building  
 Guard House Building  
 Electrical Moa Building  
 Substation Electrical Building  
 Deluge Valve Building  
 Moc Be-2 Building  
 Guard House Corner Building  
 3 Gun Cleaning Building  
 Water Storage Building  
 2 Motor Control Center Building  
 Maintenance & Warehouse Building  
 Erner Properness Building  
 Rwis Ups Building  
 2 Communications Buildings  
 Warehouse E Building  
 Main Fire Water Building  
 Fire At Black Lake Building  
 ACUS Small Shed  
 Control Room Taxoma Building  
 Sky Foam Deluge Building  
 Fab Shed Building  
 Deluge Valve  
 Flammable Storage Shed  
 Guard Conet Gate Building  
 Ravis Microwave Building  
 Ravis Computer Conrno Building  
 Sky West Building  
 Sky East Building  
 Switchgear Building  
 Contruction and Maintenance Building  
 Sample Lab Building  
 Pump House Foam Building  
 Inert gas Gen Building  
 P/S Head Frame  
 MOCS s/s Area Building  
 Equipment Storage Building  
 Fire Truck Building  
 Well Water Pump Hou Building

Fire Transformer Dei Building  
Fill Site Storage Building  
Maintenance Receiving Building  
Lab Building  
Radio Tower Building  
Guard House On Site  
Foam Prop. #3 Building  
Foam Prop.#2 Building  
Foam Prop. #1 Building  
Foam Prop. #4 Building  
Operator Control Dk1 Building  
Operator Control Dk2 Building  
Foam Prop Dock 1 Building  
Firewater Pump Dk 1 Building  
Foam Prop. Dock 2 Building  
Property Whse/Maint Building  
Vehicle Maintenance Building  
Wash Rack Building  
Wheeled Equip Building  
Sample Storage Building  
Gatehouse Front Hard Building  
Gatehouse #3 Building  
Firewater Pump Building  
Foam Proportioning Building  
Covered Laydown Building  
Rwis Guardhouse Har Building  
Substation Building  
Rwis Control Building  
Prefab. Paint Storage Building  
Rwis Comm Building  
Microwave Building  
HPP/Permit/Fire Pump  
S/S Hoist  
S/S Head Frame  
2 Property Warehouse  
Warehouse D  
Rwis  
Warehouse Guard House

*Stanford Linear Accelerator Center*

Accelerator Tunnel  
Klystron Gallery  
Beam Switch Yard (BSY)  
Damping Ring Vault, South  
Damping Ring Vault, North  
Damping Ring RF - South  
Damping Ring RF - North  
Collider Housing North Arc  
Collider Housing South Arc  
Power Conversion  
Casting Pad Shelter  
Test Laboratory  
Hydrogen Furnace Housing  
Deionization Plant  
Main Control Center (MCC)

Cryogenics Building  
Test Cell Facility  
Electronics Building Annex  
End Station A  
Final Focus Test Beam Bldg  
Final Focus Test Beam Bldg  
Bubble Chamber / 40"  
Bubble Chamber Bldg / 82"  
Spear Interaction Area/East  
Spear Control Building  
Spear Interaction Area/West  
SSRL, North Annex  
Test Beam Facility (TBF)  
SSRL South Arc Building  
SSRL Lab/Office/Shop Bldg  
SSRL Spear Injector (in Const.)  
Van Group D  
Experimental Control C-Beam  
East Pit Control Room  
82" BC Support  
82" BC Support  
Control Room B/L 19  
Cryo Eng. & Operations  
West Pit Detector Support Bldg  
Beamline 6 Test Building  
Final Focus Test Beam  
Laser Storage Building  
E 137 Experimental Building  
IR 2 Hall  
IR 2 Hall Annex  
IR 2 Counting House  
IR 2 Support Building  
IR 4 Hall  
IR 4 Counting House  
IR 4 Support Building  
IR 6 Hall  
IR 6 Counting House  
IR 6 Support Building  
IR 8 Hall  
IR 8 Support Building  
IR 10 Support Building  
IR 12 Hall  
IR 12 Counting House  
IR 12 Support Building  
SSRL PBF 18  
CEH SLC Experimental Hall  
MkII Leach  
MCC Portable Building  
Light Fabrication Building  
Heavy Fabrication Building  
Plating Shop Annex  
Vacuum Assembly Building  
Light Assembly Building  
EFD Shops and Storage  
EFD Shop Building  
Rigging Loft

PMU Shops Building  
Transport Tire Shop  
Electronics Shop Trailer  
Research Yard Machine Shop

## Department of Transportation--Federal Aviation Administration

62 Automated Flight Service Stations	391 Flight Data Input/Output Remotes
Airport Information Desk	Flight Data Remoting System Intermediate
Automated International Flight Service Station	Fields and Landing Areas
119 Approach Light Systems	39 Fan Markers
Airway Beacon	20 Flight Service Data Processing Systems
127 Air Route Surveillance Radar -	189 Flight Service Stations
FAA and Military	46 Ground/Air Transmitter Receivers
Air Route Traffic Control Center	Guidance Light Facility
189 Automated Radar Terminal Systems	Gap Filler Radar
23 Airport Surface Detection Equipment	85 Geostationary Operational
647 Altimeter Setting Indicators	Environmental Satellite Systems
263 Airport Surveillance Radar -	864 Glide Slopes
FAA and Military	1143 Homing Radio Beacons
568 Airway/Terminal Building Maintenance	5 Central Heating Facilities - Per Unit
23 Air Traffic Control Beacon Interrogator	22 Heliports
331 Air Traffic Control Radar Beacons	Homing Radio Beacon - High Power
464 Airport Traffic Control Towers	1 International Aeronautical
398 Automatic Terminal Information Systems	Telecommunications Switching Center
356 Automated Weather Observing Systems	260 Integrated Communications
Aerial Tramway	Switching Systems
597 BRITE Radar Indicator Terminal Equipment	26 Identification, Friend or Foe
294 Backup Emergency Communications	International Flight Service Station
116 Computer Based Instruction	International Flight Service
2 Central Computer Complexes	Transmitter Station
120 Closed Circuit TVs	81 Inner Markers
229 Common Digitizers	136 VHF/UHF Link Terminals
10 Cloud Height Indicators	23 Localizer Type Directional Aids
Computer Display Channel	20 Lead-in Light Facilities
Combined Center/RAPCO	37 Living Quarters
11 Control Circuit Equipment	114 Low Level Wind Shear Alert
407 Control Line Maintenance	Systems
17 Communications Microwave Link Terminals	Compass Locator at the ILS
23 Command Communications Outlets	Middle Marker
Center Building Maintenance	4 Link Repeaters
23 Direct Access Radar Channels	1053 ILS Localizers
Display Channel Complex	473 Compass Locators at the ILS
337 Direction Finders - VHF	Outer Marker
226 Direction Finder Indicators	94 Medium-Intensity Approach
584 Distance Measuring Equipment	Lighting Systems
51 Distance Measuring Equipment Remaining	633 Medium-Intensity ALS (MALS)
558 Data Multiplexors	with Runway Alignment
811 Data Terminal Equipment	Indicator Lights (RAIL)
En Route Automated Radar	4 Meteorological and Aeronautical
Tracking System	Presentation Systems
5 Electronic Data Processing Systems	9 Marine Equipment Boats and Docks
468 Electrical Distribution Systems	625 Multichannel Recorders
12 Emergency Operating Facilities	17 Military Height Finder Radar
50 Flight Data Entry and Printout	33 Military Interface Groups
23 Flight Data Input/Output Centers	Military Interface Modification

272 Microwave Landing Systems  
     Azimuth  
 160 Microwave Landing Systems  
     Back Azimuth  
 271 Microwave Landing System Distance  
     Measuring Equipment Precision  
 276 Microwave Landing System Elevation  
 1 Microwave Landing System Flare  
 828 Middle Markers  
 14 Mobile Laboratories  
 105 Mode S/Data Links  
 46 Maintenance Processing Systems  
 400 Mobile Engines or Generator Plants  
 28 National Data Interchange Networks  
 1282 National Radio Communications Systems  
 39 Next Generation Weather Radar  
 65 Off Airways Weather Stations  
 50 Omnidirectional Airport Lighting Systems  
 Oceanic Display and Planning System  
 325 Heavy Equipment and Off-Road Vehicles  
 831 Outer Markers  
 General Oil Distribution System  
 180 Precision Approach Path Indicators  
 2 Precision Approach Radar  
 707 Power Conditioning Systems  
 19 Primary Power Engines or Generator Plants  
 68 Quarters Building - Other than  
     Living Quarters  
 8 Radar Approach Control - Air Force  
 111 Rotating Beam Ceilometers  
 11 Radar Bright Display Equipment  
 22 Radar Beacon Data Processor Equipment  
 277 Remote Beacon Performance Monitor  
 685 Remote Center Air/Ground  
     Communications Facilities  
 99 Remote Control Interface Units  
 752 Radio Communications Link Repeat  
 233 Radio Communications Link Terminals  
 1837 Remote Communications Outlets  
 692 Runway End Identification Lights  
 215 Remote Monitor Control Facilities  
 214 Radar Microwave Link Repeaters  
 138 Radar Microwave Link Terminals  
 189 Remote Readout Hygrothermometers  
 95 Radar Remote Weather Display Indicators  
 135 Radar Remote Weather Display Systems  
 12 Remote Tower Communications  
     Control Systems  
 1222 Remote Transmitter Receivers  
 537 Runway Visual Range  
 Shortened Approach Light System  
 Sanitation System  
 661 Storage Buildings  
 Systems Command Center  
 Sensor, Receiver, and Processor  
 72 Simplified Short Approach Lighting  
     Systems with Runaway Alignment  
     Indicator Lights (RAIL)  
 Simplified Short Approach Lighting System  
 Self Sustained Outlet  
 49 Sewerage Systems  
 666 Tactical Air Navigation  
 8 Tower Cab Digital Displays  
 144 Terminal Data Display Systems  
 496 Telephone Exchanges  
 589 TELC Interface Maintenance  
 19 Terminal Information Processing Systems  
 125 Television Microwave Link Indicators  
 110 Television Microwave Link Repeaters  
 138 Television Microwave Link Transmitters  
 414 Tower Buildings  
 529 Trails and Roads  
 25 Terminal Radar Approach Controls  
 17 Teletypewriter Facilities  
 137 Transcribed Weather Broadcast  
 743 Utility Buildings  
 1387 Visual Approach Slope Indicators  
 769 Vehicle Maintenance  
 1025 VHF Omnidirectional Range  
 95 VHF Omnidirectional Range Test  
 Weather Message Switching Center  
 Water System Maintenance



## General Services Administration

### *Region 1*

GSA Cd Depot 234, Watertown, MA  
Federal Building, Lowell, MA  
EPA Laboratory, Lexington, MA  
US Border Station, Calais, ME  
US Border Station, Coburn Gore, ME  
US Border Station, Fort Fairfield, ME  
28 Lord Road, Marlborough, MA  
US Border Station, Houlton, ME  
US Border Station, Jackman, ME  
US Border Station, Limestone, ME  
US Border Station, Orient, ME  
US Border Station, Vanceboro, ME  
US Border Station, Van Buren, ME  
US Border Station, Calais, ME  
USBS, St. Pamhille, Saint Francis, ME  
US Border Station, Madawaska, ME  
USBP Sec Hd Houlton, Hodgdon, ME  
Parking Facility, Portland, ME  
US Border Station, Fort Kent, ME  
Warren B. Rudman, Concord, NH  
USBS Highgate Springs, VT  
US Border Station, Derby Line, VT  
US Border Station, Highgate Springs, VT  
US Border Station, Norton, VT  
US Border Station, Beebe Plain, VT  
US Border Station, Alburg Springs, VT  
US Border Station, North Troy, VT  
US Border Station, West Berkshire, VT  
US Border Station/USPO, Derby Line, VT  
US Border Station, Beecher Falls, VT  
US Border Station, Canaan, VT  
US Border Station, East Richford, Richford, VT  
US Border Station, Richford, VT  
Border Station, Sector Hdqtrs, Swanton, VT  
US Border Station, Twp20, Saint Francis, ME  
US Border Station, Township 11, Saint Francis, ME  
Swanton Bdr Ptl Building, Highgate Springs, VT

### *Region 2*

3000 JFK Blvd., Jersey City, NJ  
FB, New York-Kings, NY  
Border Station, Rouses Point, NY  
Mech Equip Garage, Champlain, NY  
Corporate Place, Rochester, NY  
17 Cronin Road, Glens Falls, NY  
10 Bouck Ct, New York-Kings, NY  
25-27 East Park Ave., Long Beach, NY  
80-02 Q Gardens, New York-Queens, NY  
Century Mall, Amherst, NY  
16 Court St Bklyn, New York-Kings, NY  
B&B Bldg, San Sebastian, PR  
Nazario Building, San German, PR

AL Cohen Plaza, Charlotte Amalie, VI  
US Border Station, Champlain, NY  
Inspection Bld Borde, Chateaugay, NY  
Main Inspector Station, Massena, NY  
Inspection Building, Mooers, NY  
US Border Station, Fort Covington, NY  
US Border Station, Rouses Point, NY  
US Border Station, Trout River, NY  
Administration Building, Alexandria Bay, NY  
Gateway I, Newark, NJ  
W/S Jamiesons Line, Burke, NY  
Quaker Village, Glenn Falls, NY  
NY5 Washington Sq Alba, Albany, NY  
Greenway Plaza, Melville, NY  
76 Eleventh Avenue, New York, NY  
Mayaguez Mall, Mayaguez, PR

### *Region 3*

Annapolis Comm. P.K.E, Annapolis, MD  
Gwynn Oak Building, Woodlawn, MD  
Federal Building 01, Philadelphia, PA  
The Metro Center, Philadelphia, PA  
5000 Wissahickon Ave., Philadelphia, PA  
Erie Library, Erie, PA  
Custom House, Norfolk, VA  
Berris Plaza, Philadelphia, PA  
Gateway, Philadelphia, PA  
Wise County Plaza, Wise, PA  
FairGrounds Dist Ctr, Richmond, VA

### *Region 4*

FB PO, Port Gibson, MS  
Battlefield Mall, Vicksburg, MS  
Judicial Building, Biloxi, MS  
MICC-DEA Warehouse, Miami, FL  
E Pointe Bus Ctr, Jacksonville, FL  
Cobb Corporate Ctr, Marietta, GA  
BP Building, Macon, GA  
Courthouse Annex, Columbia, SC

### *Region 5*

Illini Fin Center, Springfield, IL  
GSA Interag Mtr Pool, Chicago, IL  
US Border Station, Sault Ste Marie, MI  
Fed Parking Facility, Detroit, MI  
Cust Cargo Insp Fac, Detroit, MI  
US Border Station, Grand Portage, MN  
Custom & Immig Stat, Noyes, MN  
US Border Station, International Falls, MN  
Federal Building, Medina, OH  
Federal Building, Zanesville, OH  
Fed Parking Facility, Dayton, OH  
Bankers Building, Chicago, IL

Social Security Building, Danville, IL  
Park Ridge Ofc Ctr, Park Ridge, IL  
O'Hare Lake Ofc Plz, Des Plaines, IL  
Insurance Exchange B, Chicago, IL  
Plaza Tower Office, Evergreen Park, IL  
Clyde Savings Building, North Riverside, IL  
2100 N California, Chicago, IL  
Wash Bicentennial Bg, Springfield, IL  
Smoke Tree Bus Park, North Aurora, IL  
Glen Hill North Bg A, Glen Ellyn, IL  
10 West Jackson Blvd, Chicago, IL  
O'Hare Lake Off. Pla, Des Plaines, IL  
One Congress Center, Chicago, IL  
E Empire & Eastport, Bloomington, IL  
Burrell Building, Chicago, IL  
Oakmont Corporation, Westmont, IL  
1455 Golf Mill Road, Des Plaines, IL  
1279 North Milwaukee, Chicago, IL  
Bank Of America, Chicago, IL  
901 Warrenville Road, Lisle, IL  
1700 South Wolf Road, Des Plaines, IL  
Elm Plaza So. Tower, Hinsdale, IL  
Soc. Sec. Office, Chicago, IL  
125 Fairfield Way, Bloomingdale, IL  
IL Business Center, Springfield, IL  
2360 E. Devon Ave., Des Plaines, IL  
923-25 Dillon, Wood Dale, IL  
River Center, Chicago, IL  
Schaumburg Atrium, Schaumburg, IL  
600 Joliet Rd, Willowbrook, IL  
2350 E. Devon, Des Plaines, IL  
Gateway IV, Chicago, IL  
Citicorp Center, Chicago, IL  
Liberty Business Park, Elk Grove Village, IL  
29 North Wacker Drive, Chicago, IL  
Governors' Off. Park, Olympia Fields, IL  
One Oakbrook Terrace, Oakbrook Terrace, IL  
Xerox Centre, Chicago, IL  
Stewart Square, Rockford, IL  
635 Butterfield Rd, Oakbrook Terrace, IL  
Governors Off Pk IV, Olympia Fields, IL  
Glenwood Plaza, Glenwood, IL  
Northwestern Building, Evanston, IL  
The Rookery, Chicago, IL  
1600 Corporate Cntr, Rolling Meadows, IL  
4849 N. Milwaukee Av, Chicago, IL  
AT&T Corporate Cntr, Chicago, IL  
801 Warrenville Road, Lisle, IL  
1000 Tower Lane Building, Bensenville, IL  
Olympian Office Cntr, Lisle, IL  
The Park at NW Point, Elk Grove Village, IL  
945 Lakeview Parkway, Vernon Hills, IL  
2860 River Road, Des Plaines, IL  
One S. Wacker Building, Chicago, IL  
Governors Office Pk, Olympia Fields, IL

Fox River Center, Ottawa, IL  
1600 Lebanon Avenue, Belleville, IL  
Lakeside Ofc Building, Indianapolis, IN  
429 Penn Center, Indianapolis, IN  
The Furniture Co., Grand Rapids, MI  
Ambassador Bridge, Detroit, MI  
Arlington Plaza, Sault Ste Marie, MI  
5015 South Cedar Str, Lansing, MI  
Domino's Farm House, Ann Arbor, MI  
Brewery Park Phase I, Detroit, MI  
Plaza Nine Building, Cleveland, OH  
Commerce Place, Middleburg Heights, OH  
Plaza South I, Middleburg Heights, OH  
Sanning Apartments, Cincinnati, OH  
One Cleveland Ctr, Cleveland, OH  
Lakewood Center West, Lakewood, OH  
Plaza South I, Middleburg Heights, OH  
2026 West Main Stree, Springfield, OH  
Corporate Center, Middleburg Heights, OH  
4411 Montgomery Road, Norwood, OH  
CBLD Building, Cincinnati, OH  
Bank One Center, Cleveland, OH  
Eaton Center, Cleveland, OH  
Wright Executive Ctr, Fairborn, OH  
Renaissance, Cleveland, OH  
228th & Lake Shore B, Euclid, OH  
Society Tower, Cleveland, OH  
6161 Oaktree, Independence, OH  
Rockside Center III, Independence, OH  
Old Bayfield Ctse, Bayfield, WI  
Social Security Off, Wisconsin Rapids, WI  
Vander Heyden II, West Bend, WI  
575 Lester Street, Onalaska, WI  
1830 2nd Ave. Rock Island, IL  
Midway Business Ctr, Chicago, IL  
5353 S. Laramie, Chicago, IL  
Illinois Financial Ctr, Springfield, IL  
Burr Ridge Executive, Burr Ridge, IL  
Lucy and Water St., Saugatuck, MI  
IRS Data Center, Pontiac, MI  
Pontiac Place Building, Pontiac, MI  
Social Security Building, West Branch, MI  
Federal Building, Redwood Falls, MN  
Federal Building Courthouse, Minneapolis, MN  
U.S. Courthouse, Minneapolis, MN  
Building 201, St. Paul, MN  
Custom and Immigration Stat., Baudette, MN  
Moraine Business Center II, Moraine, OH  
Moraine Business Center III, Moraine, OH  
Peck Engraving Co., Lakewood, OH  
The Esplanade, 2001 Butterfield Rd,  
Downers Grove, IL  
1207 Network Centre Blvd, Effingham, IL  
IRS Data Center, Detroit, MI  
BP America Building, Cleveland, OH

Ace Industrial Dr., Cudahy, WI  
FWS Center, Onalaka, WI  
700 Regent St, Madison, WI

*Region 6*

T-Hangar "G", Grand Island, NE  
2610 Ave "Q", Kearney, NE  
US Courthouse, Kansas City, MO  
Herbert Hoover Library, West Branch, IA  
Eisenhower Library, Abilene, KS  
U.S. Geological Survey Building, Rolla, MO  
2323 Grand Building, Kansas City, MO

*Region 7*

USBP Sh Building 13, New Orleans, LA  
Open Land - FDA Site, New Orleans, LA  
US Border Station, Columbus, NM  
USBS, Santa Teresa, NM  
Federal Building, Altus, OK  
USBS B&M Bridge, Brownsville, TX  
Gateway USBS Building A, Brownsville, TX  
Columbia USBS, Laredo, TX  
US Border Station, Laredo, TX  
USBS Admin Building, Del Rio, TX  
BPSH Building 1, Hqtrs, Del Rio, TX  
USBS Br Of The Amers, El Paso, TX  
U S Border Station, Eagle Pass, TX  
Juarez-Lincoln USBS, Laredo, TX  
USBS Admin Building, Los Indios, TX  
BPSH Building A, Laredo, TX  
BPSH Administratn Bd, McAllen, TX  
Headquarters Building, Marfa, TX  
USBS Paso Del Norte, El Paso, TX  
USBS Main Building, El Paso, TX  
USBS Good Neighbr Br, El Paso, TX  
Unnamed Building, Fort Smith, AR  
Unnamed Building, Metairie, LA  
Building 27, Houma, LA  
Sun Belt Buis Ctr, Albuquerque, NM  
SSA District Office, Poteau, OK  
US Border Sta -New, Hidalgo, TX  
US Border Station, Progreso, TX  
US Border Station, Rio Grande City, TX  
US Border Station, Presidio, TX  
Unnamed Building, Laredo, TX  
Vicar Center, San Antonio, TX  
USBS Intl Rr Land, Laredo, TX  
T & P Building, Fort Worth, TX  
USBS Admin Building, Hidalgo, TX  
Chase Plaza SVC CTR, Oklahoma City, OK  
USBS Pharr Admin Bld, PHARR, TX  
USBS Paso Del Norte, El Paso, TX  
USBS Admin Building, Progreso, TX  
USBS Admin Building, Roma, TX  
GEO H Mahon FB CTHS, Lubbock, TX

*Region 8*

GSA Parking Lot, Denver, CO  
Chief Mtn BS & Qtrs, Babb, MT  
Piegan BS & Qtrs, Babb, MT  
Roosville BS, Eureka, MT  
Sweetgrass BS, Sweetgrass, MT  
Bdr Patrol Sector HQ, Havre, MT  
Tumer BS, Tumer, MT  
Ambrose BS, Ambrose, ND  
Dunseith BS, Dunseith, ND  
Portal BS, Portal, ND  
St John BS, St John, ND  
Pembina BS, Pembina, ND  
GSA Storage Building, Bismarck, ND  
Bdr Patrol Sector HQ, Grand Forks, ND  
New Parking Lot, Bismarck, ND  
Sunbeam Appl Svc, Salt Lake City, UT  
Garage, Cheyenne, WY  
Tatum Parking Lot, Helena, MT

*Region 9*

US Border Station, Lukeville, AZ  
BS Old Cus Building, Nogales, AZ  
BS Garage, Sasabe, AZ  
BS Main Building, Douglas, AZ  
Bdr Patl Sector Hqrs, Tucson, AZ  
BS Main Building, San Luis, AZ  
BS Main Building, Naco, AZ  
BS Office Building, Nogales, AZ  
Tucson L. E. Site, Tucson, AZ  
BS Old Customs Building, Calexico, CA  
BS Exist Main Building, San Diego, CA  
BS Main Building, Andrade, CA  
BS Main Building, Tecate, CA  
US Border Patrol Sta, Calexico, CA  
Federal Building, Sacramento, CA  
Parking Garage, Los Angeles, CA  
Motor Pool, San Francisco, CA  
1303 Albee Street, Eureka, CA  
Building 1, Flagstaff, AZ  
NPS Building, Grand Canyon, AZ  
Buildings 4 & 5, Flagstaff, AZ  
Sorrento Exec Plaza, San Diego, CA  
15650 Devonshire Street, Los Angeles, CA

*Region 10*

Dalton Cache Bor Sta, Haines, AK  
Station Building, Tok, AK  
Int Ag Motor Pool, Anchorage, AK  
Skagway Border Stat, Skagway, AK  
US Border Station, Eastport, ID  
US Border Sta New, Porthill, ID  
Station Building No.1 & 2, Blaine, WA  
Danville Border Sta, Danville, WA  
Station & Quarters, Curlew, WA  
Station, Laurier, WA

Station, Metaline Falls, WA  
US Border Station, Oroville, WA  
US Border Station, Sumas, WA  
Building 601, Walla Walla, WA  
Kenneth G. Ward BS, Lynden, WA  
US Border Station, Point Roberts, WA  
Border Patrol Sect HQ, Blaine, WA  
Border Patrol Sect HQ Annex, Blaine, WA  
Border Patrol Sect HQ, Spokane, WA  
Miuw Facility, Portland, OR  
U.S. Courthouse, Portland, OR  
USDA Building, Blaine, WA  
Operations Building, Moses Lake, WA  
Border Patrol Sec HQ Annex, Blaine, WA

*Region 11*

FOB 6, Washington DC  
White House, Washington DC  
Delasalle, Avondale, MD  
1800 G Street NW, Washington DC  
Doggett Building, Washington DC

Central Htg Plant Stm., Washington DC  
West Htg Plant Stm., Washington DC  
U.S. International Tr, Washington DC  
1724 F Street NW, Washington DC  
Reagan Building FOB, Washington DC  
601 4th St, NW, Washington DC  
Universal, Washington DC  
Penn-Belt Center, Forrestville, MD  
9620 Medical Center, Rockville, MD  
Manor Business Ctr, Landover, MD  
Census Computer Fac., Bowie, MD  
5000 Philadelphia Way, Lanham, MD  
Mat Land Co Office & Lab, Glendale Heights, MD  
Rockwall Building, Rockville, MD  
Herndon Industrial Park, Herndon, VA  
7405 & 7407 Lockport, Lorton, VA  
Poplar Run Park Builing 5, Alexandria, VA  
Gunston Industrial Park C, Arlington, VA  
Arlington Center, Arlington, VA  
AV Bryan Sr Courtshe, Alexandria, VA

## National Aeronautics and Space Administration

### *Ames Research Center (ARC)*

Computational Fluid Dynamics Building  
Vertical Gun  
3.5 Ft. Wind Tunnel Model Building  
12 Ft. Pressure Wind Tunnel  
12 Ft. Wind Tunnel Auxiliaries  
Propulsion Simulations Calibration Laboratory  
Ballistic Range  
Flight Support Facility  
Model Development Facility  
7x10 Ft. Wind Tunnel #1  
7x10 Ft. Wind Tunnel #2  
Model Preparation Facility  
Model Assembly  
Magnetic Calibration Laboratory  
Magnetic Test Laboratory  
14 Ft. Transonic Wind Tunnel  
14 Ft. Electrical Equipment Building  
Fan Blade Shop  
Technical Services Shop  
40x80 Ft. Wind Tunnel  
20-G Centrifuge  
80x120 Ft. Wind Tunnel  
2x2 Ft. Transonic Wind Tunnel  
Electrical Substation  
Electrical Substation North  
6x6 Ft. Supersonic Wind Tunnel  
Unitary Plan Wind Tunnel Building  
11 Ft. Transonic Wind Tunnel  
9x7 Ft. Subsonic Wind Tunnel  
8x7 Ft. Subsonic Wind Tunnel  
Unitary Plan Wind Tunnel Auxiliary Building  
3.5 Ft. Hypersonic Wind Tunnel  
3.5 Ft. Hypersonic Wind Tunnel Auxiliary Building  
3.5 Ft. Hypersonic Wind Tunnel Storage Building  
Fluid Dynamics Laboratory  
Central Computation Facility  
Advanced Computation Facility  
Thermal Protection Facility  
Thermal Protection Boiler  
Bioscience Laboratories  
Hypervelocity Free Flight Facility  
Arc Jet Facility  
Life Sciences Research Laboratory  
Life Sciences Equipment Facility  
Life Sciences Flight Experiments Facility  
Airborne Missions/Life Science Facility  
Vestibular Research Facility  
Vertical Motion Simulator  
Vertical Motion Simulator Equipment Facility  
Space Projects Facility  
Space Sciences Research Laboratory

Model Construction Facility  
Aircraft Service Facility  
Aircraft Service Facility  
Aircraft Service Facility  
RSRA Calibration Facility  
Aircraft Service Facility  
Outside Aerodynamic Research Facility  
High Pressure Air Housing  
Propane Facility  
Program Support Communication Network Facility  
Flight Data Complex  
Flight Data Facility  
Man-Vehicle System Research Facility  
Numerical Aeronautics Simulator  
High Altitude Aircraft Support Facility  
Fluid Mechanics Laboratory  
Biomedical Research Laboratory  
Human Performance Research Laboratory  
Hazardous Material Storage Facility  
Automated Sciences Research Facility

*NASA Industrial Plant (Downey) and USAF Plant 42,  
Production Site 1 (Palmdale)*

Entire Facilities are Mission Variable

### *Goddard Space Flight Center (GSFC)*

Central Flight Control Range  
Instrument Construction/Development Laboratory  
Payload Testing Facility  
Environmental Testing Laboratory  
Network Control Center  
Spacecraft Operations Facility  
Data Interpretation Laboratory  
Spacecraft Systems Development/Integration Facility  
EOS/DIS Building  
Goddard Geophysical and Astronomical Observatory  
Area

### *Jet Propulsion Laboratory (JPL)*

Environmental Laboratory  
25 Ft. Space Simulator  
Spacecraft Assembly Facility  
Space Flight Operations Facility  
10 Ft. Space Simulator  
Space Flight Support  
Frequency Standards Laboratory  
Earth & Space Sciences Laboratory  
Micro Devices Laboratory

*Johnson Space Center (JSC)*

Flight Operations Support  
Flight Operations  
Jake Garn Simulator and Training  
Crew Systems Laboratory  
Photographic Technology Laboratory  
Central Data Office  
Avionics Systems Laboratory  
Central Heating & Cooling Plant  
Auxiliary Chiller Facility  
Mission/Space Station Control Center  
Planetary & Earth Sciences Laboratory  
Space Environment Simulation Laboratory  
Mission Simulation Development Facility  
Life Sciences Laboratory  
Central Computer Facility  
Emergency Power Building  
Vibration and Acoustic Test Facility  
Atmospheric Re-Entry Materials &  
Structures Evaluation Facility  
Radiant Heat Facility  
Thermochemical Test Area

*Kennedy Space Center (KSC)*

Hangar L, Life Sciences Support Facility  
Hangar AE, Missile Assembly Building  
Robot Wash  
Manufacturing Building  
Launch Complex 39 A & B  
Communication Distribution & Switching Center  
Operations Building  
Operations and Checkout Building  
Space Station Processing Facility  
Hypergol Module Process North  
Hypergol Support Building  
Payload Spin Test Facility Replacement  
Spacecraft Assembly & Encapsulation Facility  
Hypergol Module Process South  
Payload Hazardous Service Facility  
Vertical Processing Facility  
Central Instrumentation Facility  
First Wash Building  
Orbiter Processing Facility High Bay 3  
Orbiter Processing Facility  
Launch Control Center  
Vehicle Assembly Building Repeater  
Component Service Facility  
Propellant Laboratory and High Pressure Gas Facility  
Program Support Communication  
Film Storage  
Payload Support Building  
Canister Rotation Facility  
Ordnance Storage

*Langley Research Center (LaRC)*

8 Ft. Transonic Pressure Tunnel  
University of Virginia and ART Management Office  
Building  
30x60 Ft. Tunnel  
Transonic Dynamic Tunnel  
Hydrodynamics Research Facility  
Space Environmental Effects Laboratory  
16 Ft. Transonic Tunnel.  
Subsonic Tunnel Offices  
High Speed 7x10 Ft. Tunnel  
14x22 Ft. Subsonic Tunnel  
Central Heating and Steam Generation Plant  
Conference Center  
Anechoic Noise Facility  
Hypersonic Propulsion Facility  
High Intensity Noise Research Laboratory  
Frequency Converter Building  
National Transonic Facility (NTF)  
NTF Tunnel Model Storage  
Foundry & Glass Blowing Shop  
Drive Control Facility  
0.3 Meter Transonic Cryogenic Tunnel  
Gas Dynamics/Fluid Mechanics Research Facility  
Hypersonic Facilities Complex - West Wing  
Hypersonic Facilities Cooling Tower  
Hypersonic Facilities Complex - East Wing  
Compressor Station  
60-Inch M18 Helium Tunnel Facility  
Vacuum Pumping station - Gas Dynamics Complex  
Atmospheric Sciences/Systems Development  
Laboratory  
Atmospheric Sciences Laboratory Annex  
Unitary Wind Tunnel  
8 Ft. High Temperature Tunnel  
Central Scientific Computing Facility  
Flight Simulation Laboratory  
Central Scientific Computing Facility  
EOSDIS-DAAC Facility  
East Area Compressor Station  
Flight Dynamics Drop Model Facility  
Structures and Materials Research Laboratory

*Lewis Research Center (LeRC)*

Engine Research Building  
Engine Research Building–West Wing  
Engine Research Building–Northwest Wing  
Engine Research Building–High Pressure Facility  
Engine Research Building–Spray Cooler Building  
Engine Research Building–Cooling Tower No. 4  
Chemistry Laboratory  
Icing Research Tunnel  
Icing Research Tunnel–Refrigeration Building  
Icing Research Tunnel–Cooling Tower No. 1

Special Projects Laboratory  
 Materials Research Laboratory  
 Materials & Structures Laboratory  
 Central Air Equipment Building  
 Central Air Equipment Building–PSL Cooling Tower  
 No. 3  
 Central Air Equipment Building–PSL Cooling Tower  
 Water Pump Building  
 Central Air Equipment Building–PSL Desiccant Air  
 Dryer  
 Central Air Equipment Building–PSL Cooling Tower  
 No. 6  
 Instrument Research Laboratory  
 Engine Research Building Combustion Air Heater  
 Engine Components Research Laboratory  
 Materials Processing Laboratory  
 Basic Materials Laboratory  
 Aero-Acoustic Propulsion Laboratory  
 & Control Room  
 PSL Heater Building  
 Electric Power Laboratory  
 Energy Conversion Laboratory  
 Space Power Research Laboratory  
 8 X 6 Ft. Supersonic Wind Tunnel  
 8 X 6 Ft. Supersonic Wind Tunnel– Cooling Tower  
 No. 2  
 8 X 6 Ft. Supersonic Wind Tunnel–Drive Equipment  
 Building  
 8 X 6 Ft. Supersonic Wind Tunnel–Air Dryer  
 Building  
 10 X 10 Ft. Supersonic Wind Tunnel (SWT)  
 10 X 10 Ft. SWT–Office and Control Building  
 10 X 10 Ft. SWT–2nd Compressor and Drive  
 Building  
 10 X 10 Ft. SWT–Air Dryer Building  
 10 X 10 Ft. SWT–Substation “K”  
 10 X 10 Ft. SWT–Main Compressor and Drive  
 Building  
 10 X 10 Ft. SWT–Low Pressure Fuel Pump Building  
 10 X 10 Ft. SWT–High Pressure Fuel Pump Building  
 10 X 10 Ft. SWT–Cooling Tower No. 5  
 10 X 10 Ft. SWT–Cooling Tower Water Pump  
 Building  
 10 X 10 Ft. SWT–Shop Building (#86)  
 10 X 10 Ft. SWT–Exhauster Building  
 Operations/Integration Building

*Marshall Space Flight Center (MSFC)*

Microwave Anechoic Chamber  
 Communications Facility  
 Photographic Laboratory

*Michoud Assembly Facility (MAF)*

SSME - Block II Facility  
 LIDAR Facility  
 Power Systems Laboratory  
 MAST/FSL Simulation Facility  
 Space Science Laboratory  
 Laboratory & Office Building  
 Test Stand Support Building  
 Test Facility 300  
 Test Facility 116  
 Structural Test Facility  
 Test Facility Terminal Building  
 Hot Gas Test Facility  
 Test Control and Service Building  
 TPTA Refurbishment Facility  
 Pump and Boiler House  
 Propulsion and Structural Test Facility  
 Test & Data Recording Facility  
 Space Environmental Effects Laboratory  
 Air Compressor Building  
 Materials & Processes Laboratory  
 Atmospheric Research Facility  
 Heat Treatment Facility  
 Structural Dynamics & Thermal Vacuum Laboratory  
 Hydrogen Test Facility  
 High Pressure Test Facility  
 Multi-Purpose High Bay Facility  
 Hydraulic Equipment Development Facility  
 LH2 Vaporization Facility  
 High Pressure GN2 Facility  
 Boiler Plant  
 Computer Facility  
 Pump House  
 Advanced Engine Test Facility  
 Test Support Building  
 Block House  
 Boiler House  
 Helium Compressor Building  
 Non-Destructive Evaluation Laboratory  
 Shops & Neutral Buoyancy Simulator  
 Productivity Enhancement Facility  
 Engineering & Developmental Laboratory  
 Developmental Processes Laboratory  
 X-Ray Calibration Facility  
 Office and Wind Tunnel  
 Compressed Air Facility  
 Air Compressor Facility  
 High Bay Shop Building  
 Space Station Development Laboratory  
 Surface Treatment Facility  
 High Reynolds Number Facility  
 Low Density Flow Facility  
 Engine Dynamic Fluid Flow Facility

Entire Facility is Industrial

*Plum Brook Station (PBS)*

Entire Facility is Mission Variable

*Santa Susana Field Laboratory (SSFL)*

Entire Facility is Mission Variable

*Tracking Stations*

Deep Space Network, Goldstone, CA  
TDRSS Ground Terminals, White Sands, NM  
STDN Site, Ponce de Leon, FL

*Wallops Flight Facility (WFF)*

Radar Facility  
Machine Shop - Fabrication  
Aircraft Projects/Hangar Area  
Electronics Support/Storage  
Mainland/Island

*White Sands Test Facility*

Altitude Simulation System (Steam Generator)  
Diesel Pad  
Boiler Building  
Switchgear Building  
Altitude Simulation System Building  
Steam Generator Support Building  
Boiler Building  
Water Treatment Building  
Treated Water Storage Facility  
300 Area Cooling Pond

### **Panama Canal Commission**

Marine Bureau (159 buildings)

Lock chambers  
Electrical towing locomotives  
Canal navigational lighting  
Computerized marine traffic control  
Repair facilities  
Related infrastructure

Tug, locomotive, and dredging-related equipment  
repair shops  
Potable water processing  
Communication  
Utility services

Engineering & Construction Bureau (257 buildings)

Industrial sector

General Services Bureau (239 buildings)

Vehicle maintenance and repair shops  
Fire stations  
Sanitation and grounds management facilities  
High energy-consuming activities

### **U.S. Information Agency**

Relay Station, Greenville, North Carolina  
Relay Station, Delano, California  
Relay Station, Dixon, California (inactive)  
Relay Station, Bethany, Ohio  
Relay Station, Munich, Germany  
Relay Station, Kavala, Greece  
Relay Station, Rhodes, Greece

Relay Station, Bangkok, Thailand  
Relay Station, Tangier, Morocco  
Relay Station, Colombo, Sri Lanka  
Relay Station, Botswana  
Relay Station, Belize  
Relay Station, Philippines



## **U.S. Department of Agriculture**

242 Barns	78 Office Buildings
2 Bus Stations	85 Office/Laboratory Buildings
87 Chemical Storage Buildings	Chapel
8 Engineering Facilities	6 Restroom Buildings
4 Filling Stations	215 Sheds
5 Fire Stations	158 Shops
479 Greenhouses	426 Storage Buildings
76 Garages	54 Trailers
98 Headhouses	Weather Station
137 Housing Buildings	2 Waste Treatment Buildings
2 Incinerator Buildings	494 Other Building Types
514 Laboratory Buildings	

## **U.S. Department of Justice**

FBI Headquarters, J. Edgar Hoover Building	FBI West Virginia Complex
FBI Academy, Quantico	Justice Data Center, Washington, DC
FBI Miami	Immigration & Naturalization Service Repeater Stations - Nationwide
FBI Western Region	

## **U.S. Department of State**

Main State Complex	Beltsville Information Management Center
Blair House Complex	International Chancery Center

## **National Archives and Records Administration**

National Archives Building, Washington DC,	Gerald R. Ford Library, Ann Arbor, MI
National Archives at College Park, MD	Gerald R. Ford Museum, Grand Rapids, MI
Herbert Hoover Library, West Branch, IA	Jimmy Carter Library, Atlanta, GA
Harry S. Truman Library, Independence, MO	Ronald Reagan Library, Simi Valley, CA
Dwight D. Eisenhower Library, Abilene, KS	John Fitzgerald Kennedy Library, Boston, MA
Lyndon B. Johnson Library, Austin, TX	Franklin D. Roosevelt Library, Hyde Park, NY

## **Social Security Administration**

National Computer Center, Baltimore, MD

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**APPENDIX E**  
**DEPARTMENT OF ENERGY: EDUCATION, EXTENSION,**  
**AND INFORMATION SERVICES**

Energy Efficiency and Renewable Energy Clearinghouse (EREC)

Contact: Pat Rose, (202) 586-9645

Office of Public Affairs

Contact: F. Chester Gray, (202) 586-6827

Industrial Assessment Center (IAC) Program

Contact: Charles J. Glaser, (202) 586-1298

Inventions and Innovation Program (IIP)

Contact: Sandy Glatt, (202) 586-2079

Gas Mileage Guide

Contact: David Greene, (423) 574-5963

National Energy Information Center, Energy Information Administration (NEIC/EIA)

Contact: Sandra Wilkins, (202) 586-1173

Office of Federal Energy Management Programs (FEMP)

Contact: Shelley Fidler, (202) 586-5772

Office of Scientific and Technical Information (OSTI)

Contact: Bill Edmunds, (423) 576-3382

Technical Information Program, National Renewable Energy Laboratory (NREL)

Contact: David Warner, (303) 275-4373

State Energy Program

Contact: Thomas Stapp, (202) 586-2096

Technical Information and Communication Program

Contact: Marilyn Burgess (202) 586-2040

Weatherization Assistance Program

Contact: Gail McKinley, (202) 586-4074

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**APPENDIX F**  
**FEDERAL INTERAGENCY ENERGY POLICY COMMITTEE**  
**(656 COMMITTEE)**  
**FY 1998**

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Housing and Urban Development

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Treasury

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Office of Management and Budget

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**APPENDIX G**  
**PERSONNEL OF THE DEPARTMENT OF ENERGY'S**  
**FEDERAL ENERGY MANAGEMENT PROGRAM**

**FY 1998 Personnel**

Dan W. Reicher  
Assistant Secretary, Energy Efficiency and Renewable Energy  
and Chair, Federal Interagency  
Energy Policy Committee

Federal Energy Management Program Staff:

John Archibald, Director  
Executive Secretary, Federal Interagency Energy Policy Committee,  
Executive Director, Interagency Energy Management Task Force

Veronica Bellamy  
Ted Collins  
Anne Sprunt Crawley  
Jerry Dion  
Judy Florance  
Curtis Framel  
Mike Fulton  
Nancy Hapstack  
Louis Harris  
Annie Haskins  
Arun Jhaveri  
April Johnson  
Randy Jones  
Paul King  
Bill Klebous

Rick Klimkos  
Katie Kroehle  
Helen Krupovich  
Will Litner  
Dean McCauley  
Bob McLaren  
Tatiana Strainic Muessel  
Pat O'Brien  
Vic Petrolati  
Will Prue  
Ernie Rios  
Tanya Sadler  
Cheri Sayer  
Fred Singleton  
Nellie Tibbs