

Chapter 2

Policies and Programs for
Federal Energy Efficiency

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Policies and Programs for Federal Energy Efficiency

Since the 1970s, both the executive branch and Congress have worked to promote energy efficiency within Federal agencies, although policy emphasis has varied. This chapter first examines legislative and executive efforts to implement an energy conservation strategy for the Federal Government. Next it describes the major energy efficiency programs of Federal agencies intended to implement congressional and executive policy.¹

SETTING GOALS: LEGISLATION AND EXECUTIVE ORDERS PROMOTING FEDERAL ENERGY EFFICIENCY

Legislation for Federal Facilities and Operations

Congress has visited the issue of improving energy efficiency in the facilities it owns and leases and in its operations several times since the mid-1970s. Each new piece of legislation has combined past experience with new approaches in an effort to promote further efficiency gains in Federal agencies. Table 2-1 summarizes the main acts of Congress regarding Federal energy management legislation, and the key provisions.

Energy Policy and Conservation Act (EPCA)—EPCA of 1975 was the first major piece of legislation to address Federal energy management, directing the President to develop a comprehensive energy management plan including procurement practices and a 10-year building plan. EPCA included few details, leaving those to the executive branch. EPCA also amended the Motor Vehicle Information and Cost Savings Act to require that the Federal automotive fleet meet or exceed the corporate average fuel economy mileage standards.

Department of Energy Organization Act (DOEOA)---Section 656 of the DOEOA of 1977 established the Federal Interagency Energy Policy

Committee (often called the “656 Committee”). The 656 Committee is a senior agency management group comprised of an assistant secretary or assistant administrator from each of the Departments of Defense, Commerce, House and Urban Development, Transportation, Agriculture, and Interior; from the U.S. Postal Service and from the General Services Administration. The National Aeronautics and Space Administration and the Department of Veterans Affairs have also designated members for the committee. This committee meets periodically to discuss policy options and review agency progress toward Federal conservation goals. The committee is intended to strengthen energy conservation programs which emphasize productivity through the efficient use of energy and to concurrently encourage interagency cooperation in energy conservation. One of its purposes is to focus the attention of top Federal agency management on the tasks and missions related to national energy objectives rather than on the tasks of a particular agency.

National Energy Conservation Policy Act (NECPA)—In NECPA of 1978, Congress took a more active role in defining detailed steps to be followed by the executive agencies. Several of the steps included in this legislation had been set forth by the President in Executive Order 12003 in 1977 (see below). For example, where EPCA directed the President to develop an energy-related procurement policy, NECPA specified the use of a “life cycle costing methodology” as the basis of policy. Similarly, where EPCA directed the President to develop a 10-year building plan, NECPA included details such as which buildings were subject to energy audits (all those exceeding 1000 square feet). Both of these provisions in NECPA were part of Order 12003. Unlike Order 12003, NECPA set no goal for percentage reduction in energy use, but instead specified the minimum rate at which Federal buildings had to be retrofit with all cost effective measures. All buildings were to have been retrofit by

¹In addition to the efforts to improve Federal energy efficiency, Congress and the Department of Energy are working to promote energy efficiency throughout the economy at large. These efforts will produce increased efficiency for the Federal Government as well. For example, the National Appliance Energy Conservation Act, with energy efficiency standards for products ranging from refrigerators to fluorescent light ballasts, will result in energy savings over time as agencies replace existing equipment.

Table 2-I—Federal Energy Management Legislation

Law	Purpose	Provisions for Federal Energy Management
EPCA 1975	To increase domestic energy supplies and availability; to restrain energy demand; to prepare for energy emergencies.	Directs President to: —Develop mandatory standards for agency procurement policies with respect to energy efficiency; —Develop and implement 10-year plan for energy conservation in Federal buildings, including mandatory lighting, thermal, and insulation standards, and plans for retrofitting to meet standards. Requires that Federal vehicle fleet meet corporate average fleet efficiency standards.
DOEOA 1977	Establishes department of energy to secure effective energy management and a coordinated national energy strategy.	Establishes “656” Committee.
NECPA 1978	Promote the use of commonly accepted methods to establish and compare life-cycle costs of operating Federal buildings, and the use of solar heating and cooling and other renewable energy sources in Federal buildings	Defines Federal Energy Initiative (FEI). Establishes use of life-cycle cost (LCC) method. Establishes publication of Energy Performance Targets. Requires LCC audits and retrofits of Federal buildings by 1990. Establishes Federal Photovoltaic Program. Establishes Federal Solar Program.
COBRA 1985	Reconcile the budget.	Amends FEI authorizing agencies to use shared energy savings (SES).
FEMIA 1988	Promote efficient use of energy by the Federal Government.	Amends Federal Energy Initiative. Allows Secretary of Energy to set discount rate used in LCC analysis. Removes requirement that agencies perform LCC retrofits by 1990. Establishes energy performance goals for Federal buildings, including a 10% reduction in building energy use by 1995. Directs agencies to establish incentives for energy conservation. Creates Interagency Energy Management Task Force on Federal energy management.
NDAA for FY89, Sec. 736 1988	Authorizes defense spending.	Establishes incentive for SES contracts in DOD, allowing half of first year savings to be used for welfare, morale, and recreation activities at facility. Other half to be used for additional conservation measures.
NDAA for FY90 Sec. 331 1989	Same as above.	Expands DOD’s SES incentive to include half of first 5 years’ savings.
NDAA for FY91 Sec. 2851 1990	Same as above.	Requires Secretary of Defense to: —Develop plan “to achieve maximum cost-effective energy savings;” —Develop simplified contracting method for SES; —Report annually to Congress on progress made. Expands DOD incentives to include utility rebate programs and include two-thirds of savings.

KEY: EPCA—Energy Policy and Conservation Act, 1975, Public Law 94-163.

DOEOA—Department of Energy Organization Act, 1977, Public Law 95-91.

NECPA—National Energy Conservation Policy Act, 1978, Public Law 95-619.

COBRA—Comprehensive Omnibus Budget Reconciliation Act, 1985, Public Law 99-272.

FEMIA—Federal Energy Management Improvement Act, 1988, Public Law 100-451.

NDAA—National Defense Authorization Acts: for FY 1989, Public Law 100-456; for FY90, Public Law 101-189; for FY91, Public Law 101-510.

SOURCE: Office of Technology Assessment, 1991.

1990. The main provisions of NECPA were codified as the Federal Energy Initiative.²

Comprehensive Omnibus Budget Reconciliation Act (COBRA)—COBRA of 1985 amended NECPA to provide Federal agencies an alternative source of funding for energy efficiency investments during a time of great fiscal constraints. Under

COBRA, agencies were encouraged to seek private financing and implementation of energy efficiency projects through “shared energy savings” (SES) contracts (described below).

Federal Energy Management Improvement Act (FEMIA)—FEMIA of 1988 amended NECPA and modified and added several provisions to the

²42 U.S. Code 8243-8287 (1983).

Federal Energy Initiative. A central provision was the establishment of a goal to reduce energy consumption per square foot in Federal buildings by 10 percent between 1985 and 1995. Operations energy (i.e., energy used for transport, or in energy-intensive activities such as nuclear reactors) was not included. FEMIA marked the first time that Congress specified the level of savings which should be achieved. Also, as an incentive to encourage use of SES contracts, Congress allowed agencies to retain a portion of cost savings for future energy conservation measures. Furthermore, FEMIA created an Interagency Energy Management Task Force, and directed the Department of Energy (DOE) to carry out an energy survey in a representative sample of Federal buildings to: 1) determine the maximum potential cost-effective energy savings that may be achieved, and 2) make recommendations for cost-effective energy efficiency and renewable energy improvements.

National Defense Authorization Acts for Fiscal Years 1989-91 (NDAA)—NDAA for 1989 provided incentives for shared savings in military facilities by allowing a base commander to use half the first-year savings for welfare, morale and recreation activities of the base. NDAA for 1990 expanded that incentive to cover the savings in the first 5 years. NDAA for 1991 revised the incentive such that one-third of the savings from SES contracts could be used for additional energy conservation measures, with one-third left for improving family housing at the base or for welfare and recreation activities. Further, these incentives apply not only to SES contracts, but also to other energy cost savings (e.g., from participation in utility rebate programs). NDAA for fiscal year 1991 also calls for simplified SES contracting methods, explicitly allows military facilities to participate in utility rebate programs, and directs the Secretary of Defense to develop and report annually on a plan to achieve maximum cost-effective energy savings through the year 2000.

Proposed Legislation—Congress has continued to work for increased energy savings in Federal

facilities with ongoing hearings and proposed legislation. For example, the House Energy and Commerce Committee's Subcommittee on Energy and Power and the House Government Operations Committee's Subcommittee on Energy, Environment and Natural Resources held a joint hearing in July 1990 on energy conservation and efficiency efforts at Federal facilities.³ In addition to hearings on the issue, new legislation has been proposed. For example, the proposed National Energy Policy Act of 1990, which passed the Senate in August 1990, included a goal of installing all conservation measures with less than a 10-year payback period in Federal buildings.⁴ Currently, there is proposed legislation in both Houses which includes a variety of provisions for improving Federal energy efficiency.⁵ For example, several of these acts, if enacted, would establish a fund to support energy efficiency investments and direct agencies to perform energy- and cost-saving retrofits and create new incentives.

Legislation for Households Receiving Federal Energy Subsidies

Around two-thirds of the Federal Government's spending on energy is for Federal facilities and operations. The other third is spent indirectly on the utility bills of low-income households through programs of the Departments of Housing and Urban Development (HUD) and Health and Human Services (HHS).⁶ As with the Federal Energy Initiative, legislative efforts to encourage increased energy efficiency in HHS- and HUD-assisted households have been ongoing and have evolved over time.

Energy Efficiency in HUD-Assisted Housing—The Housing and Community Development Act (HCDA) of 1974 placed an emphasis on energy conservation and renewable energy. HUD was directed to support activities related to energy, including retrofits and installation of solar equipment in buildings, and to provide aid for the assessment and design of district heating and cooling systems and resource recovery projects.

³U.S. Congress, *House Committee on Energy and commerce*, Subcommittee on Energy and Power, and *House Committee on Government Operations*, Subcommittee on Environment, Energy, and Natural Resources, *Hearings on Federal Facilities Energy Conservation Programs*, Serial No. 101-175, July 1990.

⁴S. 324 passed the Senate with an amendment by voice vote on Aug. 4, 1990 (Congressional Record, Aug. 4, 1990, pp. 12558-12596).

⁵See S. 163, introduced Jan. 14, 1991; S. 326, introduced Jan. 31, 1991; S. 341, introduced Feb. 5, 1991; S. 417, introduced Feb. 7, 1991; S. 570, introduced Mar. 6, 1991; S. 741, introduced Mar. 21, 1991; H.R. 776, introduced Feb. 4, 1991; H.R. 1196, introduced Feb. 28, 1991; H.R. 1301, introduced Mar. 6, 1991; and H.R. 1543, introduced Mar. 21, 1991.

⁶These programs are described in ch. 3.

The HCDA of 1979 directed that HUD consider life-cycle cost when selecting heating and cooling systems in newly constructed and substantially rehabilitated projects.⁷ The HCDA of 1980 required the preparation of comprehensive, communitywide energy use strategies. The HCDA of 1987 established an energy-efficient public housing demonstration project, allowed housing authorities to retain part of the energy cost savings resulting from shared energy savings projects, and required that life-cycle cost be considered in HUD's comprehensive improvement assistance program for housing authorities.

The Cranston-Gonzalez National Affordable Housing Act of 1990 required that newly constructed HUD-assisted housing meet energy efficiency standards. It also included a low-income housing conservation and efficiency grant, and required that HUD submit an energy assessment report and a 5-year energy efficiency plan.

Energy Efficiency in DOE and HHS-Assisted Households—In 1989 HHS spent \$1.4 billion on residential heating and cooling assistance payments through the Low Income Home Energy Assistance Program (LIHEAP). Congress has established two programs to improve energy efficiency in low-income households. One is a weatherization component of LIHEAP. The other is DOE's Weatherization Assistance Program (WAP), which is not limited to LIHEAP-eligible households, but targets generally the same population. Under LIHEAP, the States are allowed to use up to 15 percent of LIHEAP funding for weatherization programs. In 1990, Congress amended LIHEAP to allow States to request a waiver to spend up to 25 percent of their LIHEAP funds on weatherization under certain conditions.⁸ The maximum weatherization benefit ranged from \$160 to \$5,000 in fiscal year 1990, which aided about 160,000 households in weatherizing their homes. In recent years, 8 to 10 percent of LIHEAP funds have been used for weatherization. A rela-

tively small number of LIHEAP-eligible households receive weatherization. For example, in fiscal year 1989, less than six-tenths of 1 percent (or 142,584 households) received weatherization assistance.⁹ Since 1985 there have been substantial cuts in LIHEAP funding, and use of LIHEAP for weatherization has decreased significantly. For example, in the fiscal year 1992 budget request, HHS suggested reducing the LIHEAP appropriation by one-third to around \$1 billion.¹⁰ Between fiscal year 1988 and 1990 the weatherization assistance component has dropped by 22 percent, from \$170 million to \$133 million.

DOE's WAP was established in 1977 by Title N of the Energy Conservation and Production Act.¹¹ Through WAP, Congress directed the Secretary of Energy to develop and conduct a weatherization program that provides grants to States and Indian tribes. Households with incomes below 125 percent of the Federal poverty line (around \$6,000 in 1988) are eligible to have additional home insulation installed. States often use LIHEAP weatherization funds to supplement WAP. In 1988, 107,000 homes were weatherized with a maximum average expenditure of \$1,600 per housing unit. The appropriations levels have remained relatively constant in recent years, hovering around \$160 million, although when inflation is taken into account funding has fallen.¹²

Executive Orders for Federal Energy Efficiency

Executive Order 11912—There have been five Executive orders related to Federal energy efficiency. The earliest was Order 11912 of 1976, Delegation of Authorities Relating to Energy Policy and Conservation. Among other things, this order defined the roles of various Cabinet Departments with responsibility for Federal energy use:

- the Administrator of the General Services Administration (GSA) was designated to take on the functions assigned to the President by

⁷42 U.S.C. 1437k (1990, Cumulative Annual Pocket Part).

⁸Public Law 101-501, Nov. 3, 1990.

⁹U.S. Department of Health and Human Services, Family Support Administration, *Low Income Home Energy Assistance Program Report to Congress for Fiscal Year 1989*, Oct. 29, 1990, p. ix.

¹⁰U.S. Office of Management and Budget, *Budget of the United States Government Fiscal Year 1992* (Washington DC: U.S. Government Printing office, 1991), Part 4-667.

¹¹42 U.S.C. 6851 (1983).

¹²Mary F. Smith and Joe Richardson Library of Congress, Congressional Research Service, "CRS Report to Congress: Weatherization Assistance Programs of the Departments of Energy and Health and Human Services," June 6, 1990, p. 4.

the Motor Vehicle Information and Cost Savings Act, as amended, directing that rules be established to require the Federal fleet to achieve an average fuel economy of at least that applicable to vehicle manufacturers;

- the Administrator of the Federal Energy Administration (now the Secretary of Energy) was made responsible for coordination of a 10-year energy conservation plan for Federal buildings, energy conservation and rationing contingency plans, and preparation of annual reports to be submitted to Congress as required by EPCA; and
- the Administrator of the Office of Federal Procurement Policy was required to provide policy guidance for application of energy conservation and efficiency standards in the Federal procurement process as mandated by EPCA.

Executive Order 12003--Order 12003, issued in 1977, amended Order 11912 and aggressively expanded the requirements of the Energy Policy and Conservation Act of 1975. For example, it specified a goal of a 20-percent reduction in energy use per square foot in existing Federal buildings, and required the Federal automobile fleet to exceed the minimum statutory requirement by 4 miles per gallon beginning in fiscal year 1980. As noted above, some of its provisions are also found in NECPA. Key provisions of Order 12003 include the following:

- . The Administrator of the Federal Energy Administration (now the Secretary of Energy) was directed to:
 1. develop, implement and oversee a 10-year energy conservation plan for Federal buildings over 5,000 square feet for the 1975-85 period which would achieve a 20 percent reduction in energy use in existing buildings and a 45 percent reduction in all new buildings;¹³

2. establish a life-cycle-cost methodology; and
3. report to Congress annually on the progress of the plan.¹⁴

. The Administrator of GSA was directed to ensure that:

1. all passenger automobiles purchased by executive agencies exceed the manufacturers' corporate average fuel economy standard under the Motor Vehicle Cost and Information Act;
2. the Federal passenger automobile fleet exceed minimum statutory requirements by 2 miles per gallon in fiscal year 1978, and by 4 miles per gallon beginning in 1980; and
3. the Federal light truck fleet also meet minimum standards, although not required under the Motor Vehicle Cost and Information Act.

Executive Order 12083--In 1978, Order 12083 created an Energy Coordinating Committee, composed of the Secretaries of the major Federal agencies. Its mission is to assure Federal coordination on energy-related matters, including both policy initiatives and resource allocation. In addition to the committee, an Executive Council was formed—consisting of the Secretary of Energy, Chairman of the Council of Economic Advisers, Assistant to the President for National Security Affairs, and the Assistant to the President for Domestic Affairs and Policy—to fulfill the functions of the committee during periods when the committee is not meeting.

Executive Order 12375--Order 12375 of 1982 further amended Order 11912 to reduce the required Federal passenger automobile fleet efficiency established in Order 12003. Whereas Order 12003 required the Federal passenger fleet to exceed manufacturers' average fleet efficiency by 4 miles per gallon, Order 12375 required only that the Federal fleet meet the manufacturers' average efficiency and that light trucks meet standards set by the Secretary of Transportation.¹⁵ This Executive order contrasted sharply with Order 12003, which was far

¹³Note, as specified in 10CFR 436 which interprets the Executive order, agency goals and reports are based on both energy used at the source and energy used at the site. The distinction applies to electric energy use to account for efficiency losses in generation, transmission, and distribution. While each kilowatt-hour of electricity is equal to 3,412 Btus at the site, on average 11,600 Btus of fossil fuels are required to generate and deliver it. The source accounting system makes each unit of electric energy 3.4 times as important as each unit of fossil energy. Because source accounting reflects generation and distribution losses, DOE's reports have historically emphasized it. Beginning in 1990, agencies decided to emphasize energy use based on site rather than source accounting in future reporting. Tiua Van Sickle, Federal Energy Management Program, U.S. Department of Energy, personal communication March 1991.

¹⁴42 *Federal Register* 37523 (July 20, 1977).

¹⁵47 *Federal Register* 34105 (Aug. 4, 1982).

more ambitious and went beyond some minimum requirements set by Congress.

Executive Order 12759—On April 17, 1991, Order 12759 was issued with provisions to:

- extend the FEMIA Federal building reduction goal to 2000, requiring Btu per gross square foot to be reduced 20 percent from 1985 levels;
- require agencies to prescribe policies for improving energy efficiency of industrial facilities by at least 20 percent in 2000 compared to 1985;
- minimize petroleum use;
- procure energy-efficient goods and products by Federal agencies based on life-cycle cost;
- provide for Federal agency participation in demand-side management services offered by utilities;
- provide new Federal vehicle fuel efficiency requirements, and outreach programs; and
- promote procurement of alternative fuel vehicles for Federal fleet.

Development of the order, underway since 1989, received considerable support from members of Congress. For example, in April 1990, 19 Senators sent a letter to President Bush urging the issuance of a new Executive order, asking that the order direct the Office of Management and Budget (OMB) and Federal agencies to “implement cost-effective energy efficiency projects, including the steps necessary to encourage private sector and utility assistance in financing such projects.”¹⁶ In September 1990, 66 members of Congress sent a letter to the Secretary of Energy again supporting an Executive order.¹⁷

PROGRAMS FOR IMPLEMENTING CONGRESSIONAL AND EXECUTIVE POLICY

Each Federal agency is responsible for implementing energy management plans for its facilities and operations as part of the Federal Energy

Table 2-2--Governmentwide Approaches to Energy Efficiency

Coordination of Federal efforts by DOE's Federal Energy Management Program
Reporting on Federal energy management efforts
Providing information, training, and technical support
Hosting interagency committee meetings
Awarding certificates of achievement
Life-cycle costing for procurement
GSA's Federal supply service
Defense Logistics Agency
Shared energy savings contracts
Utility rebate programs
Energy performance standards for new Federal buildings
Surveys of efficiency opportunities based on life-cycle costs

SOURCE: Office of Technology Assessment, 1991.

Initiative (see above). The approaches taken by the individual agencies are diverse, reflecting the wide range of their missions and perceived opportunities. However, several programs, such as life-cycle cost in procurement and SES, have broad relevance across all Federal agencies. The main ones are listed in table 2-2 and described in the following sections.

DOE'S Federal Energy Management Program

The Federal Energy Management Program (FEMP) within the Department of Energy is the central mechanism that coordinates Federal energy-efficiency efforts. It has several objectives, including:

- encouraging better understanding of how energy is used in the Federal sector;
- generating energy efficiency expertise, techniques, and practices and sharing them with other agencies;
- identifying key energy managers and Federal decisionmakers; and
- promoting effective energy management practices through training and awareness of these managers.¹⁸

FEMP has a leadership role in guiding other Federal agencies to develop sound energy management practices, but has no responsibility for other

¹⁶U.S. Department of Energy, “Federal Interagency Energy Management Task Force Holds First Meeting,” *Federal Energy Management Activities*, DOE/CE-0281P, Spring 1990, p. 7.

¹⁷The Honorable Philip R. Sharp et al., U.S. Congress, letter to the Honorable James D. Watkins, Secretary, U.S. Department of Energy, Sept. 11, 1990.

¹⁸U.S. Department of Energy, Office of Conservation and Renewable Energy, “Annual Operating Plan of Federal Energy Management Program,” December 1989, p. 3.

agencies' programs. It is a small office, with a staff of six and annual funding averaging \$1.5 million between 1985 and 1990. FEMP's 1991 appropriations have been increased to \$3 million.

FEMP pursues a strategy "to seek those activities that produce the maximum energy efficiency payoff with minimum expenditures. 19 Currently, FEMP has four areas of operations: 1) reporting on Federal energy management efforts; 2) providing information, training, and technical support to Federal agency personnel; 3) hosting interagency meetings to develop new Federal initiatives (e.g., a new Executive order); and 4) annually awarding certificates of achievement to Federal facilities and personnel that have demonstrated exemplary performance.

Annual Report—Each year, FEMP produces a report to Congress describing the Federal energy management activities. Each executive agency reports quarterly and annually to FEMP on energy use in its facilities and operations. FEMP compiles these reports and publishes them in an annual report, *Federal Government Energy Management and Conservation Programs*. The report is descriptive, presenting statistics on energy use and spending by agency, and summary information on Federal investments in energy efficient equipment and the number of shared savings contracts entered into and completed. The report contains no independent analysis by FEMP staff and no discussion of the existing opportunities for improving energy efficiency.

Information, Training, and Technical Support—The bulk of FEMP's efforts are in providing training and technical support to other agencies. These activities include publishing a quarterly newsletter, publishing occasional guidebooks (e.g., *Architect's and Engineer's Guide to Energy Conservation in Existing Buildings*²⁰), conducting training classes on topics such as life-cycle cost and SES contracts, and sponsoring four mobile energy labs for use by Federal facilities.

The FEMP Update is a quarterly newsletter distributed to over 5000 facility and management personnel whose jobs are directly related to energy use. Most of the articles in *Update* are submitted by its readers, providing a forum for Federal personnel to share their experiences with new energy efficient technologies and programs. The dozen or so articles in each issue describe a small but diverse sample of the efforts pursued by different agencies.

To familiarize Federal facility engineers, managers, and planners with Federal requirements instituted by FEMIA, FEMP together with GSA have developed training courses on SES contracts and life-cycle cost methods. In addition to FEMP courses, there are several private-sector and individual agency training courses on a wide range of energy management topics, as discussed in box 2-A.

Only a small fraction of the 5000 major Federal facilities have sent personnel to FEMP's training courses. For example, through June 1990, 169 Federal employees attended one of the eight SES training courses offered.²¹ In 1990, between 25 and 50 Federal employees, down from previous years,²² took FEMP's combined life-cycle cost/a simplified energy analysis method (ASEAM) course. These courses could have an impact nonetheless. For example, if even 3 percent of the 169 Federal employees trained in SES in 1989 successfully implemented a SES, the number of SES contracts completed through 1990 would more than double.

DOE's life-cycle cost training course is intended to ease the transition from making decisions based on traditional least first cost to least life-cycle cost. It describes techniques for selecting the most cost-effective building energy projects. The course includes instruction on a computer simulation program which helps managers estimate energy savings and perform life-cycle cost analyses. The computer program, called ASEAM-2, is available to all Federal facility engineers and associated facility managers to analyze building energy requirements. Energy analysis and life-cycle cost analysis is naturally complex, and some agencies still report that it remains too complex for use. For example,

¹⁹U.S. Department of Energy, Office of Conservation and Renewable Energy, "Annual Operating Plan of Federal Energy Management Program," December 1989, p. 4.

²⁰Pacific Northwest Laboratory, *Architect's and Engineer's Guide to Energy Conservation in Existing Buildings*, DOE/RL/0183P-H4, vol.1 and 2, April 1990.

²¹Ted Collins, Federal Energy Management Program, U.S. Department of Energy, personal communication, November 1990.

²²Dean Devine, Federal Energy Management Program, U.S. Department of Energy, personal communication, Jan. 17, 1990.

Box 2-A—Energy Training Courses

Training is a necessary ingredient in a successful energy management program in the government. Energy managers must make decisions that involve rapidly changing technology, limited budgets, vacillating energy costs, and the occupant in the facility. To aid Federal energy managers, many training courses are available, both private and government-offered.

The courses address a broad scope, ranging from the particulars of boilers to lighting retrofit options to the applicability of economic analyses. Since 1989 the Federal Energy Management Program and the General Services Administration have offered two courses, Shared Energy Savings Contracts and Life-Cycle Cost Methods/A Simplified Energy Analysis Method, to facility engineers, managers, and planners. Courses are also offered by professional societies, like the American Society of Heating, Refrigeration, and Air Conditioning Engineers and the Association of Energy Engineers, by universities such as the University of Wisconsin at Madison and Virginia Polytechnic Institute, and by manufacturers (e.g., General Electric's Lighting Institute).

The private sector courses define a number of objectives: cutting costs, improving efficiency, and dispersing knowledge concerning relevant technology. Most are seminars in which a variety of applications are discussed. Many provide hands-on training and identify solutions to foreseeable obstacles. For example, Virginia Polytechnic Institute offers an Energy Management Diploma Program that is completed in four courses. The institute states that their objective in offering the program, now in its 11th year, is to "get the participants into the energy management mainstream so that they know where the resources are that can help them."¹

In 1989, 169 Federal employees, including 60 military personnel, attended one of the eight offered SES training courses. ASHRAE reported that 15 of the 339 applicants for its fall 1990 courses were Federal employees.² GSA/FEMP courses cost about \$200, while private sector courses are \$435 to \$850 at the government rate. The benefits of well selected training should produce greater savings than the cost of sending the employee.

¹Letter and enclosures from William A. Mashburn, Associate Professor, Virginia Polytechnic Institute, Nov. 27, 1990.

²Marietta Henry, American Society of Heating, Refrigerating, and Air Conditioning Engineers, Fax 011 Federal employee participation in fall 1990 AS HRAE Professional Development Seminars, Nov. 6, 1990.

when ASEAM was first introduced in FEMP courses in 1988, many found the computer program (which required 16 floppy disks) daunting.²³ The FEMP life-cycle cost course including ASEAM is completing its second year, and feedback from the first students should aid future participants.

FEMP sponsors four mobile energy laboratories (MELs) which can perform detailed measurement and analysis of facility energy use. The MELs are converted passenger buses containing sophisticated energy monitoring, auditing, and analysis equipment, as well as a mobile work space for engineers and technicians. Currently, the Army, Air Force, Navy, and DOE each are assigned one of the MELs.²⁴

Finally, FEMP provides individual assistance to agencies and facilities when requested in developing and implementing new programs. For example,

FEMP is currently working with GSA and Potomac Electric Power Co. (PEPCO) to promote a relighting initiative. This initiative has three main benefits: 1) providing a clear demonstration of new, energy-efficient but commercially available lighting technologies as an example for other facilities; 2) demonstrating use of a utility rebate program (PEPCO is adding \$10 million to GSA's \$10-million effort; and 3) implementing a highly cost-effective, energy-saving measure.

Hosting Interagency Policy Meetings—FEMP regularly hosts the meetings of two interagency committees, one oriented to policy development and the other oriented to policy implementation. The focus of the recent meetings of these two committees has been development of a new Executive Order on Federal energy management (see above).

²³Trevor L. Neve and Robert W. Salthouse, Logistics Management Institute, "Making Shared Energy Savings Work," Report AL703R1, July 1988, p. 3-7.

²⁴Pacific Northwest Laboratory, *Mobile Energy Laboratory Use Plan* (Washington, DC: U.S. Department of Energy, April 1989).

As required by law, the 656 Committee has convened annually the past 3 years. However according to the minutes of the committee meetings, no senior agency personnel have attended, with the exception of DOE's Assistant Secretary of Conservation and Renewable Energy.²⁵ Instead, the designated members have sent representatives.

The second committee hosted by FEMP is the Interagency Management Task Force, created by FEMIA in 1988. This committee is composed of the energy chiefs of all Federal agencies. It meets periodically to assist the 656 Committee in coordinating promotion of energy conservation activities within the Federal Government. This committee is responsible for assessment of agency progress in achieving energy savings, collection and dissemination of information relevant to energy savings, coordination of energy surveys conducted by the agencies, development of options for use in conserving energy, and reporting to the 656 Committee on its findings.²⁶ Since its inception the task force has met three times beginning in June 1990. Generally, the members of the task force are the same personnel who have substituted at the 656 meetings in the past 2 years.

Federal Energy Efficiency Awards-Each year, FEMP awards certificates of achievement to about 15 individuals and 15 facilities who have demonstrated exemplary performance in promoting conservation in Federal facilities. These awards include no financial reward, but rather provide recognition and favorable publicity for exemplary performance.

Life-Cycle Costing for Procurement

The Federal Government procures a great variety of energy-related goods and services, and procurement policies are correspondingly diverse. For example, procurement policy determines how gas and electric utility service is obtained; whether and how facilities use private contractors to perform heating, ventilation, and air conditioning system operation and maintenance; and which commonly used items (such as lamps and refrigerators) are available through the Federal Supply System.

Consideration of life-cycle cost is often required for Federal procurement (see box 2-B). Implementation of that requirement varies depending on the good or service being procured. Life-cycle cost analyses are generally left to individual agencies or facility managers to perform, but in some cases they are given explicit guidance.

Two Federal agencies take the lead in procuring the most commonly required products for the entire Federal Government, including energy-consuming or energy-conserving items such as lamps, household appliances, and office equipment. The Department of Defense's (DOD) Defense Logistics Agency is responsible for supplying lamps and associated equipment to all Federal agencies. GSA's Federal Supply Service is responsible for other common products and services. Of the thousands of products available from these two agencies, a few have been chosen based on their life-cycle cost, including household products such as refrigerators, water heaters, and room air conditioners listed on GSA's Household Appliances Schedule. For most other energy-using products such as lamps, agencies purchasing from the Defense Logistics Agency and the Federal Supply Service are given little or no guidance as to life-cycle cost.²⁷ GSA selects office products such as copiers and typewriters based on life-cycle cost, too, but energy costs are not considered since they are small compared to factors such as equipment durability and other operating costs (e.g., toner for copiers and ribbons for typewriters).²⁸

Shared Energy Savings

Under COBRA, all Federal agencies are allowed to seek private sector financing and implementation of energy efficiency projects. The SES program permits Federal facilities to enter into contracts of up to 25 years with private energy service companies. Under SES contracts, private companies may perform energy services using their own capital and personnel for energy efficiency improvements including energy audits, purchase and installation of new equipment, operation and maintenance of equipment, and personnel training. In exchange, the contractors receive a specified portion of the cost

²⁵U.S. Department of Energy, 656 Committee Meeting Minutes, Feb. 29, 1988, Dec. 22, 1989, Oct. 10, 1990.

²⁶42 U.S.C. 8257 (1990, Cumulative Annual Pocket Part).

²⁷U.S. Department of Energy, *Federal Energy Management Program*, "Annual Report to Congress on Federal Energy Conservation Programs, 1987," September 1988, p. 2.

²⁸Mike Smith, *Federal Supply System*, General Services Administration, personal communication, Jan. 29, 1991.

Box 2-B—Life-Cycle Cost Analysis

The Energy Policy and Conservation Act (EPCA), passed in 1975, directed the President to develop procurement policies with respect to energy conservation opportunities.¹ NECPA of 1978 went further, specifying that agencies must consider life-cycle costing in procurement decisions. This requirement has been incorporated in Office of Management and Budget guidelines for general procurement including the full range of goods and services.² In addition, the Office of Federal Procurement Policy has developed standards for energy conservation which have been incorporated into the Federal Acquisition Regulations.

Use of life-cycle cost methodology by Federal agencies was introduced by Executive Order 12003 in 1977, codified by NECPA in 1978 and amended by FEMIA 10 years later. The life-cycle cost method assesses energy costs and savings potential over the total lifetime of a building or project to allow agencies to prioritize conservation projects and provide funding to those with the highest life-cycle cost savings: investment ratio (SIR). The method was designed by the Department of Energy as a way to estimate and compare different energy-use systems and evaluate new building designs and retrofit actions, not just for initial costs, but for total costs over the estimated lifetime of the project, system, or building. The National Bureau of Standards defines the method as follows:

A method of economic evaluation that sums discounted dollar costs of initial investment (less salvage value), replacements, operations (including energy usage), and maintenance and repair of a building or building system over the study period.³

Under the Federal Energy Initiative (FEI) as established by NECPA, Federal agencies were required to retrofit all buildings larger than 1,000 square feet with cost-effective measures by 1990. That requirement was dropped from the FEI by the Federal Energy Management Improvement Act of 1988. Currently, the life-cycle cost rule principally applies to alternative building systems and designs for either existing or new federally owned and leased facilities, solar energy projects, Federal photovoltaic projects and purchase of household appliances. Life-cycle cost must be considered when choosing between alternate retrofit options, new building design, new building systems, and in the selection of leased buildings.

¹42 U.S. Code 6361 (1990, Cumulative Annual Pocket part).

²Office of Management and Budget, Office of Federal Procurement Policy, "Federal Procurement Policy Concerning Energy Conservation" Policy Letter 76-1, August 1976; and "Performance of Commercial Activities," Circular A-76, August 1983.

³Rosalie T. Ruegg, U.S. Department of Commerce, National Bureau of Standards, "Life Cycle Costing Manual for the Federal Energy Management Program," NBS Handbook 135, 1987, p. xx.

savings. This system provides Federal agencies an alternative source of funding for energy efficiency investments during a time of great fiscal constraints. See box 2-C for examples of Federal SES contracts.

SES contracts are not without shortcomings. According to one DOE contractor report, direct Federal Government financing of a project results in savings 30 to 70 percent higher than the savings from a SES contract.²⁹ This is a natural outcome of sharing the savings with the contractor. In addition, SES requires considerable effort from contract specialists. Still, SES does allow energy efficiency investment when direct Federal financing is unavailable.

There have been far fewer SES contracts than originally expected. For example, the Congressional Budget Office projected that 30 SES contracts would be in effect in fiscal year 1988, saving the Federal Government \$250 million over a 5-year period, fiscal years 1989-93.³⁰ The conference report on the legislation enabling SES contracts estimated 30 contracts averaging a savings of \$0.5 million each. However, as of 1990 only four energy savings contracts have been awarded. Some SES requests for proposals (RFPs) issued by Federal agencies have been entirely unsuccessful, receiving no responses. For example, the Department of Veteran's Affairs received no responses to its 1986 RFP concerning the Medical Center at Perry Point, Maryland.

²⁹DHR inc., "Analysis of Shared Savings vs Direct Financing of Energy Retrofits in Federal Buildings," DOE/CS/10097-1, May 1984.

³⁰U.S. Congress, Congressional Budget Office, "CBO Estimate for H.R. 4065, the Federal Energy Management Improvement Act," May 26, 1988, p. 4.

Box 2-C—Examples of Efforts To Implement Federal Shared Energy Savings Contracts

Federal agencies have been authorized by Congress to use shared energy saving (SES) contracts since 1986.¹ By December 1990, five contracts **had** been signed, but one was terminated shortly thereafter. A **larger** number of SES contracts have been considered, but not brought to fruition. At the end of 1990, **there** were 16 proposals under development and 4 contracts under negotiation.

Because every Federal facility has a unique location, use, building style, and equipment, every SES contract is unique. **The** two successful examples (only one of which resulted in **an** SES contract) here illustrate some of **the** many issues which determine the success or failure of any SES project.²

Corpus **Christi** Army Depot: On September 7, 1988, the Army signed an SES contract for the Corpus **Christi** Army Depot. This project, which took over one and a half years to sign, illustrates the benefits of patience and flexibility.

The Army wanted to retrofit a chiller and upgrade electrical service in an aircraft hanger. The Request for Proposal (RFP) for the project was issued in early 1987, and a **preproposal** conference was held with potential contractors. The winning contractor was to provide all the materials, equipment, and labor to remove the outdated chiller and replace it with a modified system. **bearing all costs** of the operation for the 25-year period specified in the contract. For the first 6 months after the RFP was issued, the Army could find no interested prospective contractors.

Based on **comments** from a potential contractor, the Army altered the contract to include additional conservation measures to the chilled water system which would generate further savings and revised the shared savings formula. These changes were crucial to making the project worthwhile for the contractor, as well as increasing total savings. After over a year of negotiations, the contract was signed with Way Engineering Co., Inc. Under the contract, Way Engineering Co., Inc. will receive 68.6 percent of the energy cost savings. The chiller is now in operation and based on current usage rates, the contractor will **receive** \$7.6 million and the government will save \$3.5 million over the next 25 years.

Housing and **Urban** Development Headquarters: In 1987, the Department of Housing and Urban Development (HUD) proposed using an SES contract in HUD's Washington, DC headquarters building to install energy efficient lighting and heating, ventilation, and air conditioning equipment. The **RFP** required that all installation work on the project be done after normal office hours, which some potential bidders considered restrictive. The contractor was to provide 7-year maintenance service.

After HUD secured a bidder and started negotiations, GSA announced that it planned to install an automatic sprinkler system for fire safety. The sprinklers altered the economics of the SES project to such an extent that **the** project was terminated. The relighting is now being performed by GSA directly concurrent with the sprinkler **installation**.³ Although the SES contract was terminated, the project objective of improving energy efficiency will be met, with all the savings accruing to the Federal Government.

¹Comprehensive Omnibus Budget Reconciliation Act of 1985 (COBRA), Public Law 99-272, Title VII, 7201(a).

²Unless otherwise noted, **these** descriptions are derived from: U.S. Department of Energy, "Shared Energy Savings Contracting for Federal Agencies, Topic D Exhibits," DOE/CE-237, May 1990, pp. 4-6. For a description of the successful SES contract at the San Diego Division of USPS, see ch. 5.

³Department of Housing and Urban Development, "Energy Conservation Plan for Department of **Housing** and **Urban Development** Headquarters," Oct. 1, 1990, p. 7.

Three factors help explain the lack of SES contracts through 1989, as noted by the General Accounting Office.³¹ First, until 1989, Federal facilities were not allowed to retain any of the savings, and agency officials lacked incentives for pursuing SES contracts. A second impediment was

the complicated structure of SES contracts, which differ from conventional contracts. Provisions for estimating energy savings, design of payment provisions tied to energy savings and future energy prices, and the slower payback for contractors are examples of how SES contracts differ from conventional

³¹For a detailed discussion of **three** of these reasons, see U.S. Congress, General Accounting office, "Report to the Congressional Requesters on Federal Shared Energy Savings Contracting," GAO/RCED-89-99, April 1989, p. 1

contracts. Coupled with a lack of detailed baseline energy-use data, developing energy and cost-saving estimates present an obstacle. Finally, uncertainty about procurement policy hampered SES efforts. For example, OMB Circular A-76 requires that agencies compare contractor cost to in-house cost for the particular service, but such comparisons are difficult to produce. Some agencies prepared voluminous and detailed RFPs to ensure compliance with procurement policies. However, contractors prefer flexible and limited RFPs because they cost less to respond to and afford opportunities to explore a wider range of energy-savings options in the facility.

GAO's report noted that the impediments it identified in 1989 were being addressed. For example, Congress added some incentives in the Federal Energy Management Improvement Act of 1988 and the National Defense Authorization Acts for fiscal years 1989-91, as described above. Lack of baseline energy-use data was partially addressed through development of ASEAM, although calibrating the model remains difficult. Increased familiarity with SES contracts should result in a more flexible interpretation of procurement policy. However, other impediments remain, such as a reluctance of agency officials to relinquish potential savings to a private firm and a shortage of staff to identify and implement projects. Whether the new incentives and other changes are sufficient to promote more SES activity in the future remains an open question.

Utility Rebate Programs

In the past year, FEMP has encouraged all Federal agencies to make use of utility rebate programs for energy efficient equipment.³² A large and growing number of the Nation's electric utilities and a few gas utilities offer such programs as part of their efforts to manage future demand. Many utility programs are well-funded and comprehensive.³³ Utility programs may also supplement facility staffs

by providing engineering and other expertise. For example, Pacific Northwest Laboratory is working for FEMP with Niagara-Mohawk Power Corp., a New York utility, to develop a model program for Federal facilities. Program goals include having the utility provide 100 percent of the financing and also provide contractors to perform audits and implementation.³⁴ Also, as noted above, PEPCO, the electric utility serving Washington, DC, is working with DOE and GSA to cofund a multimillion dollar relighting project in Federal buildings.

Where available, utility rebate programs can be a useful supplement to Federal funds and staff. Not all utilities have programs, but for those that do, there is a wide range of programs reflecting the capacity and energy needs of the utility. Some utilities, recognizing the special budgetary, procurement, and other needs of governments, have created special marketing arms to work with them. For example, San Diego Gas and Electric Co. has an office solely for Federal, State, and local governments which helps them take advantage of rebates and engineering assistance offered by the utility to promote energy efficient technologies.³⁵

Energy Performance Standards for New Federal Buildings

Under NECPA, all new Federal buildings are required to meet energy performance standards developed by DOE. The standard adopted for Federal buildings is similar to Standard 90-1-P developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and the Illumination Engineering Society.³⁶ The standard includes principles of building design for insulation and window design for building envelope, lighting, hot water, electric power distribution, HVAC system, and energy management.

³²There had been some uncertainty about whether Federal procurement policies allow facilities to accept utility rebates. That question was resolved for the General Services Administration by Public Law 101-509 Section 15, Nov. 5, 1990, and for the Department of Defense by the National Defense Authorization Act for Fiscal Year 1991, as discussed above. Those laws explicitly allow GSA and DOD to accept utility rebates.

³³A forthcoming OTA report, "Prospects for Demand Management in Electric and Gas Utilities," is examining this type of program in detail.

³⁴J. W. Currie, Pacific Northwest Laboratory, personal communication, February 1991.

³⁵J. F. Drummer, Governmental Marketing & Services Manager, SDG&E, personal communication, Sept. 28, 1990. See United States Postal Service Case Study inch. 5, which describes lighting rebates SDG&E granted to the San Diego Postal Division.

³⁶U.S. Department of Energy, Federal Energy Management Program, *Federal Energy Management Activities*, "Federal Building Energy Conservation Standards," summer/fall 1990, pp. 21-22.



Energy in a whole new light.

SDG&E Commercial Lighting Retrofit Program

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P.O. Box 1831 • San Diego, CA 92112

SDG&E Retrofit Lighting Program Investment Analysis

Company Name: U.S. Postal Service
Address: 3974 Sorrento Valley Blvd.
Job Number: 152

Retrofit savings (kWh)		
Lighting kWh-before	70,884	
Lighting kWh-after	24,984	
kWhr savings		45,900
Percent reduction		65%

Retrofit savings (dollars)		
kWh savings	45,900	
cost/kwh	\$0.100	
Lighting savings	\$4,590	
Reduce A/C savings	\$ 689	
Reduced maintenance	\$ 333	
Total savings		\$5,612

cost		
Retrofit cost ()estimate (X)final	\$6,855	
SDQ&E incentive	\$5,331	
Customer o@		\$1,524

Investment analysis		
Savings- years		\$16,835
Annual return on investment		368%
Payback period		0.27

Additional benefits

- . Hedge against future rate increases--possible increased future savings
- . Brand new lighting system-reduced future maintenance cost
- . More pleasing light-less lighting glare
- Additional profits for your business-or keeping your business more competitive
- . increases marketability of building

SDG&E's lighting rebate program announcement and an analysis performed for the U.S. Postal Service. Note that in this example, SDG&E is contributing over 75 percent of project costs, resulting in a very high return on investment for USPS.

Energy Audits and Surveys of Existing Federal Buildings

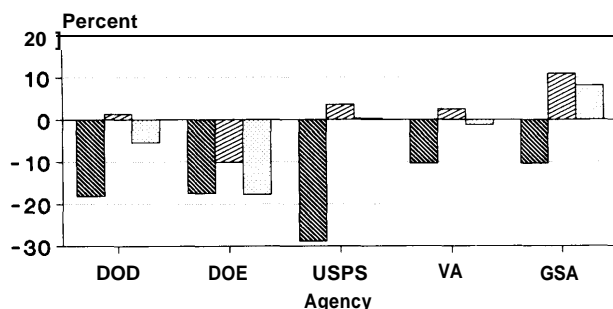
In the 1970s, both Section 381 (a)(2) of EPCA and Section 547 of NECPA, as well as Order 12003, mandated that Federal agencies conduct audits of buildings larger than 5,000 square feet. Again in 1988, FEMIA directed DOE to conduct energy surveys of a sample of facilities throughout the government. Such audits form the basis for selecting retrofit measures that improve overall energy efficiency and minimize life-cycle cost, and for determining the potential for governmentwide energy and cost savings. However, results from the early energy audits were not compiled to assess total government potential, and there is no consolidated record of the extent to which the retrofits identified were implemented. Currently, some surveys are being con-

ducted at Federal facilities, although those results have also not been coordinated to assess total government potential.

Key Agencies' Energy Management Plans

Primary responsibility for energy management lies with each Federal agency for its own facilities and operations. Under FEMIA, each major agency is required to develop and implement its own energy management plan to reduce building energy use per square foot by 10 percent by 1995. The following descriptions for the largest energy-using agencies demonstrate the diversity of approaches taken, reflecting the wide range of their missions and perceived opportunities. Also, the agencies' performance in meeting the 20 percent reduction goal

Figure 2-1—Percent Change in Building Energy Use per Square Foot, Fiscal Years 1975-85 and 1985-89



= 1975-85, Source = 1985-89, Source
m 1985-89, Site

SOURCE: U.S. Department of Energy, "Annual Report on Federal Government Energy Management Fiscal Year 1985," DOE/CE-0171, August 1986, table 2, p. 6; and U.S. Department of Energy, "Annual Report to Congress on Federal Government Energy Management and Conservation Programs Fiscal Year 1989," Oct. 3, 1990, table 3, p. 15; and table F, p. 78.

for 1975-85³⁷ set forth in Order 12003 and performance between 1985 and 1989³⁸ are summarized (see figure 2-1). Note, annual reports have historically emphasized energy used at the source rather than energy used at the site as the most accurate measure (see footnote 13). However, in 1990, the 656 Committee and the Interagency Energy Management Task Force agreed to emphasize energy use at the site rather than at the source,³⁹ and presumably that will be the measure used to judge compliance with FEMIA's requirement of 10 percent savings between 1985 and 1995 although that is not certain. Accordingly, changes in energy between 1975 and 1985 are shown based on source accounting, and between 1985 and 1989 are shown based on both source and site accounting.

Department of Defense—Between 1975 and 1985, DOD reduced energy consumption per square foot in buildings by 18.1 percent, more than the

average reduction accomplished by Federal agencies. Between 1985 and 1989, building energy use per square foot increased 1.4 percent using source accounting and declined by 5.4 percent using site accounting.

In 1986, DOD established a second 10-year plan to reduce energy consumption in buildings.⁴⁰ Under DOD's overall policy guidance, each service (e.g., Army, Navy, and Air Force) creates its own energy management plan with minimum interference. These plans, in turn, can be very detailed and comprehensive.⁴¹ The overall DOD plan sets the services' minimum reduction goal, and assigns lead responsibilities with respect to research and development for energy conservation and conversion technologies to the three services. The assignment of lead service responsibilities, which helps reduce duplication of effort, has been given to the service with the most expertise in the relevant technology. For example, the Army is responsible for computer programs to determine building energy characteristics, energy-conserving structures and construction technology, advanced heating and air conditioning, and energy storage and distribution systems for fixed facilities.

On March 13, 1991, the Deputy Secretary of Defense set forth comprehensive new guidance for facility energy management, and established a goal of reducing energy use in all facilities by 20 percent in the year 2000 compared to 1985.⁴²

Spending on energy conservation investments has decreased from \$136 million in fiscal year 1985 to 0 in 1989. Reversing this trend, \$10 million has been appropriated for fiscal year 1991, with a target of \$50 million annually beginning in 1993.

Department of Energy—DOE is the largest consumer of energy in the civilian sector. Between 1975 and 1985, DOE reduced its buildings energy use per square foot by 17.5 percent. Between 1985 and 1989, DOE further reduced building energy use by 10.1 percent using source accounting, and by 17.7

³⁷U.S. Department of Energy, "Annual Report on Federal Government Energy Management Fiscal Year 1985," DOE/CE-0171, August 1986, table 2, p. 6.

³⁸U.S. Department of Energy, "Annual Report to Congress on Federal Government Energy Management and Conservation Programs Fiscal Year 1989," Oct. 3, 1990, table F, p. 78, and table 3, p. 15.

³⁹Tina Van Sickle, Federal Energy Management Program staff, personal communication, Mar. 20, 1991.

⁴⁰U.S. Department of Defense, Office of the Assistant Secretary of Defense for Acquisition and Logistics, "Defense Energy Program Policy Memorandum 86-3," DEPPM 86-3, Apr. 16, 1986.

⁴¹See, for example, Reynolds, Smith & Hills, "Department of the Army Energy Resources Management Plan FY86-FY95, Department of the Army, January 1987.

⁴²D.J. Atwood, Deputy Secretary of Defense, memorandum to secretaries of the military departments, Mar. 13, 1991.



Photo credit: Robin Roy

GSA's Suitland Complex has successfully used occupancy sensors to automatically turn off lights when not needed.

percent using site accounting, already beating the 1995 FEMIA goal.

In 1985, DOE established the Ten-Year In-house Energy Management Plan⁴³ with the goals of reducing energy consumption in buildings, metered processes, and vehicles and equipment by 10 percent by 1995 compared to fiscal year 1985. The plan consists of 12 programs that train employees in energy-related matters and alter procedures to include conservation elements. An example of employee training is within the central plant improvement program, which consists of all activities to make existing and new central heating and cooling plants more energy efficient. In 1983, a formal boiler operator training and tuneup program was established. The program consists of 4 days of classroom and hands-on training on boiler tuneups, and the identification of retrofit options. In fiscal year 1984, a steam-trap program was added. In the fiscal year 1989 annual report on in-house energy management, DOE stated that six training sessions were conducted and, assuming that all recommendations were implemented, the anticipated annual savings would be over \$7 million.⁴⁴

Several of the programs alter procedures to incorporate energy conservation decisions. An Operator Contractor Clause requiring efficient energy

use has been added for DOE owned and leased facilities. The utility contract improvement program seeks to identify and promote integrated usage and cost reduction initiatives including conservation, load management, and generation techniques in concert with existing utility rate structure in order to meet total energy requirements at lowest possible cost. The metering program seeks to establish usage patterns to pinpoint conservation opportunities by monitoring actual consumption. New DOE buildings, owned or leased, are required to have permanent metering for each type of energy consumed.

Department of Veterans Affairs (VA)--Between 1975 and 1985, VA reduced buildings energy use per square foot by 10.4 percent. Between 1985 and 1989, use increased by 2.5 percent using source accounting, and declined by 1.1 percent using site accounting. VA delegates responsibility for energy management to its 162 medical facilities.⁴⁵ Each is required to create the 10-percent reduction plan for its facility. The central office monitors energy consumption quarterly and tracks facility progress toward meeting its goal.

The U.S. Postal Service (USPS)—Between 1975 and 1985, USPS exceeded the 20 percent energy reduction goal, reducing consumption by 28.8 percent per square foot. However postal energy use is rising due to increased automation, increased mail volume, budget constraints, the relaxation of federal temperature settings, and the required increased ventilation mandated in the proposed ASHRAE standard regarding indoor air quality. Energy use per square foot in USPS facilities rose 3.6 percent by source accounting or by 0.3 percent using site accounting between 1985 and 1989. Each of the five postal regions has been assigned a target reduction to be met using energy surveys, employee awareness (including energy discussions at higher levels of management and SES training), and improved maintenance.

General Services Administration—Between 1975 and 1985, GSA reduced building energy use per

⁴³U.S. Department of Energy, Office of Project and Facilities Management, "FY1989 Annual Report on In-house Energy Management" DOE/MA-0416P, July 1990.

⁴⁴U.S. Department of Energy, Office of Project and Facilities Management, "FY 1989 Annual Report on In-House Energy Management," July 1990, p. 34.

⁴⁵Rajinder P. Garg, Chief, Energy Management Division, Veterans Administration, personal communication, Sept. 6, 1990.

square foot by 10.4 percent.⁴⁶ Between 1985 and 1989, building energy use per square foot increased by either 11 percent or by 8.2 percent, using source or site accounting.

In-house, GSA has a comprehensive master plan to be implemented by each region. Created in 1990 by energy coordinators, the plan is entitled the 5 Point Energy Reduction Plan.⁴⁷ The five points are

planning and monitoring, identifying and implementing projects, improving operations, raising energy awareness, and conserving energy in leased space. Each point contains a series of activities to be completed by a specific date and responsible office. The administration has set aside \$30 million in its fiscal year 1991 budget to complete conservation projects.

⁴⁶The General Service Administration's performance between 1975 and 1985 is a good example of the effect of using source rather than site accounting in measuring building energy use. Measured according to site energy, GSA's building energy use declined by 24.5 percent rather than only 10.4 percent.

⁴⁷General Services Administration Real Property Management and Safety, "GSA 5 Point Energy Reduction Plan," March 1990.