

GAO

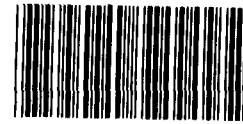
United States General Accounting Office

Report to the Chairman, Environment,
Energy, and Natural Resources
Subcommittee, Committee on
Government Operations, House of
Representatives

April 1992

ENERGY CONSERVATION

DOE's Efforts to Promote Energy Conservation and Efficiency

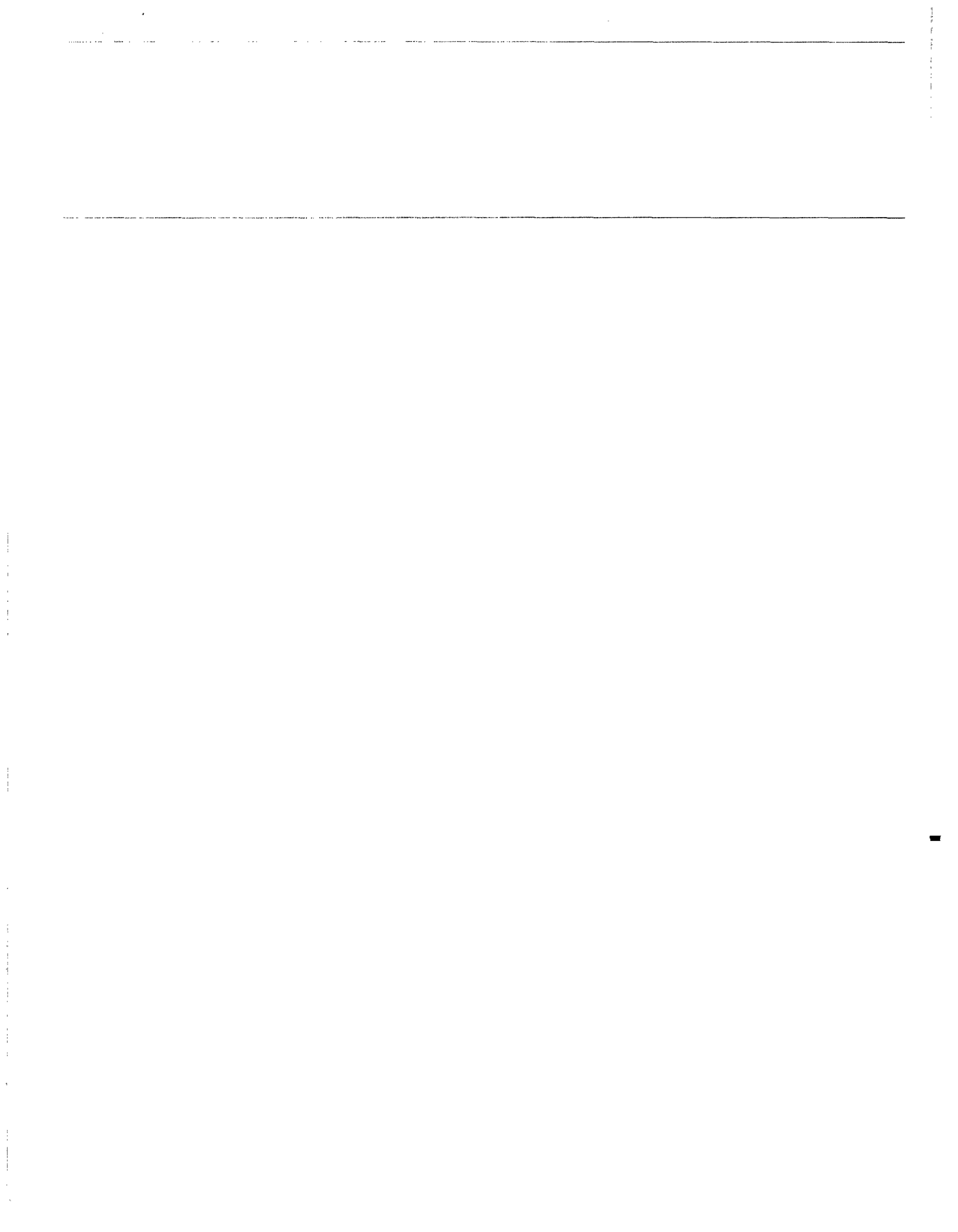


146799



**RESTRICTED--Not to be released outside the
General Accounting Office unless specifically
approved by the Office of Congressional
Relations.**

RELEASED



**Resources, Community, and
Economic Development Division**

B-247057

April 16, 1992

The Honorable Mike Synar
Chairman, Environment, Energy, and
Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In response to your December 21, 1990, request and as subsequently discussed with your office, this report provides information on the Department of Energy's (DOE) programs to promote electricity and overall energy conservation and efficiency. Specifically, we agreed to (1) examine the scope of DOE's conservation and efficiency programs, including its Integrated Resource Planning (IRP) Program; (2) examine how the policy options identified in the National Energy Strategy (NES) promote conservation and efficiency, as well as increased energy supplies; and (3) determine the extent to which DOE evaluates the results of its conservation and efficiency programs and considers evaluation results in its planning and budgeting decisions for these programs. You also asked us to examine the role of the Federal Energy Regulatory Commission (FERC), which is responsible for regulating most wholesale electricity transactions, in promoting electricity conservation and efficiency.

Results in Brief

The scope of DOE's efforts to promote conservation and efficiency encompasses (1) funding long-term research and development projects of efficient technologies at national laboratories; (2) helping to fund state programs that promote efficiency improvements for buildings such as hospitals, schools, and low-income residences; and (3) disseminating information about new and existing efficient technologies and their installation, use, and maintenance to utilities and utility regulators. DOE's IRP Program promotes the use of regulatory and resource planning approaches that encourage utilities to implement electricity conservation (also called "demand-side management" or DSM) programs.¹ (See app. II for further descriptions of DOE's conservation programs.)

DOE's National Energy Strategy includes 17 demand reduction approaches—conservation and efficiency policy options—and 31

¹Electricity Supply: Utility Demand-Side Management Programs Can Reduce Electricity Use (GAO/RCED-92-13, Oct. 31, 1991).

approaches oriented toward increasing energy supplies (called "supply-side options"). For example, to help promote efficient use of electricity, the Strategy endorses the expansion of DOE's IRP Program; to augment future electricity supply, the Strategy recommends, among other things, that DOE continue and/or expand its efforts to develop clean coal technologies and advanced nuclear reactors. In balancing energy demand and supply, the Strategy does not assign priorities to either conservation and efficiency options or supply-side options. Furthermore, as we testified in 1991, the Strategy's conservation options exclude those associated with higher energy prices,² and funding for expanded conservation efforts the Strategy recommends has been inconsistent.

In the past DOE has not systematically evaluated the effectiveness of conservation and efficiency programs. The agency has recently initiated efforts to consider program evaluation results, as well as the policy priorities of the National Energy Strategy when developing its program plans and budgets. In 1990 we found that DOE historically allocated funds to its conservation and efficiency programs on the basis of existing, or short-term, geopolitical, economic, and other policy considerations.³ However, DOE now plans to have a panel of scientific and technical experts in energy evaluate its conservation and efficiency research and development, and other programs, and then to consider the evaluation results when budget decisions are made at specific points in the programs' life cycles. Furthermore, in order to allocate program funding on a basis that considers long-term policy priorities, for its fiscal year 1993 budget DOE staff assessed the contributions of its programs, including its conservation and efficiency programs, in light of the National Energy Strategy's broad goals.

FERC is exploring what actions, if any, it should take to encourage electricity efficiency through the use of integrated resource planning. Specifically, FERC has met with state regulators to explore regional planning or other approaches, including DSM programs, designed to balance electricity supply and demand at the lowest cost. Some state regulators have called upon FERC to adopt a policy of rejecting proposed wholesale transactions that do not comply with a utility's state-approved integrated resource plan. However, FERC has not done so because, in some

²Balanced Approach and Improved R&D Management Needed to Achieve Energy Efficiency Objectives (GAO/T-RCED-91-36, Apr. 17, 1991).

³Energy R&D: Conservation Planning and Management Should Be Strengthened (GAO/RCED-90-195, July 30, 1990).

cases, utilities propose to sell power in more than one state, and the least-cost option in one state may not be the least-cost option in another.

Background

DOE is responsible for formulating federal energy policy and implementing programs that are aimed at promoting energy conservation and efficiency. For example, in response to the Department of Energy Organization Act (P.L. 95-91, sec. 801), DOE submits proposed national energy policy plans to the President every 2 years. The most recent national energy policy plan, the February 1991 National Energy Strategy, established broad goals for energy production, use, and conservation and identified general strategies, resources, and legislative and administrative actions to achieve those goals. In addition, legislation mandates many of DOE's conservation and efficiency programs; for example, the Energy Policy and Conservation Act, as amended (P.L. 94-163), mandated certain DOE conservation grant programs.

Federal support for conservation and efficiency, as reflected in budget allocations, has varied significantly, usually as a result of changes in national policy caused by economic, environmental, or international events. In fiscal year 1992, DOE budgeted \$426 million on programs that we identified as promoting conservation and efficiency in the use of electricity and other forms of energy.⁴ This amount represents an increase of some \$16 million over fiscal year 1991, following a decline in DOE expenditures for energy conservation from \$373 million in fiscal year 1983 to \$177 million in fiscal year 1987.

DOE's Conservation and Efficiency Programs

DOE activities directed at increasing conservation and efficiency include (1) research and development of efficient technologies, (2) electricity conservation and efficiency grant programs, (3) technical outreach efforts, and (4) promotion of efficiency-oriented regulatory and resource planning approaches. In accordance with the Secretary of Energy's January 1990 announcement that DOE would give conservation and efficiency programs increased policy and budget priority, DOE has begun to expand its efforts to promote energy conservation and efficiency.

DOE budgeted about \$122 million in fiscal year 1992 for research and development of efficient equipment, technologies, and processes,

⁴This total includes moneys allocated to the federal government by courts as a result of lawsuits in which oil companies were found to have overcharged on oil prices. It excludes DOE programs aimed at improving energy efficiency in the nation's transportation sector. Budget data for fiscal year 1992 are estimates, not actual expenditures.

compared with about \$108 million in fiscal year 1991. These efforts are directed at improving energy conservation and efficiency in industrial processes, as well as in commercial and residential buildings and facilities. According to DOE records, since 1978 DOE's national laboratories have developed and commercialized 24 new technologies that use electricity and other energy more efficiently—for example, a more efficient canning system and welding device.

DOE's grant programs, begun in the mid- and late-1970s as a result of legislation, encourage more efficient electricity use in low-income housing, schools, hospitals, and other public facilities. For instance, DOE's Institutional Conservation Program provides financial grants to help finance energy audits and energy-saving improvements at large institutions such as schools, colleges, and hospitals. Since 1978, this program has awarded grants totaling more than \$800 million. In 1986 the Congress enacted legislation⁵ that continued the funding of DOE's grant programs, in part, with proceeds from court-ordered payments from oil companies to DOE as a result of oil price overcharge violations. In fiscal year 1992, budgeting for grant programs exceeded \$240 million, compared with about \$246 million in fiscal year 1991.

DOE conducts activities to disseminate information to state regulators, electric utilities, industry, researchers, consumers, and other federal agencies about the availability, installation, and use of efficient new technologies.⁶ To communicate research and development project results, DOE provides (1) nontechnical fact sheets and bibliographies on energy efficiency technologies to the general public; (2) tailored information regarding new technologies to energy professionals; and (3) technical publications, videos, and exhibits to industry, government, and the scientific community. Outside parties are made aware of, and can obtain listings of, available DOE information by using DOE-funded telephone hotlines and computer data bases. DOE's fiscal year 1992 budget included over \$41 million for these efforts, versus about \$39 million in fiscal year 1991; however, according to a DOE official, these totals are likely understated because other areas, such as research and development and resource planning, also have an information dissemination component. Through an additional outreach effort, the Federal Energy Management Program, DOE provides technical assistance to other federal agencies for promoting electricity and overall energy efficiency in their buildings and assists in funding the retrofitting of all federal facilities with cost-effective,

⁵Petroleum Overcharge Distribution and Restitution Act of 1986 (P.L. 99-509).

⁶In this report, we use the term "technical outreach" to refer to these DOE efforts.

energy-efficient lighting, heating, and cooling systems. In fiscal year 1992, funding for this program approached \$4 million.

DOE's IRP Program is intended to encourage utilities and state regulators to use resource planning and regulatory approaches that emphasize electricity conservation and efficiency. For example, DOE has sponsored round table discussions and seminars where regulators can exchange information and funded studies about methods for estimating DSM electricity savings and costs. In fiscal year 1992, DOE budgeted over \$3.9 million to its IRP Program, compared with about \$3 million in fiscal year 1991.

National Energy Strategy Includes Both Conservation and Supply Options

DOE's National Energy Strategy includes both conservation and efficiency policy options and supply-side options in order to balance supply and demand for electricity and other energy sources. In promoting efficiency, the Strategy relies on DOE's research and development of efficient new technologies and the dissemination of information about the new technologies and innovative regulatory and resource planning approaches (such as IRP) to utilities, regulators, and the general public. In order to promote increased electricity and other energy supplies, the Strategy calls for continued, or expanded, DOE research and development of clean coal technologies, advanced nuclear power plants, and technologies that harness renewable energy sources, such as solar or geothermal energy, to generate electricity. Moreover, the Strategy notes that use of IRP can also promote the use of new electricity supply-side technologies.

The Strategy's executive summary includes 17 conservation and efficiency policy options and 31 supply-oriented policy options, but it does not assign weights or otherwise explicitly establish priorities for either type of option. In addition, the options proposed exclude those associated with higher energy prices, relying instead on continued relatively low energy prices, which generate less urgency to identify and implement energy-efficient alternatives. The Strategy also makes little effort to reflect in energy prices all the costs to society of obtaining and using energy, such as the adverse environmental consequences of relying on fossil fuels.

To accomplish the broad goal of increasing federal leadership in promoting electricity and energy efficiency, the NES endorses policy options that expand or extend existing DOE conservation and efficiency programs. However, funding for these programs has been inconsistent, varying with short-term, geopolitical, or other considerations. Moreover,

after increasing the budget from fiscal years 1989 through 1992, DOE proposed to reduce conservation and efficiency program spending for fiscal year 1993—the first complete fiscal year budget prepared after the NES.

DOE Has Not, but Plans to, Incorporate Evaluation Results in Budgeting Decisions

DOE has historically allocated funds to its conservation and efficiency programs on the basis of existing, or short-term, geopolitical, economic, and other considerations. For example, when energy prices were high or supplies were threatened, conservation and efficiency programs were funded at relatively high levels. During times of low energy prices and secure, plentiful supplies, conservation and efficiency programs have been de-emphasized. By assessing the effectiveness of DOE's conservation and efficiency programs relative to other programs, evaluations can assist policymakers in allocating budget dollars on the basis of a program's cost-effectiveness and potential contribution to the nation's energy supply and demand equation.

In our 1990 report, we found that the DOE long-range conservation research and development plan's usefulness for planning and budgeting was hampered, in part, because the planning process did not include a systematic review of ongoing individual research and development projects. We recommended, among other things, that top managers of the Office of Conservation and Renewable Energy systematically review the effectiveness of individual projects. Further, in 1991 we recommended that DOE conduct peer reviews of its conservation and efficiency programs annually and examine the implementation of peer review recommendations as part of the multiyear planning process.⁷ DOE officials agreed with the facts presented in our report and agreed to implement some of the report's recommendations.

During this review, we found that even when it evaluated the effectiveness of its conservation and efficiency programs, DOE did not always consider available evaluation results when it prepared its budgets or program plans. For example, although DOE sponsored an evaluation of its Weatherization Assistance Program by the Oak Ridge National Laboratory, DOE's budget office staff had neither reviewed nor considered the report in compiling DOE's conservation and efficiency budget for fiscal year 1992.

⁷Balanced Approach and Improved R&D Management Needed to Achieve Energy Efficiency Objectives (GAO/T-RCED-91-36, Apr. 17, 1991).

DOE has made some progress in improving its budgeting and planning processes for its conservation research and development programs. For example, DOE officials said that they had taken preliminary steps to improve DOE's budgeting and planning processes for conservation and efficiency programs, including integrating program evaluation results into these processes and establishing points in program implementation when DOE will make decisions about future program funding. In addition, DOE plans to improve its budgeting process for fiscal year 1993 by explicitly considering the National Energy Strategy's goals when deciding how to allocate its funds for all of its programs, including conservation and efficiency programs. According to DOE staff, the efforts to improve their budgeting and planning processes were delayed by about 6 months in order to expedite efforts to publish the 1991 National Energy Strategy.

FERC's Role in Promoting Conservation Is Evolving

Under the Federal Power Act, as amended, FERC is responsible for, among other things, reviewing the rates, terms, and conditions of proposed wholesale electricity sales and interstate electricity transmissions to determine that they are "just and reasonable," without undue preferences or advantages to buyer or seller. Because wholesale electricity transactions have grown in recent years, FERC now regulates about one-third of the electricity sold by utilities.

Although the National Energy Strategy calls upon FERC to promote electricity conservation by "encouraging" IRP, the Strategy does not specify how the option is to be implemented in the context of FERC's regulatory responsibilities under the Federal Power Act. In some cases, interstate wholesale power transactions may not comply with state integrated resource planning requirements, even though the transactions were approved by FERC as being "just and reasonable." In this regard, some state regulators have called upon FERC to adopt a policy of rejecting proposed wholesale transactions that do not comply with a utility's state-approved integrated resource plan. FERC has not done so, however, because, in some cases, utilities propose to sell power in more than one state, and the least-cost option in one state may not be the least-cost option in another.

As of December 1991, FERC had not determined what steps, if any, it should take to encourage electric utilities' use of IRP. However, in part to help determine its role in promoting efficient electricity use, FERC has met with state regulators to explore regional planning or other approaches, including DSM programs, designed to balance electricity supply and demand at the lowest cost. Furthermore, it is possible, as suggested by one

court decision, that state regulators may be able to enforce their IRP requirements without FERC's active involvement by challenging the prudence of a utility's decision to buy power, even if that power was purchased at a rate that FERC found to be just and reasonable.⁸

Agency Comments

We discussed the information in this report with agency officials, who generally agreed with the facts as presented. As you requested, we did not obtain written agency comments.

To respond to your request, we interviewed DOE officials, including the Assistant Secretary, Conservation and Renewable Energy, and reviewed relevant documents concerning the current status, upcoming efforts, and accomplishments of DOE's conservation and efficiency programs, as well as supply-side programs. We also reviewed the final and interim National Energy Strategy reports, as well as supporting documentation and draft legislation. To determine FERC's role in promoting conservation and efficiency, we interviewed officials from FERC, various state public utility commissions, and the National Association of Regulatory Utility Commissioners and reviewed and analyzed legal and court records delineating FERC's and state regulators' roles in promoting electricity conservation and efficiency. We conducted our work between December 1990 and October 1991 in accordance with generally accepted government auditing standards.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time we will send copies to interested parties and will make copies available to others upon request.

⁸Pike County Light and Power Co. v. Pennsylvania Public Utility Commission, 465 A.2d 735 (Pa. Commw. 1983).

If you have any questions about this report, please contact me at (202) 275-1441. Major contributors to this report are listed in appendix VI.

Sincerely yours,



Victor S. Rezendes
Director, Energy Issues

Contents

Letter		1
Appendix I		12
Introduction	DOE's Role in Energy Supply and Demand Objectives, Scope, and Methodology	12 13
Appendix II		15
DOE's Conservation and Efficiency Programs	Scope of DOE's Efficiency Efforts	15
Appendix III		22
National Energy Strategy Includes Both Conservation and Supply Options	NES Conservation Options May Have Limited Effectiveness Strategy Calls for Increasing Federal Role in Promoting Energy Supplies	22 27
Appendix IV		29
DOE Plans to Ensure That Program Evaluations Are Performed and Considered in Budgeting Decisions	Previous GAO Report Found Planning and Management Deficiencies DOE Has Undertaken Preliminary Corrective Actions	29 31
Appendix V		33
FERC's Role in Promoting Electricity Conservation and Efficiency Is Evolving		

Appendix VI Major Contributors to This Report	35	
Related GAO Products	36	
Table	Table III.1: Funding for DOE Conservation and Efficiency Programs Versus Supply Programs	26

Abbreviations

DOE	Department of Energy
DSM	demand-side management
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GAO	General Accounting Office
IRP	integrated resource planning
NES	National Energy Strategy
OMB	Office of Management and Budget

Introduction

Energy conservation and efficiency are responsive to national concerns, such as enhancing national energy security, providing environmental benefits, and improving U.S. competitiveness. The Department of Energy's (DOE) conservation and efficiency programs have contributed to the technology base and improved energy efficiency. For example, DOE reported that it has developed efficient new technologies in fluorescent lighting, windows, heat pumps, and industrial processes and that it has successfully transferred these technologies to the commercial sector. These contributions can be cost-effective. For instance, according to DOE, by 1992 the cumulative value of energy savings from low-emissivity windows should reach \$1 billion.

DOE's Role in Energy Supply and Demand

DOE is responsible for formulating federal energy policy and for implementing numerous programs that are aimed at promoting energy conservation and efficiency. Specific DOE activities include funding and conducting research and development programs in energy technologies, energy regulatory programs, as well as energy data collection and analysis. The Department also funds and administers programs aimed at promoting the conservative and efficient use of electricity and other forms of energy. These conservation and efficiency programs are detailed in appendix II.

DOE's Assistant Secretary for Conservation and Renewable Energy is responsible for formulating and directing programs designed to increase the production and utilization of renewable energy and improving the energy efficiency of buildings, industrial systems, and utility processes. Another responsibility includes administering statutorily mandated programs that provide financial assistance for state energy planning and weatherization of housing and other facilities.

Federal legislation mandates many of DOE's conservation and efficiency programs. For example, the Energy Policy and Conservation Act, as amended (P.L. 94-163), mandated the development of programs to institute a number of energy conservation measures, such as appliance efficiency standards. Also, the Energy Conservation and Production Act, as amended (P.L. 94-385), encourages energy conservation measures in new and existing buildings and provides financial incentives and technical assistance to states and local governments for conservation and efficiency improvements. Under the National Appliance Energy Conservation Act of 1987, as amended (P.L. 100-12), DOE is to establish energy conservation standards for 13 categories of major home appliances. The National

Energy Conservation Policy Act, as amended (P.L. 95-619), authorized federal loans and grants for installation of conservation measures.

In addition, the Department of Energy Organization Act, as amended (P.L. 95-91), required that the President biennially submit a national energy policy plan to the Congress. Under the act, the biennial plans are to establish objectives for energy use, production, and conservation and delineate the appropriate strategies, resources, and actions to achieve these objectives. The National Energy Strategy (NES) was developed because of a presidential directive that was intended to satisfy this legislative requirement. The current National Energy Strategy, that DOE began developing in July 1989, was issued in February 1991.

Objectives, Scope, and Methodology

The Chairman, Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, requested a GAO study of the Department of Energy's efforts to promote electricity and other energy conservation and efficiency. As agreed with the Chairman's office, we examined

- the scope of DOE's conservation and efficiency programs, particularly its Integrated Resource Planning Program;
- how the policy options identified in the National Energy Strategy promote conservation and efficiency as well as increased supplies;
- the extent to which DOE considers program evaluation results in its planning and budgeting decisions for its conservation and efficiency programs; and
- the Federal Energy Regulatory Commission's (FERC) role in promoting electricity conservation and efficiency.

To examine the status and scope of DOE's conservation and efficiency programs, we interviewed the Assistant Secretary, Conservation and Renewable Energy, as well as program officials from component offices of DOE's Office of Conservation and Renewable Energy. We interviewed DOE officials to obtain information on the current program status, upcoming efforts, and accomplishments and explanations about program budget and planning documents. We also examined how DOE promotes supply-side options (i.e., natural gas, fossil, and nuclear energy) by interviewing officials from various supply-side technology offices and again reviewed documents related to programs' scope, funding, and status.

To determine how conservation and efficiency were addressed in the National Energy Strategy, we reviewed the final and interim National Energy Strategy reports, as well as supporting documentation and draft legislation.

To determine if evaluations are performed and if the results are used in budgeting decisions, we interviewed officials from the Office of Planning and Assessment in DOE's Office of Conservation and Renewable Energy, and we obtained information on any evaluation procedures used and how results are used. We also discussed how evaluation results are used by DOE's Office of Budget in making funding decisions. To the extent possible, we followed up on the relevant findings of a report that we released in 1990.¹

To determine FERC's role in promoting electricity conservation and efficiency, we interviewed officials from FERC, DOE, state public utility commissions primarily in the Northeast, and the National Association of Regulatory Utility Commissioners. We also reviewed and analyzed court cases that delineated FERC's and state regulators' roles in promoting electricity conservation and efficiency.

As requested by the Chairman's office, we did not obtain written agency comments on a draft of this report. However, we discussed the report with officials from DOE, who agreed with the information presented. We conducted our work between December 1990 and October 1991 in accordance with generally accepted government auditing standards.

¹Energy R&D: Conservation Planning and Management Should Be Strengthened (GAO/RCED-90-195, July 30, 1990).

DOE's Conservation and Efficiency Programs

DOE funds and administers a number of programs to promote conservation and efficiency in electricity and other energy use. For example, in fiscal year 1991, DOE spent \$410 million on programs that we identified as promoting conservation and efficiency.¹ Responding to concerns about the security of U.S. oil supplies raised by the recent Persian Gulf crisis and about the environmental consequences of building new power plants—such as emissions that can result in acid rain, air pollution, and global warming—DOE has increased its funding for efforts promoting conservation and efficiency. The fiscal year 1992 budget for conservation and efficiency programs of \$426 million represents an annual funding increase of over \$16 million from the previous year.

Scope of DOE's Efficiency Efforts

DOE uses various methods to encourage efficient use of electricity and other forms of energy. For example, DOE has funded research and development projects of more efficient technologies and hardware, such as low-emissivity glass for use in windows and new residential insulation. DOE also administers energy conservation grant programs, disseminates energy-efficiency information through various technical outreach activities, and encourages state regulators and electric utilities to experiment with, and adopt, regulatory and resource planning approaches that encourage electricity conservation.

Research and Development of Efficient Technologies

DOE's research and development of efficient equipment, technologies, and processes budget was over \$122 million in fiscal year 1992 compared with about \$108 million in fiscal year 1991. These efforts can improve efficiency and conservation in the manufacturing industry as well as in buildings and facilities. For example, in one project, DOE is developing industrial heat pumps that capture low-temperature waste heat and reprocess it back into the industrial cycle, possibly improving the heat pump's energy efficiency by 30 percent.

DOE's Office of Conservation and Renewable Energy manages the Department's conservation and efficiency programs, including projects at national laboratories to research and develop efficient, new technologies. This office is organized according to energy end-use sectors, with components devoted to promoting energy efficiency for electric utilities, industry, and in residential and commercial buildings.

¹Our budget data for DOE conservation and efficiency efforts exclude DOE programs aimed at improving the energy efficiency of the nation's transportation systems.

Industrial Technologies

Improving the electricity and overall energy efficiency of the industrial sector can have significant implications for the U.S. economy as a whole. Industry accounts for about one-third of total energy use in the United States. Energy use per dollar of industrial output has decreased since 1970 as a result of efficiency improvements, process changes, product mix changes, and other industrial shifts in the United States. In promoting conservation and efficiency for industry, DOE's Office of Conservation and Renewable Energy attempts to develop industrial technologies that reduce waste generation, reuse unavoidable waste streams, and improve the energy efficiency and fuel flexibility of industrial processes.

For example, DOE has funded a more electrically efficient welding process involving a control mechanism for a high-efficiency transformer. Under conventional technology, the electric current continuously flows through the transformer used in welding, resulting in considerable energy loss when the unit is idling between welding steps. The DOE-developed controller shuts off power to the transformer when the system is idling, greatly reducing electrical energy consumption. Typical power loss for the high-efficiency welding unit is only 15 percent compared with 45 percent to 55 percent for a conventional unit.

In addition, DOE is requesting \$500,000 in fiscal year 1992 to research and develop more efficient electric drive motors. Currently, electric motors account for about 70 percent of industrial electricity use in the United States. Initially, DOE plans to explore cost-sharing opportunities with industry. DOE expects to focus on developing techniques for retrofitting existing motors.

Building Technologies

The Conservation and Renewable Energy Office also implements research and development programs that have the objective of holding the use of conventional energy sources nearly constant by increasing energy-efficiency in buildings and using solar and other renewable energy sources. For example, at the Oak Ridge National Laboratory, research into more efficient building structures has resulted in the development and testing of more efficient insulation products as well as wall and ceiling structures. Because more than one-third of all U.S. energy use is in buildings, programs for increasing the use of renewable energy in buildings and for increasing the energy efficiency of building structures and equipment can contribute significantly to the nation's overall energy efficiency. Some DOE conservation and efficiency research and development projects also focus on more efficient lighting, including new lighting systems and equipment.

In addition, DOE is developing energy efficiency codes and standards for new buildings pursuant to the Energy Conservation in Existing Buildings Act of 1976, as amended (P.L. 94-385). To date, DOE has drafted proposed codes and standards for federal (primarily military) housing and for commercial and multifamily high-rise buildings. These "interim" codes and standards, which are mandatory for the federal government but voluntary in general, are being reviewed within DOE and should be formally reported to the Congress by March 1992. In addition, DOE will draft and propose codes and standards for low-rise family housing to the Congress probably by mid- or late-1995.

Conservation Grant Programs

DOE administers grant programs that were begun in the mid- and late 1970s as a result of legislation. In the late 1980s, these programs were funded in part by court-ordered payments from oil companies to DOE because of oil price overcharges.² The Petroleum Overcharge Distribution and Restitution Act of 1986 (P.L. 99-509) mandated that these overcharge funds be allocated to DOE's grant programs. These programs encourage electricity conservation and efficiency in low-income housing, schools, hospitals, and other public facilities, as well as energy conservation planning by state energy offices. In fiscal year 1992, the budget for grant programs exceeded \$240 million compared with about \$246 million in fiscal year 1991.

DOE's Weatherization Assistance Program was established by the Energy Conservation in Existing Buildings Act of 1976, as amended. The act provides funding for state and Indian tribal programs that insulate or weatherize the dwellings of low-income persons. Grant monies are distributed to states on a formula basis that considers such factors as the estimated number of eligible low-income residences, climate, and the type of efficiency improvements that will be needed. Also, according to DOE data, the Weatherization Assistance Program has weatherized more than 4 million homes—about 20 percent of the nation's low-income housing.

DOE's Institutional Conservation Program provides grants to help finance energy audits and energy-saving improvements at large institutions such as schools, colleges, and hospitals. Since 1978, this program has awarded grants totaling more than \$800 million, reducing the energy bills of participating institutions by about \$2 billion. This program was authorized by the National Energy Conservation Policy Act (P.L. 95-619).

²We reported on the use of oil overcharge funds. *Energy Management: Better Federal Oversight of Territories' Overcharge Funds Needed* (GAO/RCED-92-24, Feb. 21, 1992).

In conjunction with state energy offices, DOE's State Energy Conservation Program grants are used to support state (1) funding of energy efficiency improvement loans for private and public low-income housing, schools, hospitals, and other public buildings, (2) implementation of IRP and other innovative regulatory approaches, and (3) energy plans that estimate possible electricity and other energy savings and establish policies to accomplish those savings. This program was authorized by the Energy Policy and Conservation Act, as amended.

Technical Outreach Efforts

DOE's conservation and efficiency programs include "technical outreach" efforts to (1) disseminate information to state regulators, electric utilities, industry, researchers, and consumers about the availability of efficient new technologies and (2) provide technical assistance to facilitate the installation and use of these technologies, including assistance to other federal agencies. These outreach efforts consist of sponsoring workshops, publishing reports and pamphlets, and providing tailored technical assistance to energy professionals. In fiscal year 1992, DOE budgeted over \$41 million on technical outreach efforts versus \$38 million in fiscal year 1991.

DOE established an Office of Technical and Financial Assistance in 1991, in part, to consolidate its technical outreach efforts. Although this office is relatively new, it is engaged in providing technical and financial assistance in order to promote the use of energy efficient technologies by state and local governments and private and nonprofit organizations.

Communicating the Results of Conservation and Efficiency Programs

DOE's technical outreach efforts include communicating the results of DOE research and development projects and providing assistance in the adoption of the resulting efficient technologies. According to DOE records, since 1978 DOE has developed and commercialized 24 new, efficient technologies resulting in energy savings through September 1991 of about 372 "quads" (or 372 quadrillion British thermal units). The primary electricity savings come from increased use of (1) biomass grain driers, (2) cogeneration-slow speed diesel motors, and (3) high-efficiency welding units.

In communicating the results of its research and development projects as well as information about new technologies it did not help to develop, DOE provides technical and nontechnical fact sheets, publications, videos, and exhibits to energy contractors, utilities, state and local officials, researchers, and consumers. These parties request DOE's assistance by

using telephone hotlines and computerized data bases. Moreover, DOE uses mailing lists to send promotional materials to these parties. Also, in response to requests from its hotlines, DOE directly provides information on how to obtain, install, maintain, and repair efficient new technologies. Many of DOE's outreach activities, especially those aimed at state and local governments, are mandated by the National Energy Extension Service Act, as amended (P.L. 95-39).

In addition, DOE, the Environmental Protection Agency, and the State Department's Agency for International Development have a new initiative to engage in domestic and international technology transfers. The three agencies are establishing an international technology clearinghouse to address requests for information about the availability and use of efficient new technologies. DOE officials believe that the clearinghouse can help to promote the use of new technologies that were developed in the United States.

Assisting Federal Agencies

As legislatively mandated, DOE provides technical assistance to other federal agencies in making efficiency improvements in their facilities.³ Specifically, DOE's Federal Energy Management Program provides technical assistance to federal agencies for promoting electricity and overall energy efficiency in their buildings and assists in funding the retrofitting of all federal facilities with cost-effective, energy-efficient lighting and other improvements. In fiscal year 1992 the budget for the Federal Energy Management Program was about \$4 million. Two primary activities are under this program.

In the first program activity, DOE budgets about \$250,000 to assist other federal agencies in soliciting and selecting an energy management firm (contractor) to perform efficiency improvements in federal facilities. This assistance takes the form of funding and technical assistance in preparing work specifications, contract solicitations, and proposals, as well as selecting contractors. "Shared energy savings" contracts allow an agency and its contractor to share at least 50/50 in the energy savings profit that occurs after the dollar value of the energy savings offset and exceed the cost of the efficiency improvement work the contractor performed.

In the second program activity, DOE administers a federal relighting initiative with a main objective of relighting all federal facilities with more energy-efficient, cost-effective lighting technologies. To achieve this

³The National Energy Conservation Policy Act, as amended (P.L. 95-619), and the Federal Energy Management Improvement Act of 1988 (P.L. 100-615) authorized DOE initiatives for improving the efficiency of energy use in federal buildings.

objective, DOE will use a two step process: (1) demonstrating an approach for federal energy managers to use in analyzing, selecting, designing, installing, and evaluating energy-efficient lighting technologies and (2) transferring the relighting technology to federal energy managers by providing in-depth training courses to federal facilities managers and agency energy coordinators. The training provides detailed material about new, efficient lighting technologies, engineering information about how to install or retrofit a project, associated costs, and contractors to perform the work.

Encouraging Alternative Resource Planning and Regulatory Approaches

The Conservation and Renewable Energy Office's Integrated Resource Planning Program⁴ is primarily responsible for encouraging utilities and state regulators to experiment with and use innovative regulatory and resource planning approaches that can encourage electric utilities to implement DSM programs.

The IRP program's primary objective is to promote the use of integrated resource planning—a regulatory and resource planning framework that is currently being implemented in many states—to promote a “level playing field” between traditional supply-side options and innovative efficiency and renewable energy options. During IRP, utilities identify various appropriate options (such as traditional coal-fired base-load power plants, DSM programs, and use of renewable energy sources) that can be used to balance electric supply and demand. These options are tested for cost-effectiveness. Those that are cost-effective are then ranked according to cost, including environmental costs in some cases. IRP is seen as promoting the use of DSM options because they are frequently the least-cost ways of balancing electricity supply and demand, particularly when the environmental costs of fossil-fired power are considered.

DOE has increased funding for the IRP Program since it expects increased federal support and state implementation of IRP to reduce the nation's electricity capacity requirements by 45,000 megawatts by 2010, and up to 90,000 megawatts in the longer run, below the level that would otherwise exist. The program's budget grew from about \$3.0 million in fiscal year 1991 to \$3.9 million in fiscal year 1992. In addition, in order to raise the program's visibility, in the fall of 1991 the IRP Program was organizationally placed directly under the Deputy Assistant Secretary for Utility Technologies. Prior to this reorganization, the IRP Program had reported to

⁴Formerly called the “Least Cost Utility Planning Program.”

the Deputy Assistant Secretary through the Director, Office of Energy Management.

According to DOE staff, the IRP Program has additional objectives, including promoting

- the use of DSM programs and
- changes in regulations to overcome regulatory barriers to IRP.

Under the IRP Program, DOE has sponsored round tables and seminars for state electric utility regulatory officials and funded studies about ways that regulators can promote the accurate and consistent reporting of electricity savings attributed to DSM programs.

National Energy Strategy Includes Both Conservation and Supply Options

DOE's National Energy Strategy includes both demand-reducing approaches—conservation and efficiency policy options—and those oriented toward increasing energy supplies (referred to in this report as “supply-side options”). In general, the Strategy lists broad policy options and goals that DOE and other organizations should pursue. Although the Strategy's executive summary details 17 conservation and efficiency options and 31 supply-side options, the Strategy does not assign priorities or otherwise explicitly emphasize conservation and efficiency options over supply-side options, or vice-versa. However, the Strategy may have limited effectiveness in promoting conservation because it excludes options that would raise energy prices, a primary consideration that influences the use and implementation of conservation and efficiency techniques. Furthermore, the record of inconsistent funding for conservation and energy-efficiency programs, including a proposed decrease in fiscal year 1993, does not support the Strategy's call for expanded program efforts.

The Strategy, released in February 1991, is intended to define a new federal energy policy that leads to a more efficient, secure, and environmentally beneficial energy future. The Strategy was developed in response to a July 1989 presidential directive that was intended to satisfy a legal requirement. Specifically, the Department of Energy Organization Act (P.L. 95-91, section 801) requires the President to submit a proposed national energy policy plan every 2 years. These plans are to establish energy production, use, and conservation objectives. Moreover, the plans should list strategies, resources, and legislative and regulatory actions needed to achieve these objectives. Previous energy policy plans have been prepared to satisfy this legislative requirement.¹

NES Conservation Options May Have Limited Effectiveness

The Strategy notes that there are many benefits to using energy more conservatively and efficiently, such as reducing energy costs to customers, enhancing environmental quality, maintaining our standard of living, and increasing the nation's energy security. While stating that the nation should rely on market forces to allocate energy demand and supply, the Strategy concedes that in many cases reliance on market mechanisms neither adequately reduces the nation's dependence on unstable oil sources nor considers the need for a healthy environment. Therefore, the Strategy endorses an increased federal (including DOE) leadership role in

¹Energy Policy: Evolution of DOE's Process for Developing a National Energy Strategy (GAO/RCED-91-76, Feb. 21, 1991).

promoting conservation and efficiency in the use of electricity and other energy sources.

It is uncertain whether the NES energy efficiency goals will be met for the following reasons:

- The NES does not contain proposals that address the possibility that energy prices may remain relatively low in the future.
- The NES conservation proposals primarily extend or expand existing program activities for which funding has been inconsistent.

NES Excludes Options That Would Raise Energy Prices

There are several ways that the government can encourage greater efficiency in energy use. For instance, policies that raise energy prices, such as taxes, can reduce the demand for energy while correspondingly increasing the demand for more efficient energy technologies. Government-sponsored research and development can result in more, cheaper energy-efficient technologies being developed. Also, the government could require energy efficiency by placing mandatory constraints on inefficient energy use and hasten the development and use of energy-efficient technologies. The administration's approach of depending to a large extent on research and development and the dissemination of information on energy-efficient technologies may not be as effective as projected if current low oil prices continue.

The success of the NES proposals to improve energy efficiency is tied to the price of energy, because relatively low energy prices generate less urgency to identify and implement efficient alternatives. In contrast, sustained higher prices would encourage the development and use of more efficient technologies. However, as part of the process of developing the NES, the administration considered and rejected policy measures (such as energy taxes) aimed at raising the price of energy because of the anticipated effects on the economy. In fact, higher energy prices, particularly if not phased in over time, could produce adverse economic consequences unless other offsetting policy actions are taken. A DOE official said that concern about price increase effects on the economy is one factor in the Strategy's emphasis on expanded research and development and information dissemination.

However, current low energy prices do not reflect all of the costs to society of the production of most fuels. The Secretary of Energy's Advisory Board cautioned that if the national energy policy is going to be

one of relying on market forces to determine energy choices, options to ensure that all of the costs of energy production and use are reflected in market prices (e.g., through taxes) must also be considered. Also, the Council of Economic Advisers reported to the President that private market forces are unlikely to give adequate weight to national security and environmental considerations in setting energy prices.

**Funding of Conservation
Programs Has Been
Inconsistent**

In order to accomplish the broad goal of increasing federal leadership in promoting electricity and energy efficiency, the National Energy Strategy endorses policy options that expand or extend existing DOE conservation and efficiency programs. However, funding for these programs has been inconsistent, varying with short-term, geopolitical, or other considerations. Inconsistency in funding can limit program effectiveness.

Many of the Strategy's proposals are directed at increasing DOE's research and development funding for energy-efficient technologies that can be commercialized over the long-run and providing information to consumers and industry on technologies that are available now. Additional conservation and efficiency-oriented policy options in the National Energy Strategy call for

- expanding DOE's current integrated resource planning program which, in this context, the Strategy directs the federal power marketing agencies that sell federal electricity to implement IRP on their own;
- continuing DOE's support for state and utility efforts to promote energy efficiency, including support for weatherizing the homes of low-income persons, retrofitting existing buildings, and providing information to consumers about opportunities to use electricity and other energy, more conservatively and efficiently; and
- continuing to establish cost-effective efficiency standards for 13 major appliances and equipment, working with state and local governments to upgrade building efficiency standards, and requiring all new buildings subsidized by federal funds or financed with federally backed mortgages to meet cost-effective efficiency standards.

The Strategy also emphasizes that DOE and the federal government should promote conservation and efficiency through example—specifically, by producing, distributing, and consuming electricity as efficiently and as cleanly as possible. To this end, a presidential executive order states that energy use in federal buildings and facilities will be reduced by 20 percent,

as compared with 1985 consumption, by the year 2000.² DOE supports the executive order through its continued implementation of the Federal Energy Management Program.

The Strategy's approach to conservation and efficiency is consistent with statements made by the Secretary of Energy and other agency officials. They said that as a matter of policy DOE would emphasize its role in promoting conservation and efficiency through (1) increased information dissemination and technology transfer activities with state and local governments as well as utility representatives, (2) expanded support for research and development in efficient new technologies, and (3) expanded support for reforms of state and federal electric utility regulation in order to encourage more competition in electricity markets and the use of unconventional renewable and demand-side approaches to satisfy electricity requirements.

However, funding for the conservation programs stressed in the Strategy has been inconsistent. In the past DOE allocated funds to its conservation and efficiency programs on the basis of existing, or short-term, geopolitical, economic, and other considerations. For example, in the 1970s, while oil prices were rapidly increasing, the Congress mandated that DOE initiate conservation programs that foster weatherization of low-income residences and efficiency improvements at public facilities. During times of low energy prices and secure, plentiful supplies, conservation and efficiency programs were deemphasized.

As table III.1 shows, funding for conservation and efficiency programs has varied considerably over the past decade, whether measured in nominal or constant dollars. Program budgets generally declined from fiscal years 1983 through 1987, a period characterized by falling oil prices due to excess supply. While funding for conservation and efficiency programs generally increased from fiscal years 1989 through 1992, the level DOE proposed for fiscal year 1993 represents an 18-percent decline from fiscal year 1992. The table also shows that funding for energy supply-side programs, while also inconsistent during the past decade, has remained well above expenditures for conservation and efficiency measures. Further, measured in constant dollars, proposed fiscal year 1993 funding for supply-side programs is higher than it was in 1983, while proposed funding for energy conservation and efficiency programs is considerably below the decade-earlier level.

²The executive order is Executive Order 12759, "Federal Energy Management" (Apr. 17, 1991).

**Appendix III
National Energy Strategy Includes Both
Conservation and Supply Options**

**Table III.1: Funding for DOE
Conservation and Efficiency Programs
Versus Supply Programs**

Year	Dollars in millions			
	Supply ^a		Conservation and efficiency	
	(Nominal)	(1987 ^b)	(Nominal)	(1987 ^b)
1983	\$2,653	\$3,042	\$373	\$428
1984	2,228	2,448	362	398
1985	2,257	2,391	397	421
1986	2,117	2,185	371	383
1987	1,700	1,700	177	177
1988	2,474	2,381	257	247
1989	2,417	2,230	262	242
1990	3,171	2,809	338	299
1991	3,417	2,921	410	350
1992	3,821	3,203	426	357
1993 ^c	4,011	3,261	359	292

^aThese figures include funds appropriated for energy supply research and development, fossil energy research and development, and clean coal technology efforts.

^bNominal values for 1983-91 adjusted using gross domestic product implicit price deflator (PDI) from the Economic Report of the President, Feb. 1992. Fiscal years 1992 and 1993 nominal values adjusted using forecasted PDI from Wharton Econometric Forecasting Associates U.S. Economic Outlook 1991-94.

^cThese figures are based on the requested amounts.

Source: U.S. Department of Energy Congressional Budget Request.

DOE has not taken advantage of instances that do not necessarily require increased funds, such as providing service. During our review we noted that the Environmental Protection Agency's (EPA) "Green Lights Program," started in January 1991, encourages private corporations to voluntarily install efficient lighting at their facilities over a 5-year period. In order to lessen the need for fossil fuel combustion to generate electricity—and thereby reduce power plant emissions linked with global warming—EPA's program consists largely of providing companies with information about efficient lighting technologies and securing a voluntary agreement that the companies will install the more efficient and cost-effective lighting. EPA consulted with DOE during the planning stages; however, at that time DOE declined to participate because it planned to implement a similar program on its own.

Strategy Calls for Increasing Federal Role in Promoting Energy Supplies

The Strategy also contains numerous options to develop and enhance the nation's electricity and other energy supplies. For example, the Strategy recommends that the federal and state governments act in concert to accelerate the use of clean coal technologies. To facilitate the revival of the nuclear power option, the Strategy recommends that DOE should continue its research and development of new, advanced nuclear reactors. The Strategy also endorses continued and expanded DOE support for technologies that can use renewable resources, such as wind, solar, and hydropower, to generate electricity. Moreover, in order to secure future energy supplies, the Strategy endorses policy options that are intended to increase domestic oil supplies from such locations as the Arctic National Wildlife Refuge and certain offshore areas. It also calls for diminishing the nation's reliance on Middle Eastern oil by cultivating other sources of oil imports.

DOE's Supply-Side Programs

In fiscal year 1992, DOE budgeted about \$3.8 billion on research and development of advanced electricity supply-side technologies.³ According to program officials, progress is being made in developing technologies that use renewable clean energy sources (such as solar and wind energy), as well as clean coal and advanced nuclear technologies to generate electricity.

Currently, DOE administers programs to promote the development of technologies that enhance the usefulness of coal as an energy resource. Funding for fiscal year 1990 was approximately \$823 million, for fiscal year 1991 about \$676 million, and the fiscal year 1992 request was about \$694 million. The coal-oriented programs include DOE's clean coal technology program, with a multiyear commitment to a clean coal demonstration program (with federal funds matched by industry) to commercially deploy these new technologies. Clean coal technologies are intended to burn coal in power plants more cleanly than do conventional coal-fired power plants and, therefore, emit less sulfur dioxide and carbon dioxide pollutants. For example, according to a DOE program official, DOE has helped to develop combined gasification cycle power plants with efficiency ratings of about 40 percent, compared with efficiency ratings for traditional coal-fired power plants of about 30 percent.

DOE also supports development of advanced nuclear technologies—light-water nuclear reactors, high-temperature gas-cooled reactors, and liquid-metal reactors—that are seen as safer than current

³The DOE component organizations involved include the offices of energy supply research and development, fossil energy, and clean coal technology.

**Appendix III
National Energy Strategy Includes Both
Conservation and Supply Options**

nuclear power designs. Funding levels have decreased slightly from about \$340 million in fiscal year 1990 to a budgeted amount of \$332 million in fiscal year 1992. In addition, DOE is currently engaged in research and development of technologies that harness renewable energy sources, such as hydropower, solar, and geothermal energy, to generate electricity. The funding levels have increased from \$111 million in fiscal year 1990 to \$204 million in fiscal year 1992.

DOE's supply-side programs also include such efforts as research and development related to (1) energy storage systems, such as various types of batteries; (2) magnetic fusion; and (3) basic energy research. Funding for these programs makes up the balance of the approximately \$2 billion to \$3.8 billion that DOE has budgeted annually for its supply-side programs.

DOE Plans to Ensure That Program Evaluations Are Performed and Considered in Budgeting Decisions

Assessing the effectiveness of DOE's conservation and efficiency programs relative to other programs can assist policymakers in allocating budget dollars on the basis of a program's cost-effectiveness and potential contribution to the nation's energy supply and demand equation. In a 1990 report,¹ we found that DOE's multiyear decisions for its conservation and efficiency research and development plans were not based on systematic reviews of individual projects by top management. DOE officials agreed with the facts presented in the report and agreed to implement some of the report's recommendations. However, the corrective actions were delayed while the Department's staff worked to complete and publish the National Energy Strategy. DOE officials are now undertaking preliminary steps to implement our recommendations.

Previous GAO Report Found Planning and Management Deficiencies

In 1990 we reported that DOE did not systematically evaluate the effectiveness of its conservation and efficiency research and development programs and that any evaluation results were not reflected in DOE's conservation program planning and budgeting decisions. Specifically, the report found the following:

- Although DOE's long-range conservation research and development plan helped to set priorities for funding decisions, the plan's usefulness for planning and budgeting decisions was hampered, in part, because the planning process did not include a systematic review of ongoing individual research and development projects.
- There was no assurance that DOE's research and development program portfolio reflected up-to-date needs and priorities and that DOE was not unnecessarily funding and implementing outdated or ineffective programs.
- DOE's conservation and efficiency plans were not useful for budgeting purposes because DOE did not compile different program plans to correspond with alternative funding levels.
- Although DOE had implemented a peer review process that identified deficiencies and prescribed recommendations, it did not formally monitor or document actions taken in response to recommendations; therefore, DOE policymakers had no assurances that program managers adequately addressed the peer review findings. In 1989 the top management of the Office of Conservation and Renewable Energy decided to deemphasize the peer review process.

¹Energy R&D: Conservation Planning and Management Should Be Strengthened (GAO/RCED-90-195, July 30, 1990).

**Appendix IV
DOE Plans to Ensure That Program
Evaluations Are Performed and Considered
in Budgeting Decisions**

To address these findings, we recommended, among other things, that DOE's Office of Conservation and Renewable Energy should (1) systematically review individual projects, (2) integrate its planning and budgeting processes by providing research and development plans for varying funding levels, and (3) conduct peer reviews annually and examine the implementation of peer review recommendations as part of the multiyear planning process. We also recommended in congressional testimony, as a result of work performed for our 1990 report, that DOE conduct peer reviews of its conservation and efficiency programs annually and examine the implementation of peer review recommendations as part of the multiyear planning process.² DOE officials agreed to implement these recommendations.

During our current review, we again found that although DOE has formally and informally evaluated the results of some of its conservation and efficiency programs and has analyzed the effectiveness of efficient new technologies, utility DSM programs, and innovative regulatory and resource planning approaches, DOE has not systematically considered the results of these analyses when it prepared its budgets or program plans.

Specifically, DOE has sponsored formal Oak Ridge National Laboratory studies about problems in measuring the electricity savings impacts of utility DSM programs, the status of IRP nationwide, and the need to better define the costs of DSM programs. In addition, DOE sponsored a formal evaluation of the Weatherization Assistance Program by the Oak Ridge National Laboratory. However, DOE did not consider the results of the Oak Ridge evaluation when it made its programming and budgeting decisions for its conservation and efficiency programs. Although DOE's Budget Office reviewed the annual work plans, documents prepared by the program office detailing work to be done and resource allocations, as part of its annual budget process, the Budget Office staff did not consider evaluation results in budgeting decisions, even when evaluation reports were available. For example, although the Budget Office staff were aware of the Oak Ridge National Laboratory's ongoing assessment of the effectiveness of the Weatherization Assistance Program, the staff did not receive or review the evaluation report.

According to an IRP Program official, the IRP Program underwent an informal reevaluation process in 1989 whereby DOE sponsored an effort in

²Balanced Approach and Improved R&D Management Needed to Achieve Energy Efficiency Objectives (GAO/T-RCED-91-36, Apr. 17, 1991).

which 51 utilities and their public utility commissions were contacted and their views requested regarding the usefulness and importance of 21 IRP initiatives sponsored by DOE. DOE aggregated the responses to determine which IRP initiatives were the most, and least, useful to the respondents. Although the results of this evaluation were not used to determine future funding amounts for the IRP Program, the results were used internally by the IRP Program staff to help assess where IRP project resources should be directed.

DOE Has Undertaken Preliminary Corrective Actions

According to a DOE Office of Planning and Assessment official, the Office of Conservation and Renewable Energy is planning to implement the recommendations in our 1990 report and will perform program reviews. According to this official, although DOE currently has no systematic program review process for existing conservation and efficiency programs, "DOE is really trying to get an evaluation process underway."

In October 1991 DOE personnel informed us that the first steps had been taken to improve its budgeting and planning processes for all of its conservation programs, including integrating program evaluation results into these processes. These initial steps include establishing points in program implementation when DOE will make decisions about future funding for the programs. According to DOE officials, these funding and program continuation decisions will consider analyses about the potential costs and benefits of a program, such as its contributions to the environment. Although DOE initially planned to implement the recommendations in our 1990 report within 6 months, DOE officials said that implementation of the recommendations was delayed by the pressing requirement to issue the National Energy Strategy.

DOE plans to further improve its budget process by evaluating the distribution of fiscal year 1993 funds among its programs on the basis of its broad National Energy Strategy goals. Specifically, the Department has convened a panel of energy experts to review groups of programs directed at three broad National Energy Strategy goals. These groupings are programs that (1) reduce the nation's vulnerability to oil supply disruptions, (2) enhance electricity supplies, and (3) support basic research. The panel's budget recommendations are based on how research and development programs meet the identified objectives.

In our view, the budget analysis process described above is a positive step in explicitly linking program budget decisions to specific policy goals and

**Appendix IV
DOE Plans to Ensure That Program
Evaluations Are Performed and Considered
in Budgeting Decisions.**

priorities. In addition, DOE's initiatives to integrate the panel evaluations of conservation and efficiency into programmatic and budgeting decisions will further help to ensure that program effectiveness is also considered in DOE's budget decisions.

FERC's Role in Promoting Electricity Conservation and Efficiency Is Evolving

The National Energy Strategy calls upon FERC to promote utilities' use of integrated resource planning through its rule making and regulatory powers, and thereby encouraging electricity conservation and efficiency. However, the Strategy is not specific about what steps FERC should take. In turn, FERC has not determined what steps, if any, it should take to encourage electric utilities' use of IRP. FERC is examining what steps, if any, it should take to encourage electricity conservation by promoting the use of integrated resource planning.

Under the Federal Power Act, as amended, FERC is responsible for, among other things, reviewing the rates, terms, and conditions of proposed wholesale electricity sales and interstate electricity transmissions to determine that they are "just and reasonable," without due preferences or advantages to buyer or seller. According to some state regulators, FERC's rules for regulating wholesale electric purchases may conflict with state IRP requirements. More specifically, these regulators have called upon FERC to adopt a policy of rejecting proposed wholesale transactions that do not comply with a utility's state-approved integrated resource plan.

However, FERC has not adopted this policy, because in some cases utilities propose to sell power in more than one state, and the least-cost option in one state may not be the least-cost option in another. Furthermore, according to FERC officials, state regulators may have recourse in instances in which FERC has approved the rates, terms, and conditions of a wholesale power transaction that the state determines does not comply with an integrated resource plan. At least one state court has determined that, although state regulators cannot challenge the FERC-approved rate, they may be able to enforce their least-cost requirements by challenging the prudence of the utility's decision to purchase that specific power.

The Supreme Court has affirmed FERC's authority over approving wholesale electricity rates and delineated the states' authority to regulate retail rates. In a 1951 decision, the U.S. Supreme Court established the filed-rate doctrine, which provides that sellers of interstate wholesale power governed by FERC can recover, in a subsequent state retail transaction, the cost incurred by their payment of just and reasonable FERC-approved rates.¹ In 1977 the Rhode Island Supreme Court determined that, based on the filed-rate doctrine, the state commission could not challenge the reasonableness of a FERC-approved rate.² A 1986 U.S. Supreme Court decision slightly expanded the filed-rate doctrine by

¹Montana-Dakota Utilities Co. v. Northwestern Public Service Co., 341 U.S. 246 (1951).

²Narragansett Electric Co. v. Burke, 381 A.2d 1358 (1977), cert. den., 435 U.S. 972 (1987).

preventing a state commission from revising a FERC-approved wholesale power purchase cost allocation on which the wholesale rates are based.³ In a 1988 case, the U.S. Supreme Court again held in favor of FERC by overturning the Mississippi Supreme Court decision to investigate a cost allocation made in determining a FERC-approved rate.⁴ However, in 1983, the Pennsylvania Commonwealth Court determined that while the state must accept a given FERC-approved wholesale rate, the state regulatory commission could review the prudence of the utility's decision to purchase a certain quantity of wholesale power at that rate.⁵ Thus, states may be able to enforce their least-cost requirements under the Pike County doctrine by challenging the prudence of a utility's decision to purchase power, while not legally challenging the rate itself.

According to FERC officials, FERC has not yet formally determined its position about whether or how to accommodate state least-cost requirements. They are concerned that neighboring states, with closely inter-linked power grids and served by the same holding company, may have conflicting least-cost requirements; this would complicate FERC's regulation of wholesale transactions. FERC officials would prefer to rule on regional IRP or least-cost requirements, rather than dealing with state-specific rules that could conflict with the rules of neighboring states. FERC officials met with state regulators on October 7, 1991, in order to discuss FERC's role in accommodating the IRP programs of various states.

The National Energy Strategy calls upon DOE to encourage FERC to implement rules that are favorable to IRP. Accordingly, said an official from DOE's IRP Program, DOE representatives meet periodically, on an informal basis, with FERC officials to explore FERC's position on encouraging IRP and electricity conservation and efficiency in general, where it would be consistent with FERC's basic mission of regulating wholesale power transactions.

³Nantahala Power & Light Co. v. Thornburg, 476 U.S. 953 (1986).

⁴Mississippi Power & Light Co. v. Mississippi ex rel Moore, 108 S.Ct. 2428 (1988).

⁵Pike County Light and Power Co. v. Pennsylvania Public Utility Commission, 465 A.2d 735 (Pa. Commw. 1983).

Major Contributors to This Report

Resources,
Community, and
Economic
Development
Division,
Washington, D.C.

James E. Wells, Jr., Associate Director, Energy Issues
David G. Wood, Assistant Director
Carlos E. Hazera, Assignment Manager
Nancy Bowser, Evaluator-in-Charge

Office of the General
Counsel

Jackie A. Goff, Senior Attorney

Related GAO Products

Energy Reports and Testimony: 1991 (GAO/RCED-92-120, Mar. 1992).

Electricity Supply: Potential Effects of Amending the Public Utility Holding Company Act (GAO/RCED-92-52, Jan. 7, 1992).

Energy Management: Better Federal Oversight of Territories' Oil Overcharge Funds Needed (GAO/RCED-92-24, Feb. 21, 1992).

Electricity Supply: Utility Demand-Side Management Programs Can Reduce Electricity Use (GAO/RCED-92-13, Oct. 31, 1991).

Balanced Approach and Improved R&D Management Needed to Achieve Energy Efficiency Objectives (GAO/T-RCED-91-36, Apr. 17, 1991).

Energy Policy: Evolution of DOE's Process for Developing a National Energy Strategy (GAO/RCED-91-76, Feb. 21, 1991).

Energy: Bibliography of GAO Documents January 1986 - December 1989 (GAO/RCED-90-179, July 1990).

Energy R&D: Conservation Planning and Management Should Be Strengthened (GAO/RCED-90-195, July 30, 1990).

Ordering Information

The first copy of each GAO report is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

**U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877**

Orders may also be placed by calling (202) 275-6241.

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use \$300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100