United States General Accounting Office

GAO

Testimony

Before the Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

For Release
on Delivery
Expected at
9:30 a.m. EDT
Tuesday
June 23, 1992

ENERGY CONSERVATION

Efforts Promoting More Efficient Electricity Use

Statement of Jim Wells,
Associate Director, Energy Issues,
Resources, Community, and Economic Development Division

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to appear before you today to discuss our reports on efforts being made by electric utilities, states, and federal agencies to increase the efficiency of electric energy use.[1]

Utility-sponsored "demand-side management" (DSM) programs encourage consumers to use less electricity through such actions as better insulating their homes and businesses, and replacing appliances and other devices with more efficient models. In many states, utilities and state regulators have encouraged DSM programs that use a technique called integrated resource planning (also known as "least-cost planning"), which essentially requires consideration of all options for balancing future electricity supply and demand.

As you requested, I will briefly discuss our findings concerning the (1) prospects for DSM programs to achieve energy conservation, (2) impediments that need to be overcome, and (3) DOE's efforts to promote DSM and integrated resource planning, including options identified in DOE's National Energy Strategy.

In summary, our work has shown the following:

---

[1]Electricity Supply: Utility Demand-Side Management Programs Can Reduce Electricity Use (GAO/RCED-92-13, October 31, 1991) and Energy Conservation: DOE's Efforts to Promote Energy Conservation and Efficiency (GAO/RCED-92-103, April 16, 1992)

-- Utility-sponsored DSM programs are an increasingly important means of improving the nation's energy efficiency; in some states, DSM programs are expected to avoid more than half of the growth in electricity demand that would otherwise occur by the year 2000. In the nine states we reviewed, the projected savings varied considerably, reflecting differing levels of DSM activities among the states.[2]

-- Factors ranging from consumer behavior to regulatory disincentives inhibit the implementation of utility DSM programs. Further, because the programs primarily offset future demand growth, utilities that do not face such growth--and therefore have plenty of generating capacity--may find that DSM is not a cost-effective option.

-- DOE has undertaken a number of efforts to promote energy conservation and efficiency. The National Energy Strategy--which expresses DOE's overall approach for meeting the nation's future energy needs--endorses policy options that expand or extend existing DOE conservation and efficiency programs, but these programs have been subject to inconsistent funding over the years. Efforts by DOE's power marketing administrations (which market wholesale power from federal

---

[2]California, Florida, Illinois, Maine, Massachusetts, New York, Oregon, Texas, and Washington. These states accounted for about one-third of U.S. electricity consumption at the time of our review.

hydroelectric projects), to encourage DSM programs among customer utilities vary widely.

POTENTIAL FOR ELECTRICITY DEMAND REDUCTIONS

Electricity production accounts for over one-third of the energy consumed in the United States. DOE has estimated that increased U.S. electricity use may require up to 104,000 megawatts of new generating capacity by the year 2000--the equivalent of 100 or more large power plants. Because new capacity is financially costly and often raises environmental concerns, utilities have launched DSM programs. The power "saved" through these programs is then available to meet new demand, thus avoiding additional capacity.

In the nine states we selected, state and utility officials estimated that DSM programs will reduce total electricity demand by up to 15 percent in the year 2000. (Table 1 at the end of this statement shows the estimates for each state.) These estimates, which we obtained between late 1990 and early 1991, are utilities' and regulators' best estimates of the extent to which DSM programs can be relied upon to satisfy the demand for power. Other regional and/or national estimates of electricity savings that we found were in the same range; for example, the Electric Power Research Institute, a utility-funded research and development organization,

estimated in 1990 that DSM programs would reduce electricity consumption by 3 percent in the year 2000.

The savings from DSM programs are projected to satisfy system growth needs, rather than to displace existing generating plants. In locations with more active DSM programs, including Massachusetts, California, and the Pacific Northwest states, estimates are that DSM programs can satisfy over half of new electricity demand; for example, California DSM programs may satisfy about 61 percent of the state's new requirements for electric power between 1990 and

Studies by EPRI and others have suggested that dramatic electricity savings, ranging from 24 to 75 percent reductions in demand, are possible through the increased use of efficient, available technologies. However, these estimates--which are not attributable to DSM programs alone--do not necessarily assess the probability that technological substitutions will be made or the factors that would have to occur to make the substitution a reality.

IMPEDIMENTS TO INCREASING EFFICIENT ELECTRICITY USE

Our work and studies by others show that utilities and regulators face formidable impediments to realizing increased electricity savings through DSM programs. These impediments include (1)

factors that limit consumers' willingness to buy electricity-saving appliances, (2) a regulatory process that can discourage utilities from choosing to implement DSM programs instead of producing and selling electricity, and (3) the difficulty of measuring and estimating DSM programs' electricity savings accurately.

Consumer Reluctance

Consumers should be willing to purchase more expensive, energy-efficient devices (such as refrigerators, lights, and air conditioners) if the devices can save them enough money on their electricity bills over a period of time--called the "payback period"--to offset the higher purchase costs. However, studies have generally shown that consumers will purchase such devices if the payback period is 2 years or less; this relatively short payback period shows that consumers, in effect, demand a higher rate of return on energy-efficiency investments than they do on other investments such as stocks and bonds. Moreover, consumers may not purchase more efficient models because they are not aware of the potential savings or because electricity cost savings in consumers' bills cannot be traced to specific appliances.

To overcome customer reluctance to make energy-efficient improvements, DSM programs provide consumers with (1) rebates to help them pay the costs of acquiring more efficient products, (2) discounts on monthly electricity bills if customers install

efficient devices, and/or (3) directly-installed efficient devices. Utilities also provide consumers with information about the benefits of energy-efficient devices through such means as mailings to customers and free energy audits.

Regulatory Disincentives

Traditional regulatory approaches that link utility revenues and profits with electricity sales can discourage DSM, because DSM programs that reduce electricity sales can also reduce profits. In addition, because electricity rates--which are established by state regulators--are generally based on the average cost of supplying electricity, they tend to hide the often higher cost of supplying each additional unit of power (the marginal cost). This pricing practice may encourage more electricity consumption than would occur if consumers had to pay higher rates based on marginal costs.

Our October 1991 report noted that many states are acting to reduce or eliminate regulations that dissuade utilities from implementing DSM programs. According to the Congressional Research Service (CRS), as of 1990 at least nine states had implemented regulations to (1) reduce utilities' revenue losses attributable to DSM programs and (2) provide financial returns for utilities' DSM investments. At least 14 other states were actively considering such proposals. (According to CRS, in addition to California, Illinois, Maine, Massachusetts, New York, Oregon, and Washington--

which were included in our review--Connecticut, Colorado, Idaho, Iowa, Maryland, Minnesota, Nevada, New Hampshire, New Jersey, North Carolina, Pennsylvania, Rhode Island, Vermont, and Wisconsin have revised or are considering revising their regulations in order to encourage DSM.) In addition, states have approved the use of alternative rates, such as peak rates, that more closely mirror the actual costs of generating electricity.

Measurement Difficulties

Measuring actual electricity savings from DSM programs is an important factor in assuring regulators and utility officials that DSM programs are a cost-effective and reliable way to balance electricity supply and demand. However, DSM energy savings are hard to measure: (1) because the savings cannot be directly observed, they must be estimated, and estimating methods are susceptible to error, and (2) estimates rely in part on predicting and measuring human behavior--a task fraught with uncertainties.

State regulators and others are testing a variety of methods to validate utilities' estimates of energy savings, improve the techniques used to estimate savings, and collect data more consistently. DOE also sponsors efforts to promote greater certainty about DSM electricity savings. For example, the DOE-initiated, utility-funded Northeast Demand-Side Management Data Exchange Project is developing a standardized data collection form.

DOE also co-sponsors an Oak Ridge National Laboratory project to standardize definitions and reporting formats for DSM energy savings and program costs.

DOE'S EFFORTS TO PROMOTE EFFICIENT ELECTRICITY USE

DOE efforts to promote energy conservation and efficiency include (1) researching and developing more efficient electricity-using technologies, (2) providing grants for state programs that promote efficiency improvements for buildings such as hospitals, schools, and the residences of low-income people, and (3) disseminating information to utilities and utility regulators about the availability, installation, use, and maintenance of new and existing efficient technologies. DOE's Integrated Resource Planning (IRP) Program promotes the use of regulatory and resource planning approaches that encourage utilities to consider and implement DSM programs.

The National Energy Strategy lists broad conservation and efficiency policy options as well as "supply-side" options that can increase energy supplies. The Strategy does not explicitly emphasize conservation and efficiency over supply-side options, or vice-versa. However, the usefulness of the Strategy in balancing supply and demand may be limited because it excludes options that would raise energy prices, a primary consideration that influences

the use and implementation of conservation and efficiency techniques.

In order to accomplish the broad goal of increasing federal leadership in promoting electricity and energy efficiency, the Strategy endorses policy options that generally expand or extend existing DOE conservation and efficiency programs. However, funding for these program has been inconsistent, varying with short-term geopolitical or other considerations. Following a decline in funding for these efforts from $373 million in fiscal year 1983 to $177 million in fiscal year 1987, funding gradually increased to $426 million in fiscal year 1992. However, measured in constant dollars, proposed fiscal year 1993 funding is considerably below that of a decade earlier.

DOE's five power marketing administrations' efforts to encourage DSM programs among their customer utilities vary significantly, in part reflecting differences in each agency's legislative mandate and authority to promote efficient power use.[3] The Bonneville and Western Area Power Administrations, with the most extensive conservation programs, have been prompted by laws that (1) specifically direct them to encourage the efficient use of electricity and (2) allow them to link, or "condition," power allocations or power rates to their customer utilities' DSM

[3]Bonneville, Western, Southeastern, Southwestern, and Alaska Power Administrations.

efforts. In contrast, the statutory authorities of the other, smaller power marketing agencies permit them to encourage DSM programs, but not specifically to link power allocations or rates to such efforts.

Because of this situation, we noted in our October 1991 report that the Congress may wish to consider enacting legislation that would authorize the Southeastern, Southwestern, and Alaska Power Administrations to link power allocations or power rates to customer utilities' DSM programs.

- - -

This concludes my prepared statement. I will be glad to answer any questions that you or other Members of the Subcommittee may have.

Table 1: Estimated Electricity Demand Reductions Resulting From Utility DSM Programs in States Reviewed

State	Percent of U.S. electricity consumption in 1989	Percent reduction in electricity consumption in 2000
California	7.7	14.8
Florida	5.2	1.7
Illinois	4.1	[a]
Maine	0.4	1.9
Massachusetts	1.7	5.4
New York	4.8	6.6[b]
Oregon	1.6	5.4
Texas	8.7	[c]
Washington	3.3	5.4
Total	37.5	

[a]Illinois state officials indicated that DSM impacts for this period would be almost nonexistent.

[b]As reported by the New York Energy Office in its draft July 1991 state energy plan update.

[c]Annual energy forecasts prepared by the Texas Public Utility Commission project a reduction of peak electricity use of about 1,600 megawatts, or 2.4 percent, as a result of to DSM.

Source: GAO calculations based on data from state regulatory and energy agencies and the New England Power Pool.

(307324)