

Energy Savings Potential, Goals, and Funding Requirements

Information about the extent of attainable cost-effective energy savings remains sparse. Systematic surveys and audits of energy savings opportunities in federal facilities have been established in legislation and executive orders dating back over 15 years. Although building audits were conducted at most major facilities, the results apparently were neither compiled nor analyzed and were not kept current with changing technology and energy market conditions.

Currently, DOE is coordinating a government-wide energy survey of a representative sample of federally leased and owned buildings “. . . determining the maximum potential cost effective energy savings that may be achieved. . . .” as required by EPACT (Sec. 152 (h)). Although there is no statutory deadline for the survey, DOE’s June 1993 Implementation Plan³ set a tentative completion date of April 1994, with a report to Congress to follow shortly thereafter. EO 12902 further requires “prioritization surveys” or rapid assessments used to identify facilities with high-priority projects based on the degree of cost-effectiveness. It further requires agencies to implement 10-year plans to obtain comprehensive facility audits. These current efforts can go a long way to addressing questions of the potential and costs of improving federal energy efficiency. For example, the U.S. Army has developed a modeling system called “Renewable and Efficiency Energy Planning” (REEP) for its response to the survey. REEP organizes raw data, has been applied to more than 49 facilities representing about three-quarters of army facilities energy use, and is already being used to optimize the

³U. s. Department of Energy, Office of Federal Energy Management programs, “Implementation Plan for the Survey of Federal Buildings Energy Saving Potential as Required by Section 550 of the National Energy Conservation Policy Act as amended by the Energy Policy Act of 1992, ” June 1993, p. 17.

Army's energy efficiency purchasing and planning efforts.⁴ The Navy and Air Force have adopted REEP as well.

Early detailed audit efforts were criticized by some federal energy management personnel for being uncoordinated with implementation. Any audits or surveys become outdated with changes in energy prices, efficiency technologies, and other conditions (e.g., changing facility missions or base closings). For this reason, the efforts dedicated to identifying potential can be most useful when tailored to program goals and plans. The current planned approach, including initial broad surveys followed by more detailed audits tied to implementation plans should avoid the unnecessary costs that accompanied the earlier detailed efforts.

Better information about the extent of attainable energy and cost savings and the investment required can be useful for setting program goals. For example, EPACT directed agencies to reduce building energy consumption per square foot by the year 2000 by 20 percent relative to 1985. This type of percentage reduction goal, first established in 1978, is simple to understand and easy to track, making it a potentially useful tool. However, a key issue has always been the appropriate target to set. Reflecting the lack of clear estimates of the economically attractive potential, targets have been revised repeatedly in the past several years to require greater energy savings over an increasing horizon (see table). For example, EO 12902 established a new goal of a 30 percent reduction by the year 2005 relative to 1985 energy use. There appears widespread agreement that the current goals are attainable and economically attractive. However, more systematic analyses such as those anticipated from the DOE-led survey noted above should provide a much better basis for goals than has existed to date.

⁴Steve Siegel, U.S. Army, personal communication, Mar. 25, 1994.

Table 3- Goals for Energy Use/ft² Reduction in Existing Federal Buildings

Executive order or law	Goal, implementation date
EO 12003, 1977	20% by 1985 relative to 1975
FEMIA 1988	10% by 1995 relative to 1985
EO 12759, 1991; EPACT, 1992	20% by 2000 relative to 1985
EO 12902, 1993	30% by 2005 relative to 1985

FEMIA = Federal Energy Management Improvement Act, Public Law 100-615.
 SOURCE: Office of Technology Assessment, 1994.

Better information about the extent of potential savings, and the capital and other resources required to attain those savings is important for planning and budgeting to meet program goals. Legislation and executive orders have repeatedly established or updated requirements that all cost-effective energy efficiency opportunities be implemented by a certain date. Most recently, EPACT directed each agency to install all energy conservation measures with payback periods less than 10 years by no later than January 1, 2005.⁵ Absent systematic analyses such as the current DOE-led survey, however, the consistency between this goal and the percentage reduction targets is unclear. Also, the adequacy of current plans and anticipated budgets to fund the investment required remains speculative.

To address the issue of adequate funding, EPACT requires DOE to analyze and report to Congress on the financial investment needed to comply with current goals.⁶ That report, the “Federal Energy Efficiency Funding Study,” was to be submitted no later than April 1993 but has remained under review by DOE. DOE has recently deferred submittal of the study to allow it to incorporate changes resulting from EO 12902. **Completion and circulation of**

⁵EPACT, Sec. 152(b).

⁶EPACT, Sec. 162.

DOE's "Federal Energy Efficiency Funding Study" and the DOE-led survey results should be useful steps toward assessing the adequacy of current plans and budgets.

Highly approximate estimates of investment opportunities have suggested that at least \$5 billion of efficiency investments are cost-effective and thus required to meet current statutory goals. For example, the Energy Systems Modernization Office of Battelle Pacific Northwest Laboratories estimated in 1992 that there are \$5 to 10 billion of energy efficiency investment opportunities that meet or exceed the federal government's minimum life-cycle cost economic test.⁷ Consistent with that estimate, OTA's 1991 Report estimated that \$2 to 3 billion worth of highly attractive opportunities (i.e., with annual returns on investment of a lucrative 30 percent or higher) were available then, noting, however, that there was limited available information. Current administration plans are to ramp up annual investments from \$154 million in fiscal year 1992 to \$600 million by fiscal year 1997. At \$600 million annually, full implementation of a \$5 to 10 billion investment program would take between 8 and 17 years.⁸

Status of Funding Mechanisms for Efficiency Investments

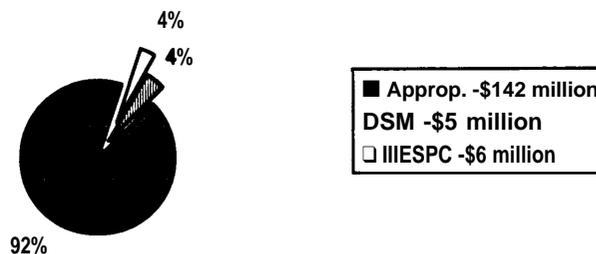
While relying heavily on direct agency appropriations to fund efficiency investments, Congress and the executive branch have promoted use of alternate financing sources. These include ESPC, utility DSM, and a government-wide Federal Energy Efficiency Fund. The great majority of funding for federal energy efficiency investments to date has come from direct agency appropriations, although the alternative approaches, if successfully implemented, may provide a growing share. For example, in fiscal year 1992, the most recent year for

⁷J. William Currie, testimony before the Senate Committee on Governmental Affairs, Feb. 18, 1992.

⁸Private sector funding such as DSM or ESPC would increase total annual investment and reduce the time until full implementation.

which preliminary estimates are available, total efficiency investment finding was \$154 million, over 90 percent of which was from direct agency appropriation (see figure 1).⁹

**Figure I--Energy Efficiency Funding
Fiscal Year 1992
\$154 million total**



NOTE: Neither the Federal Energy Efficiency Fund nor Energy Savings Performance Contracts had been established in 1992. ESPEC total reflects Shared Energy Savings, a predecessor of ESPEC.
SOURCE: Preliminary estimates provided to OTA by DOE/Office of Federal Energy Management Programs. Mar. 17, 1994.

In keeping with the ongoing tradition of evolution in the federal energy efficiency arena, efficiency proponents within and outside government continue to develop or consider novel approaches. For example, some have suggested consideration of a government-backed loan fund similar to Sally Mae or Fanny Mae (for student loans and home mortgages, respectively) to be used for federal facility efficiency upgrades. DOE is leading an interagency effort examining the benefits and challenges of this type of approach.¹⁰ These proposals, which go by such names as Daisy Mae and Effie Mae, have unique merits and challenges relative to other funding mechanisms. These efforts remain at a preliminary stage of

⁹U.S. Department of Energy, *Annual Report to Congress on Federal Government Energy Management and Conservation Programs Fiscal Year 1991*, (Washington, DC: Oct. 22 1992).

¹⁰Mark Hopkins, Alliance to Save Energy, personal communication, March 1993; and Greg Katz, U.S. Department of Energy, personal communication, March 1993.

investigation, have not been proposed for legislative action, and are not reviewed in this paper.

The amount of funding that can be reasonably provided by alternative funding approaches remains speculative. Each alternative approach has advantages and disadvantages, and agencies are gradually gaining practical experience as the approaches continue to evolve. To better determine the extent of federal finding required to meet federal energy management goals, EPACT directs DOE to conduct a detailed study of financing options as part of the Federal Energy Efficiency Funding Study mentioned earlier.¹¹ That analysis, which should be useful in guiding federal agency finding requests, was due in April 1993 but remains under review within DOE. **Completion and circulation of the Funding Study should be a useful step toward assessing the extent to which private sector funds can displace federal appropriations.**

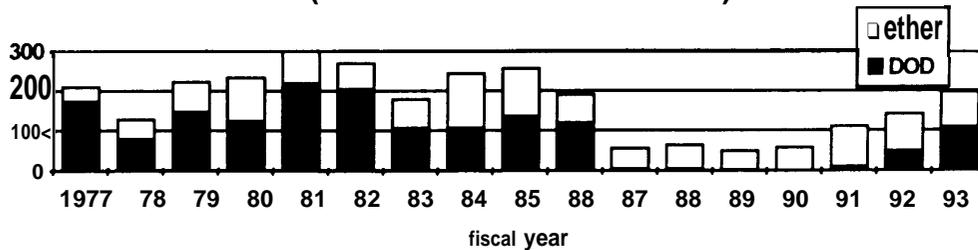
Direct Appropriations

Direct appropriations have the advantage of being administratively simple and well understood. However, federal funds are relatively scarce and energy efficiency appropriations must compete with other agency activities. Because energy efficiency is generally not a primary agency mission and because energy costs are typically a small fraction of total agency budgets, even projects with rapid paybacks have often received low priority for finding. Figure 2 shows how appropriations have fluctuated over the past two decades, with substantial increases in the past few years returning nominal annual investment to about the level of the late 1970s. Current administration plans are to continue escalating efficiency investments to a level of \$600 million in fiscal years 1997-98.¹²

¹¹EPACT, Sec. 162.

¹²Mark Ginsberg, U.S. Department of Energy, Office of Federal Energy Management Programs, personal communication, Feb. 25, 1994, based on Office of Management and Budget projections for a 4-year period, issued winter 1993,

**Figure 2-- Federal Energy Efficiency Funding
direct agency appropriations
(millions of nominal dollars)**



SOURCE: Department of Energy data. Fiscal year 1992-93 figures are preliminary estimates.

To help establish explicit priorities, EPACT requires the President’s annual budget submittal to include a statement of the amount requested for each agency’s energy management activities.¹³ That information is provided for some, but not all, agencies in the fiscal year 1995 budget request. The largest energy using agencies, including the Department of Defense (DOD), DOE, and the General Services Administration (GSA) are among those providing energy management line items in the current budget request.

Federal Energy Efficiency Fund

EPACT authorized DOE to establish a Federal Energy Efficiency Fund (FEEF) to provide grants to agencies to assist them in energy and water conservation requirements.¹⁴ DOE finalized guidelines for proposals for FEEF support in December 1993, and has distributed those to all federal agencies.¹⁵ Initial year FEEF efforts are a small portion of federal energy management efforts, reflecting the approach’s unique and previously untested

¹³EPACT, Sec.152(e). The U.S. General Accounting Office is conducting a study of this provision, with a report expected for release by the end of April 1994.

¹⁴EPACT, Sec. 152 (f).

¹⁵U.S. Department of Energy, Federal Energy Management Program, “Guidelines for Proposals for Federal Energy Efficiency Fund Support,” Dec. 22, 1993.

nature. For fiscal year 1994, \$6 million is available for all agencies with the exception of DOD, GSA DOE, and Veterans Affairs, which were specifically excluded in the appropriations bill. EPACT authorized \$50 million for the find for fiscal year 1995.

FEEF may have the advantage of focusing some energy management finding decisions on DOE, an agency for which energy management is a primary mission. This can help promote activity in agencies for which energy efficiency is a low priority. At the same time, this approach raises questions of coordination of budgets, both among the agencies in their budget planning and among appropriations subcommittees. As with direct agency appropriations, FEEF requires an investment of federal finds. **Early results from the program, if properly assessed, should be useful in determining whether the increase in agency efficiency activity outweighs the budgeting challenges raised and in establishing appropriate longer term funding levels.**

Energy Savings Performance Contracts

Energy savings performance contracts are a successor to the Shared Energy Savings (SES) concept first authorized in 1985.¹⁶ Under these contracts, private companies use their own capital and personnel to perform energy efficiency improvements at federal facilities. Their services may include energy audits, purchase and installation of new equipment, efficient operation and maintenance of equipment, and training of personnel. In exchange, the contractors receive a specified portion of the cost savings for a number of years. This system provides agencies a private-sector alternative to federal finding and staffing for energy efficiency investments, although by sharing the savings, it reduces the government's total cost-saving potential (since those savings are shared).

¹⁶ Comprehensive Omnibus Budget Reconciliation Act, 1985, Public Law 99-272.

Early results from the SES program were far less promising than originally anticipated, with a cumulative total of 4 contracts awarded by fiscal year 1990 and 13 by fiscal year 1992. SES contracts must contain generally complex terms distributing benefits and risks between the contractor and the federal government. Agencies reported that developing these novel contracts in a manner consistent with the Federal Acquisition Regulations proved to be even more complex and time-consuming. The typical lack of reliable energy use data at federal facilities further exacerbates the uncertainty and risks associated with these contracts. Finally, as private businesses, energy service companies have a cost of capital exceeding that of the federal government. Thus, some efficiency investment opportunities that are moderately cost-effective based on the federal cost of funds may not be attractive under ESPCs.

EPACT modified some SES contracting requirements, adopted the term ESPC, and directed DOE to develop uniform contracting procedures with the concurrence of the FAR Council.¹⁷ Those procedures, which were to have been adopted by rule by April 1993, remain under review and are expected to be released for comment in late March or April 1994.¹⁸ EO 12902 further directs GSA to develop procurement methods including ESPCs to speed the adoption of energy efficient technologies. **Eventual adoption of an ESPC rule should be a useful step enabling more widespread use of the approach. Continued experience with this evolving program is needed to determine its long-term potential contribution to overall federal energy efficiency funding.**

¹⁷EPACT, Sec. 155.

¹⁸Mark Ginsberg, U.S. Department of Energy, Office of Federal Energy Management Programs, personal communication, Feb. 25, 1994.

Utility Demand Side Management Programs

Where offered, utility rebate programs encouraging the use of highly efficient equipment and methods can be a substantial supplement to federal finds.¹⁹ For example, in its fiscal year 1991 annual report on federal energy management, DOE noted announcements of DSM rebates government-wide totaling about \$15 million, with over half of that total coming from a single facility-wide effort at Fort Lewis, Washington.²⁰ Besides reducing the federal finding required for energy management projects, this approach allows agencies to make use of utility expertise in project design and implementation. Not all utilities have programs, however, and for those that do, there is a wide range of programs reflecting the needs and approaches of the local utility.

OTA's 1991 Report found that in the past, procurement policies may have hindered federal facilities from participating in utility rebate and incentive programs. While Federal Acquisition Regulations appeared to include no specific prohibitions against participation in such utility programs, there were no specific allowances either to accept what might be construed as a gift. To clarify that federal participation in utility programs is indeed legal and in the national interest, Congress specifically included language to that effect for GSA and for DOD in 1990, and for agencies generally in EPACT.²¹ There remains, however, a potential conflict with federal life-cycle cost requirements that provide for a "fuel-neutral" analysis rather than one oriented to the type of energy provided by the utility. DOE staff have

¹⁹For an indepth discussion of electric utility demand side management programs, see U.S. Congress, Office of Technology Assessment, *Energy Efficiency: Challenges and Opportunities for Electric Utilities*, OTA-E-561 (Washington, DC: U.S. Government Printing Office, September 1993).

²⁰U.S. Department of Energy, *Annual Report to Congress on Federal Government Energy Management and Conservation Programs Fiscal Year 1991*, Oct. 22, 1992, p. 19-22. The report does not note whether the DSM rebates were received in 1991 or would be spread over several years.

²¹EPACT, Sec. 152(f).