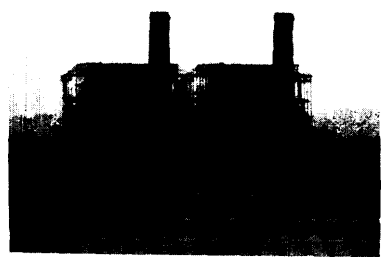
Policy Issues and Options 2

The Federal interest in encouraging energy efficiency throughout the U.S. economy rests firmly on three broad national policy goals: economic growth, environmental protection, and national security. The Federal Government has a long history of involvement in the utility sector, both as a regulator and as the builder and operator of large power systems. Following the energy crises of the 1970s, new Federal laws and programs were established to support energy conservation activities, minimum energy efficiency standards, utility regulatory reforms, and the research, development, demonstration, and commercialization of new and more environmentally friendly technologies for generating electric power.

Improvements in energy efficiency through the electric utility sector offer the promise of savings for ratepayers and electric utilities, profits for shareholders, and societal benefits to energy security, international competitiveness, and environmental quality. But, as discussed later in this report, the Federal Government has only limited direct influence over utility resource decisions, demand management programs, and retail operations. Most of these matters are regulated at the State and local level. Yet there are a number of areas where the Federal Government can make a contribution in encouraging the development and availability of energy-efficient technologies for electric utilities and their customers. Moreover, Federal Government decisions in a number of areas could significantly affect the success and cost-effectiveness of utility programs and investments.



This chapter discusses a range of legislative policy options for encouraging greater energy efficiency through the electric utilities sector. They include Federal policy options for supporting expanded integrated resource planning, demand-side management programs, and other State regulatory incentives for utility investment in energy efficiency. The chapter also presents options for new Federal energy efficiency standards for buildings

and equipment and greater support for efficiency research and development and technology transfer.

This report was completed and sent to the 'Technology Assessment Board before passage of the Energy Policy Act of 1992.[1] The policy options discussed include many that were adopted in whole or in part in recently enacted legislation. We have noted some of these new provisions in the text and in box 2-A. The recently passed legislation leaves many issues for subsequent Congresses. Decisions will have to be made about appropriations levels for newly authorized programs and the efficacy of agency implementation.

Box 2-A–The Energy Policy Act of 1992

The Energy Policy Act of 1992[1] was passed in October 1992 following 2 years of extensive legislative consideration and debate. The act contains a wide range of Federal initiatives intended to Improve the energy efficiency of the U.S. economy, encourage the commercialization of energy-efficient and renewable energy technologies, reduce oil import vulnerability, and lessen the environmental impacts of energy production and use. Provisions that aid utility energy efficiency efforts are highlighted below.

Energy Efficiency Policy Goals

National energy policy plans submitted after 1993 must contain a national least-cost energy strategy to meet the goals of increasing energy efficiency by 2010 by 30 percent over 1988 levels, expanding use of renewable resources by 75 percent over 1988 levels, and reducing greenhouse gas emissions.

Integrated Resource Planning

State utility regulatory commissions must consider adopting standards requiring utilities to adopt integrated resource planning (IRP).

The Tennessee Valley Authority (TVA) must establish a least-cost planning process to develop a resource plan with the lowest system cost. The process must consider a full range of supply and demand resources, including renewable resources, energy conservation and efficiency, and provide opportunities for involvement by TVA distributors.

The Western Area Power Administration (WAPA) must require its long-term firm power customers to implement IRP within 3 years. WAPA will provide technical assistance in developing IRP programs and review the plans prepared. Utility resource plans must select options that minimize life-cycle costs, including adverse environmental effects, and give priority to energy efficiency and renewable energy to the extent practicable. WAPA may impose penalties for failure to file or carry out IRP. Special provisions are included to aid small utilities in preparing resource plans.

DOE is to study the implementation of IRP and its impacts and report to Congress in 2 years.

Demand-Side Management

State utility regulatory commissions must consider standards giving utility energy efficiency investments a return at least as high as that given supply-side investments.

Federal grants of up to $250,000 each to State regulatory commissions are authorized to encourage utility demand-side management (DSM) measures and help weatherization grantees participate in State leascost planning processes.

TVA is directed to provide technical and financial assistance to its distributors in the planning and implementation of cost-effective energy efficiency options.

[1] Public Law 102-466, 106 Stat. 2776, Oct. 42, 1992.

[1] Public Law *102-486,* 106 Stat. *2776,* Oct. *24, 1992.*

DOE will provide grants to States **to promote industrial energy efficiency and utility industrial energy efficiency programs.**

Utility subsidies to residential customers for energy efficiency measures are granted an exemption from Federal income tax **and payments to commercial and industrial customers are made partially exempt.**

Energy Efficiency Standards

Categories of electric equipment subject to standards are expanded to include: lamps; shower heads; electric motors; commercial heating, cooling, and water heating equipment; and utility distribution transformers.

Existing Federal efficiency standards for appliances and fluorescent ballasts must be upgraded to the highest levels that are technologically feasible and economically justified.

Federal energy testing and labeling requirements are expanded to cover light fixtures, office equipment, and major consumer appliances, and to disclose life-cycle energy costs, usage, and comparisons to the most efficient models. DOE will support industry efforts at voluntary ratings and labeling systems for windows, office equipment, and lighting fixtures, however, mandatory Federal standards are to be issued if the private efforts fail.

Federal cofunding will be made available to set up 10 regional centers to demonstrate efficient lighting, heating, cooling, and building technologies.

DOE will provide technical assistance to help States update and enforce commercial and residential building codes to incorporate model industry energy efficienccy standards.

DOE will issue voluntary guidelines for home energy rating systems and provide technical assistance to local officials.

The Department of Housing and Urban Development will establish a pilot program for energy-efficient home mortgages for new homes and improvements in existing homes.

Energy Efficiency Research, Development and Demonstration

Many existing DOE programs are reauthorized as part of a 5-year program to increase the use of energy-efficient and renewable technologies in the buildings, industrial, and utility sectors. Goals for the utility sector are to accelerate the development of technologies that will increase energy efficiency and the use of IRP. DOE is required to submit a plan for the 5-year program within 180 days of enactment.

Federal Energy Management

DOE must develop tough, new energy efficiency standards to be effective in 3 years for all new Federal buildings. Federal agencies must install cost-effective, energy and water saving technologies by 2005.

Authorization and conditions for Federal agency participation in utility DSM programs and energy savings performance contracts are clarified.

The Federal Energy Management Program is extended to the Congress and the U.S. Postal Service.

New public housing and new homes with Federal I-busing Administration and Veterans I-busing Administration mortgages have to meet Federal energy efficiency standards.

Expanding Utility Resource Options

New **wind or** closed loop biomass energy systems may qualify for an income tax credit of up to 1.5 cents/kWh generated for up to 10 years.

To encourage growth of independent power producers, qualifying wholesale generators are granted a new exemption from the limitations of Public Utility Holding Company **Act.**

The Federal Power Act is amended to expand Federal Energy Regulatory Authority to order utilities to provide transmission services to other utilities and power generators.

Several significant utility-related issues were left unresolved, especially in the delicate area of conflicts in Federal and State jurisdiction over utility planning on multistate systems, wholesale power transactions, and their effects on retail rates.

STRATEGIES FOR ENERGY EFFICIENCY

Efforts to harness the utility sector as a means to achieve greater energy efficiency have focused on three regulatory strategies: requirements for adoption of utility integrated resource planning (IRP), also called utility least-cost planning; expansion of utility demand-side management (DSM) programs; and rate reforms and other regulatory incentives for utilities to invest in energy-saving technologies. Programs for promoting energy efficiency through utility IRP and DSM measures are already entrenched in many States and are rapidly being developed and implemented in many others. These State and utility efforts could eventually involve the expenditure of billions of dollars of ratepayer funds. These programs reflect a recognition that increasing the efficiency of energy use by consumers can be a financially attractive and reliable alternative to the addition of new energy supplies to meet demand growth and a belief that tapping the economic and technical resources of electric utilities can be an effective strategy for speeding the adoption of energy-efficient technology in all sectors.

Initial results have demonstrated that well-designed and implemented utility energy efficiency programs can deliver sustained, reliable, and cost-effective electricity savings. Despite this promise, there have been early disappointments. Many programs have failed to achieve the significant electricity savings and high degree of participation needed to make DSM the true equal of new generating units and other supply-side options in meeting customer energy needs. DSM programs and IRP methods are evolving to take advantages of lessons learned and to target a broader range of electricity-saving opportunities. The challenge is to assure that expanded utility and State programs achieve their goals and that Federal policies support, or at least not frustrate those objectives.

Although energy efficiency through IRP was a keystone of the Bush Administration's National Energy Strategy, Federal financial commitments to energy efficiency are dwarfed by Federal investments in conventional supply-side technologies (fossil and nuclear power) and in renewable energy sources (see chapter 7). Part of the disparity can be explained by the fact that electric utility resource planning decisions and DSM programs are matters largely within the purview of State regulation and Federal regulatory influence is largely indirect. The Federal Government clearly lags far behind the States in programs and expertise in the utilities sector, particularly in the areas of resource planning and DSM. Moreover, at the same time, Federal policies and regulatory initiatives are promoting both the growth of a competitive bulk power sector that includes more unregulated nonutility generators and greater use of market-based rates in wholesale power contracts in place of traditional cost of service rates. To the extent that utilities rely on wholesale power purchases to supply future needs instead of investing in their own plant and equipment, Federal regulatory control over power supplies will increase and State regulators' influence over power supply costs will diminish and so too will their ability to enforce State-approved least-cost plans unless there is a change in law at the Federal level.[2]

The Federal Government has provided modest levels of financial support to State initiatives and supported research on IRP and DSM through the

[2] The implications for greater conflict between Federal and State regulation of electric power is discussed in detail in U.S. Congress, Office of Technology Assessment, *Electric Power Wheeling and Dealing: Technological Considerations for Increasing Competition*, OTA-E-409 (Washington, DC: U.S. Government Printing Office, May 1989),

national laboratories. With the exception of programs by the Bonnville Power Administration and, to a lesser extent, the Western Area Power Administration, the Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC) at present are ill-equipped to provide substantive direction and technical support on increasingly sophisticated aspects of utility resource planning and evaluation of DSM efforts. New policy directions coupled with modest funding support, would, however, improve Federal capabilities to further utility energy efficiency programs and enhance cooperation with State and local governments.

The primary strategies available to Congress to advance energy efficiency through the utility sector include:

- Supporting, through Federal actions, expanded use of IRP, DSM programs, and State regulatory initiatives to increase utility investment in energy efficiency technologies, including legislation imposing new requirements on State regulators and electric utilities;
- Providing Federal financial and technical support to State regulatory agencies for implementation of utility energy efficiency initiatives;
- Providing Federal support for research, development and demonstration of energy efficiency technologies and technology transfer programs;
- Strengthening and expanding Federal energy efficiency standards and labeling and information requirements for a wider variety of electric products and equipment;
- Requiring the Federal Energy Regulatory Commission to advance IRP and energy efficiency in its direct regulatory responsibilities;
- Requiring the Tennessee Valley Authority to adopt IRP principles to guide its future resource acquisitions (including investment in cost-effective energy efficiency measures) and to assist its customer utilities in developing IRP and DSM programs of their own;
- Expanding the activities of Federal power marketing administrations to support IRP and DSM; and
- Requiring the Federal Government to "lead by example" by improving the energy efficiency of its buildings and operations and participating in utility sponsored energy efficiency programs.

The Energy Policy Act of 1992 includes provisions that commit the Federal Government to many of these strategies (see box 2-A). The challenges now lie in the implementation of new Federal policies and requirements. For Congress, this means decisions over appropriations levels for new energy efficiency initiatives and hard choices over competing demands for Federal funds in a time of financial difficulty and looming budget deficits. Congressional oversight of the pace and direction of agency implementation of energy efficiency measures and the successfulness of these programs also plays a role in assuring that the ambitious energy efficiency mandate is attained. Even given the breadth and detail of the recently passed energy act, there remain, however, several areas where additional legislation may be appropriate to further goals of increased energy efficiency and greater use of integrated least-cost planning methods.

Much of the success of these initiatives will depend on how they are implemented and will require continued congressional oversight and support.

INTEGRATED RESOURCE PLANNING

IRP is a technique used by utilities and State energy regulatory agencies to develop plans for providing reliable and economic electric power supply for customer needs. The process includes explicit consideration of both supply-side and demand-side resource options. The process begins with development of a range of projections of future electricity demand under alternative

future scenarios. Next, the planners assemble a menu of potential resource options for meeting those energy service needs including both supply--side resources (new generation, transmission and distribution (GT&D) facilities, retrofit or improvement of existing GT&D facilities, and/or bulk power purchhases) and Utility-Sponsored demand-side resources (conservation, load management, and end-use efficiency improvements). The lifetime capital and operating costs, availability, reliability, and suitability of the various supply- and demand-side resource options are then compared to develop an overall plan to meet identified future needs. There are several competing methodologies for defining what resource choices constitute a "least-cost" mix. In developing a least-cost plan, some planning processes require that environmental externalities be quantified and explicitly weighed in the resource selection process, others give preferences to certain technology choices, i.e., locally produced coal, DSM, low carbon emissions, or renewable resources. The planning process usually includes public participation and comment and may require approval of State regulators before adoption. After adoption, the plan is used to guide utility choices in acquiring new resources.

Many utility analysts and energy-efficiency advocates believe that, compared with past supply-oriented utility planning methods, IRP will favor the selection of more cost-effective, more efficient, and more environmentally-friendly energy technologies, including renewable energy technologies and demand-side options. Adoption of an IRP process alone will not automatically produce these results. What is even more important are the policy choices made in establishing the goals and in weighing the costs, reliability, and other attributes of alternative technology choices in resource plans.

Adopting formal utility IRP processes has certain clear effects that are usually deemed positive by State regulators. First, the IRP process opens up utility resource planning to review and influence by the public, potential resource suppliers, and regulators. IRP creates a mechanism for consideration of a wider variety of potential resources and future planning contingencies than might be the case under past internal supply-oriented utility planning procedures. Opening the process creates opportunities for developing broader consensus among utility decisionmakers, ratepayers, regulators, and other interested parties about preferred strategies-perhaps lessening some of the contentiousness of adversarial proceedings on capacity and rates. Indeed, some States and utilities have made collaborative consensus-building efforts a keystone of their overall IRP process. Open planning will perhaps avoid some of the problems of utility construction programs of the 1970s when unneeded capacity and cost overruns in a time of slower demand growth produced protracted, bitter rate hearings and disallowances of recovery for investments later found to be imprudent. Rigorous and open advance review of utility plans and periodic reassessments also encourages more flexible responses to changing conditions.

Among the potential disadvantages of broader application of IRP among States and utilities are the additional procedural burdens it could impose on smaller utilities and State regulatory programs. Many smaller investor-owned public power and cooperative utilities may not have the resources, personnel, or need to do extensive independent IRP. Their needs could perhaps be as well served by participation in State or region-wide planning exercises. For some utilities and financial analysts, more open planning processes and State IRP approvals may be perceived as diminishing the utility's control over resource choices. There is no doubt that this is a goal of some IRP proponents. However, for many utilities, adoption of IRP with its more explicit consideration of planning uncertainties and inclusion of more flexible supply and demand alternatives is a natural response to the changes in the utility operating environment in the 1980s and 1990s. Expanded use of IRP will require some utilities to use longer plarming horizons than previously, and

public and regulatory review will mean that resource planning may take longer than when it was a purely internal exercise. Offsetting this, of course, is the expectation that implementation of the plan will be smoother.

To encourage the expanded use of IRP, Congress could direct State regulatory agencies to consider adopting rules requiring jurisdictional utilities to use IRP. This option follows the approach established by the Public Utility Regulatory Policies Act of 1978 (PURPA) and upheld in the courts and avoids a direct clash between State and Federal powers or preempting State authority. State regulators can constitutionally be directed to consider a proposed action within a specific period of time, but the decision whether to adopt IRP and the precise form it would take is left to the States. The legislation might further provide that States consider requiring that utility investments in supply and demand-side resources be consistent with the State integrated resource/least-cost plan. The Energy Policy Act of 1992, indeed, took this approach and requires State regulators to consider several policies under PURPA section 111 on IRP, DSM, and supply-side efficiency investments.

More than half of the States have already adopted some form of IRP requirement without any Federal prodding-attesting to the attractiveness of the process to State regulators (see chapter 6). Many of the remaining States are already considering IRP proposals. These developments mean that utility IRP will grow even without Federal legislation. A key issue in formulation of added Federal requirements would be how existing State IRP programs should be treated. Should State regulators initiate new proceedings to consider IRP anew, or would the legislation exempt States that had already adopted plans? Imposing new procedural requirements could divert scant resources and personnel away from implementing existing initiatives. Utilities, too, would likely object to additional requirements. To minimize this outcome, legislation could provide for States to certify that they have already met the procedural requirements for IRP consideration.

The Federal Government could also provide additional inducements for State adoption of IRP with or without any direct Federal requirement for formal State rulemakings to consider adopting IRP.

- Federal financial and technical support could be provided for State development and implementation of IRP/LCP requirements through direct grants to State agencies, and funding of cooperative research on IRP methodology. This assistance could help offset the impact on State agency budgets and staffing of developing and implementing IRP programs. The Energy Policy Act of 1992 includes authorization for grants to State regulatory agencies of up to $250,000 to implement various efficiency initiatives.
- Congress could require that Federal actions including FERC rulings be consistent with State approved integrated resource plans. If FERC rulings are not consistent with approved regional or State least-cost plans, FERC actions should be subordinate to State actions needed to implement these plans.
- Congress could amend the Federal Power Act to delegate more authority over wholesale rates and intrastate electric power transactions from the FERC to States that have adopted IRP programs that meet certain minimum Federal standards.
- Congress could authorize States to enter into regional compacts for purposes of developing and implementing integrated resource plans for utilities that operate in more than one State or that are members of multistate tight power pools. Congress might further require that utility resource plans be consistent with these regional or multistate plans.

The comprehensive energy legislation passed in 1992 did not address issues of State and Federal regulation involving resource planning. Various

proposals to clarify respective roles in regional planning and to close the regulatory gap created by recent developments have been offered. (See chapter 3.)

DEMAND-SIDE MANAGEMENT

DSM refers to utility-led programs intended to affect the timing or amount of customer electricity use. These include energy efficiency programs aimed at reducing the energy needed to serve customer needs and programs that shift electricity demand to reduce peak loads or to make more economic use of utility resources. A variety of DSM mechanisms are in effect, including audit and information programs, rebates and other consumer financial incentives, direct installation programs, technical assistance, and energy performance contracting.

Utility DSM programs are rapidly proliferating in extent and cost. Estimates of current annual utility DSM expenditures range from several hundred million dollars to almost $2 billion. One large California utility is poised to spend $1 billion on energy efficiency investments over the next decade and is awaiting the blessing of the State public utility commission. Equally ambitious efforts are being mounted in other jurisdictions as utilities announce plans to meet a significant portion of their demand growth in the 1990s through energy efficiency.

DSM programs have had mixed success to date. Many have delivered dramatic electricity savings at low cost-demonstrating their promise. However, many other programs have had low rates of customer participation, produced actual energy savings that were less than predicted, and lacked adequate evaluation and verification of energy savings over time (see chapters 5 and 6). For energy conservation and efficiency to become true alternatives to supply side resources, DSM efforts will have to be expanded in size and to a wider range of end-use applications, customer participation rates will have to increase, and actual savings will have to be closely monitored and evaluated.

There are several options available for Federal encouragement of utility DSM programs.

- Congress could direct State regulatory commissions to consider requiring their jurisdictional utilities to establish or expand cost-effective DSM programs.
- The Federal Government could provide additional financial and technical assistance to State agencies in developing, implementing and evaluating utility demand-side management programs. These could take the form of direct grants to State agencies, funding of cooperative research and demonstration program, sponsorship of training programs for State regulatory personnel, collection and dissemination of information on various State and utility DSM measures and their effectiveness.

As noted, the Energy Policy Act of 1992 does require States to consider financial incentives for DSM and conservation investments under PURPA, and authorizes Federal grants to State agencies. The legislation does not establish any new Federal program to aid in research and development and training in DSM evaluation.

U.S. DEPARTMENT OF ENERGY PROGRAMS

The DOE Integrated Resource Planning (IRP) Program, which has primary responsibility for advancing IRP and DSM, has a modest budget of a few million dollars and a very small staff. The program originally was established in response to congressional initiatives; its mission is to provide technical assistance and support on utility planning issues including DSM. It has primarily served as a conduit for funds to support research efforts at national laboratories, sponsor conferences, and provide small grants for cooperative efforts. Overall, the program results to date have received praise from utilities, regulators, and efficiency advocates. The growth of IRP and

DSM programs and the more sophisticated technical challenges they present for State regulators are rapidly outstripping the low budgets, modest research efforts, and limited expertise of the IRP Program. Despite the high profile given to electricity efficiency in DOE's energy policy pronouncements and budget submissions, the size and activities of the IRP office indicate the low priority actually attached to supporting utility IRP and DSM (see chapter 7). If Congress wishes DOE to provide leadership and support to State efforts and provide needed imputs to national energy policy debates, the IRP Program will have to be expanded and given adequate resources to establish a strong institutional presence to advance IRP and other utility energy efficiency programs.

There are clear opportunities for the Federal Government to be involved in research, development, and demonstration (RD&D) activities to advance utility efficiency initiatives. Utilities are funding significant amounts of resource independently and through the Electric Power Research Institute. Continued cooperative efforts with Federal agencies and national laboratories should be encouraged. The potentially large amounts of funds at stake in utility demand-side programs suggest that Federal policymakers and State regulators also have a need for independent and impartial assessments of IRP methods, DSM programs, and alternative regulatory incentives for efficiency investments. DOE-sponsored research can serve this public need by expanding RD&D efforts on DSM, supply-side efficiency technologies, IRP, conservation and load management methodologies, and on energy efficiency estimation, metering, monitoring, and evaluation technologies. Such research should include engineering, behavioral, and policy studies to assist improvement of DSM and IRP efforts. The research could be funded by redirecting a small portion of funds now devoted to supply technologies. opportunities for joint funding of research by the Federal Government, State agencies, utilities, trade associations and other interested parties could also be authorized and would allow leveraging of Federal research dollars.

UTILITY RATE REFORMS

Under traditional approaches to utility ratemaking, utility profits are based on sales of kilowatt-hours of electricity and total investment in generating, transmission and distribution equipment (see chapters 3 and 6). Almost without exception, every additional kilowatt-hour sold by a utility yields a profit.[3] Investments that promote energy efficiency and reduce electricity consumption, lower sales and threaten profits. States are currently experimenting with various regulatory mechanisms to decouple utility sales from profits and to make efficiency investments more attractive to utilities and their shareholders as detailed in chapter 6. To support these State efforts, Congress could:

- Direct DOE to expand funding for research on model State utility regulations and innovative ratesetting mechanisms such as decoupling profits from power sales, time of day pricing, interruptible rates, and performance incentives for efficiency; research results should be made widely available.
- Establish a DOE-supported multidisciplinary resource center to assist State regulators and utilities in developing and implementing innovative rate reforms and in evaluating the results.
- Provide grants to States for experiments in developing, implementing and evaluating innovative rate structures to encourage cost-effective supply and demand-side energy efficiency investment by utilities.

Congress could also follow the precedent of PURPA and direct States to consider the adoption

[3] David Moskovitz, *Profits and Progress Through Utility Least-Cost Planning (Washington DC: National* Association of Regulatory Utility Commissioners, 1989).

of ratemaking mechanisms that provide utilities with financial incentives for implementing cost-effective efficiency improvements and the Energy Policy Act of 1992 does this. Again, more than half of the States have already adopted some financial incentives for utility demand-side efficiency investments. Congress, could of course go further and require that State regulators adopt rate procedures that make demand-side efficiency improvements at least as profitable for utilities as investments in new supply-side resources. This direct, and obviously preemptive approach would likely be viewed with disfavor by many State regulators who believe that the choice of a proper incentive is a matter of State policy. Some consumer representatives would likely argue that such provisions could distort rates unnecessarily as utilities are already under some obligation to invest in cost-effective efficiency measures as a means of minimizing rates whether or not they are as profitable for shareholders as new generating plants.

FEDERAL REGULATION OF POWER TRANSACTIONS

While much Federal influence over utility planning and State ratemaking policies is indirect, there are three areas where the Federal Government can directly influence utility resource planning and energy efficiency investments:

1. FERC regulatory authority over wholesale power transactions and transmission arrangements.
2. Operation of five Federal power marketing administrations that supply power to local utilities and oversight of the operations of the Tennessee Valley Authority.
3. Rural Electric Administration loans and loan guarantees to electric cooperatives.

The Federal Government can provide leadership in adoption of IRP and cost-effective energy efficiency investments through its established regulatory and administrative authority in these areas.

The extent to which FERC on its own initiative and as a matter of policy could require utilities engaged in wholesale power transactions and multistate holding companies to develop integrated resource plans is not clear, even if FERC were inclined to do so (see chapter 3).[4] FERC has used its conditioning authority to induce utility compliance with various FERC economic policy initiatives, most recently open transmission access. Under the recent policy directions of FERC toward greater reliance on competition and market-based prices, it seems unlikely that the commission would advance new policies that would involve it more deeply in consideration of the details of resource planning and least-cost determinations of utilities that are either purchasing or selling power. Current FERC electricity policies could actually work to increase disincentives to investment in DSM. FERC could, however, use its rate design authority to eliminate biases against investment in DSM by wholesale power providers and purchasers. As a practical matter, FERC is largely bereft of the expertise that would allow it to pass on the merits of utility resource plans and DSM programs. Even if FERC does not become involved in promoting IRP and demand-side management, its preemptive jurisdiction over wholesale transactions and cost allocations in multistate holding companies has the potential to frustrate State initiatives at least-cost planning and DSM.

As mentioned above, if Congress wishes to support State implementation of IRP and DSM programs it could amend the Federal Power Act to require that FERC decisions be consistent with State-approved integrated resource/least-cost plans. To accomplish this, FERC could be directed to revise its procedures so that State regulators and other interested parties can effectively participate

[4] The Federal Power Act provides that FERC has no authority to order utilities to expand generating facilities or to buy or exchange power (16 USC 824f).

in wholesale proceedings to make regional or local interests known to the commission.

In the late 1980's the Tennessee Valley Authority (TVA) has discontinued its energy conservation and DSM programs and began to look at the need for adding new generating capacity in the later 1990s to meet the needs of its customers. Congress could require that TVA develop and implement its own least-cost planning program to direct its future resource acquisition strategies. It further could authorize and require TVA to invest in demand-side resources where it is cost-effective to do so as an alternative to construction of new generating capacity. TVA could also be directed to require its customer utilities to adopt IRP processes and to certify that purchases are in compliance with their plans. TVA could be directed to reestablish its programs in support of energy efficiency and conservation and provide technical assistance in these areas to its customers. The Energy Policy Act of 1992 does just this and requires TVA to adopt a least-cost planning program including participation by its distributors and the public.

Congress could require that the Federal power marketing administrations adopt an IRP approach and require their customer utilities to adopt IRP as a condition of power contracts. Under existing law, the Bonneville Power Administration already engages in extensive regional power planning and must give preference to conservation and renewable resources in its power procurement (see chapter 7). The Western Area Power Administration has already embarked on a regulatory effort to require its customers to engage in limited IRP as a part of its power supply contracts. The Energy Policy Act of 1992 incorporates much of this into statute. The much smaller Southwestern Power and Southeastern Power Administrations have not yet implemented planning or energy efficiency programs directed at their customers. Southwestern is cooperating with Western in development of programs and materials to help customer utilities implement IRP. Legislation has been introduced to approve the sale of the Alaska Power Administration.) Design of IRP and DSM requirements for power marketing administration customers must be done with care and sensitivity to the small size and limited resources of many public power utilities and cooperatives, and potential for Federal requirements overlapping with conditions imposed under State regulation.

Congress could require that cooperatives seeking REA loans or guarantees for new generation facilities demonstrate that they have adopted an IRP process that includes explicit consideration of energy efficiency alternatives and that the proposed facility is consistent with the least-cost plan. REA has already moved in this direction by rule. Legislation could reinforce and make permanent such conditions for REA transactions. Again, caution must be exercised in the design of requirements because of the size of many cooperatives and the possibility of overlap with State and other Federal agency requirements.

LEADING BY EXAMPLE: THE FEDERAL GOVERNMENT AS ENERGY CONSUMER

The Federal Government is the Nation's largest single energy consumer, in fiscal year 1989 it spent over $8.7 billion on direct energy purchases for its own facilities and operations and about $4 billion more subsidizing the energy expenses of low-income households under various programs. Not reflected in this direct energy expenditure of some $12.7 billion are the additional energy costs for leased space for which the Federal Government does not pay utilities directly. Payments to electric utilities accounted for an estimated $2.4 billion of the fiscal year 1989 Federal energy bill for government buildings.

The Office of Technology Assessment's (OTA) May 1991 report, *Energy Efficiency in the Fed-*

eral Government: Government by Good Example,[5] found that despite a wide array of programs and policies developed over the past 15 years, the Federal Government still has many opportunities to improve energy efficiency in its facilities and operations using commercially available, cost-effective measures. OTA estimated that total Federal Government energy consumption could be cut by 25 percent with no sacrifice to comfort or productivity. There are many measures with potential returns of 30 to over 100 percent. OTA's report found that existing Federal programs and present funding levels maintain program capabilities and will yield gradual improvements in Federal energy efficiency. However, the status quo is not sufficient to capture significant savings opportunities. At the present low level of energy efficiency funding and staffing for individual agencies, OTA estimated that it would take several decades to make all the economically attractive investments. During that time tens of billions of dollars would be unnecessarily spent to buy inefficiently used energy.

The Energy Policy Act of 1992 toughens energy efficiency standards for Federal buildings, sets a new deadline of 2005 for Federal agencies to install cost-effective, energy- and water-saving technologies, and contains a number of other measures to raise agency awareness and financial commitments to energy efficiency improvements. Nevertheless, taking full advantage of existing opportunities will require a higher priority for energy efficiency as reflected in adequate investment funding and staffing. One alternative is private sector financing in the form of utility rebate programs and shared energy-savings contracts that can be used to supplement direct Federal investments.

OTA found significant benefits associated with Federal actions to support energy efficiency.

- *Setting a good example* by demonstrating the cost and performance of a wide range of energy-efficient technologies and practices in its own facilities and operations,
- *Creating market pull for energy-efficient goods and services* through Federal purchasing power and promoting earlier introduction of high-efficiency technologies by specifying the most cost-effective energy efficiency products.[6]
- *Providing first-hand experience basis for national energy policy* on the technical and cost performance of energy efficiency measures from Federal projects.
- *Cutting Federal spending through energy efficiency savings;* and
- *Reducing the environmental, health and security costs of energy use.* Among the congressional policy options for making the Federal Government a leader in advancing cost-effective energy efficiency measures are several that would encourage Federal agency participation in utility-sponsored demand management programs.

Congress could use its oversight and appropriations processes to press Federal agency managers to give greater priority to funding and staffing to achieve the variety of existing congressional and presidential directives to cut building energy use and improve energy efficiency in operations. A 1991 Executive Order calls for a reduction in Federal building energy use by at least 20 percent by 2000 compared to 1985 and greater participation in utility DSM services.[7]

Congress could provide clear authorization and direction for Federal agencies to participate in utility demand management programs and shared

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5 U.S. Congress, Office of Technology Assessment, *Energy Efficiency in the Federal Government:* Government by Good Example, OTA-E-492 (Washington, DC: U.S. Government Printing Office, May 1991).

6 For example, about 10 percent of residential appliances are used in federally assisted or owned housing units, but are purchased by private individuals. Ibid., p. 106.

7 Executive Order 12759, Apr. 17, 1991.

energy savings contracts, to accept payments, services, and goods associated with such energy efficiency programs, and to incur obligations for financing of efficiency measures. Confusion over agency eligibility and authority to enter into utility demand management programs was found to have deterred participation. Congressional legislation has already been enacted that specifies that Federal agencies (principally the Department of Defense and the General Services Administration may enter into shared energy savings contracts for federally-owned buildings and facilities.[8] The Energy Policy Act of 1992 expands that authority and specifically encourages agencies to participate in utility programs and to negotiate with local utilities for demand-side management programs specially tailored to the needs and characteristics of government facility loads.

Federal agencies could themselves become purveyors of energy efficiency savings to meet utilities' resource needs. Many Federal facilities would be attractive targets for energy efficiency savings under utility programs seeking cost-effective demand-side resources. Federal facilities managers should be authorized to enter agreements with energy services companies or directly with utilities to offer these potential resources in competitive procurements. Under such arrangements, utilities might install efficiency measures directly, the agency might pay for the measure and receive a rebate for some or all of the costs of the measures, or an energy service company would install the measure and recover its costs and profits from the utility. Such agreements at a minimum should provide that Federal payments for efficiency measures do not exceed the value of electricity bills that would have been due if the measure had not been installed.

Congress could assure that agencies devote sufficient funds and competent well-trained personnel to oversee and administer energy efficiency efforts, including those funded in whole or in large part by private funds through utility demand management programs or agreements with energy service companies. Several provisions of existing law and executive order attempt to do that through the budgeting process and reporting requirements.

As an additional incentive agencies could be allowed to keep some or all of the proceeds from energy efficiency rebates for either general program activities or for additional energy efficiency measures. Existing law authorizes retention of a portion of such energy savings in DOD facilities and allows them to be used for recreation.

Technical support could be provided to agency energy efficiency coordinators/personnel to aid them in identification of efficiency opportunities and provide assistance in negotiations with local electric utilities and energy service companies. These might include establishment of several regional model or demonstration energy efficiency facilities.

OTA's report on the Federal Government experience suggests that rewards for good performance in agency energy efficiency measures would also aid both agency management and energy efficiency staff deterrnination in capturing possible savings. In addition to the prior suggestion that agencies be allowed to keep all or a portion of savings, additional incentives might include establishment of well-publicized agency citations or awards for energy efficiency savings and bonuses for individual energy managers.

Improving the energy efficiency of Federal buildings and operations will require a long-term commitment and many novel approaches to new situations. It will be important that efforts be periodically evaluated and that successes and failures alike be analyzed and the results distributed among public and private energy managers so that needed modifications can be made, successes shared and failures avoided.

[8] Comprehensive Omnibus Budget Reconciliation Act, Public Law 99-272, Title VIII, 100 Stat. 42, Apr. 7, 1986.

SUPPORTING ENERGY-EFFICIENT TECHNOLOGIES

Federal support for improvements in the availability of energy-efficient equipment in the marketplace can complement utility energy efficiency programs. In addition to creating a market pull for efficiency by creating incentives for utility investment in DSM measures, Federal efforts can create a market push to raise the efficiency of new products.[9]

Information, Labeling and Efficiency Standards

Among possible approaches is strengthening and expanding Federal efficiency standards and labeling and consumer information requirements applicable to buildings and to household and commercial appliances, fixtures, and electrical equipment. These actions provide consumers with more information on energy use and can require that new buildings and products incorporate cost-effective efficiency technologies.

The Energy Policy Act of 1992 contains a number of provisions relating to increasing the efficiency of electric equipment. Specifically, it:

- Expands Federal energy efficiency standard legislation to major categories of electric equipment including: lamps; shower heads; electric motors; commercial heating, cooling, and water-heating equipment; and distribution transformers.
- Requires existing Federal efficiency standards for appliances and fluorescent ballasts to be raised to the highest levels that are technologically feasible and economically justified.
- Adopts expanded Federal energy testing and labeling requirements for light futures, office equipment, and major consumer appliances, including life-cycle energy costs and usage and comparisons to most efficient models.

The major share of residential and commercial energy use is for heating, cooling, lighting and providing hot water to buildings. Improving the energy efficiency of buildings offers significant opportunities for energy savings. Options for expanding and enforcing energy efficiency standards for buildings include:

- Developing and applying energy efficiency rating systems for new and existing commercial and residential buildings.
- Requiring DOE to work with national professional and trade associations to develop strengthened energy efficiency standards for new buildings to reflect the best cost-effective energy savings practices.
- Encouraging States to adopt these standards as part of State building codes and assisting them in strengthening building code compliance and enforcement procedures.
- Requiring sellers to provide information on energy efficiency features and energy use of buildings.
- Requiring compliance with the new Federal standards for federally assisted housing, mortgage guarantees, and Federal facility housing.

The success of such information, labeling and standards programs will require at least four conditions to be met. First, adequate funding and technical expertise must be available to develop standards for technically achievable and cost-effective energy-efficient technologies in a timely fashion and to revise them periodically to reflect technical advances. Second, mechanisms must be put in place to educate Federal, State and local officials, architects, manufacturers, wholesalers, equipment installers, and construction trades about new requirements. Third, monitoring and enforcement mechanisms need to be established

9 Various Federal market push policy options and the effectiveness of past Federal efforts are discussed in detail in U.S. Congress, Office of Technology Assessment, *Building Energy Efficiency*, *OTA-E-5 18* (Washington, DC: U.S. Government Printing Office, May 1992).

and adequately funded and staffed to backup the new standards. Lastly, the programs must be periodically evaluated to assess their effectiveness (including review of quantitative indicators of energy savings, costs, ease of administration, alternative implementation methods), improvements needed, and the continuing need for government involvement. Continuing congressional oversight and support will be key to assure that the new initiatives will be successful in attaining their goals.

R&D and Technology Transfer

Federal programs promoting efficiency initiatives through the utilities sector are limited in scope and funding. Most federally supported efforts have been targeted at the buildings and industrial sector and weatherization assistance for institutions and low-income consumers. Between 1980 and 1990, Federal spending on conservation and efficiency technologies and programs was slashed. Only congressional steadfastness kept many programs alive. Funding of efficiency research and development has begun to rise. However, most of the DOE research and development funds allocated as promoting electricity efficiency in budget documents actually support conventional fossil technologies, nuclear power and nuclear waste disposal programs.[10] Less than 0.5 percent of the non-defense DOE research and development budget went to programs to improve energy efficiency in the utilities sector.

The Federal Government support for research, development, demonstration and commercialization activities can advance the availability of energy-efficient supply-side and demand-side technologies. For example, the DOE Clean Coal program could be redirected to give more preference to technologies that improve powerplant efficiency and reduce environmental impacts of burning coal. Similar objectives can be applied to funding of other advanced electric power technologies offering significant efficiency gains. (for example, advanced generating technologies such as advanced gas turbines, and fuel cells, improvements in automation, monitoring, and dispatch controls, and high-efficiency transmission and distribution technologies.) Efforts should be directed at technologies for new construction and for retrofitting/repowering old generating plants. Research efforts should yield information on the performance characteristics, and the capital and operating costs of these technologies to be made more available to State regulators and Utility planners.

INCREASING UTILITY RESOURCE OPTIONS

A wider range of cost-effective supply- and demand-side resources will increase potential benefits to utilities and customers from the full implementation of IRP. Proponents of greater competition in electric power supplies contend that competition will bring market forces to bear to force greater efficiency in resource selection and in the development of new power technologies. Allowing demand-side measures to compete against supply-side options can help foster selection of more cost-effective efficiency alternatives to new powerplant construction.

Utility resource planning and supply acquisition have largely been matters of State jurisdiction. However, if as seems likely, expanded competition results in more wholesale power transactions, Federal authority over resource acquisition will increase. This enlarged influence could hinder rather than encourage efficiency gains if utility transactions receive Federal approval without regard to State least-cost plans.

Expanding Competition

Congress could increase competition either directly or through FERC by:

10 General Accounting Office, "Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research" GAO/RCED-92-155, April 1992, pp. 13-16.

- Requiring utilities to acquire new power resources through competitive procurement mechanisms and requiring the inclusion of demand-side options in the competition.[11]
- Amending the Public Utility Holding Company Act (PUHCA) to encourage participation in bulk power and energy efficiency industries by broader group of potential suppliers.

The Energy Policy Act of 1992 creates a new exemption to PUHCA for entities engaged in wholesale generation markets. The exemption is applicable to utility affiliates.

Transmission Access

Increased access to the transmission grid has been advocated as a means to expand utility resource options and to open additional markets for capacity and electricity made available through efficiency efforts. Greater access to transmission facilities increases opportunities for power producers to sell power and for buyers to choose from a potentially greater variety of sellers and a wider range of generating options. Among options Congress could consider for encouraging more open transmission access are:

- Authorizing voluntary transmission-sharing mechanisms through regional agreements and joint planning among all prospective transmission users—both utilities and independent generators-under nondiscriminatory guidelines to be established by the FERC.
- Requiring the FERC to consider conditioning approval of special rate treatment, mergers, etc. on the petitioning utilities offering expanded non-discriminatory access to their transmission services.
- Providing additional Federal authority to require utilities to provide transmission services with protection for system reliability and native customer loads.
- Directing the FERC to defer to State efforts to improve transmission access and transmission services by State jurisdictional utilities unless the State efforts were found to be unjust, unreasonable, or to confer undue competitive advantage.

The Energy Policy Act of 1992 gave FERC explicit authority to order transmission access for wholesale transactions. The controversial details of pricing policies and information requirements to carry out this mandate have been left to FERC and progress on these matters will have to be monitored to determine if additional mechanisms are needed. Many utilities have been pressing for legislative approval for organization of voluntary regional transmission groups as a more flexible alternative to mandatory wheeling orders.

LEVELING THE PLAYING FIELD IN RESOURCE PLANNING

Because most energy prices do not reflect all of the social and environmental costs of particular energy choices, many economists and energy analysts believe that market-based mechanisms alone cannot be relied upon to produce the most efficient options from a social, environmental, and economic perspective. (A similar imperfection is also introduced by the tax and other "subsidies" that some fuels enjoy.)

1 Energy Taxes

One **way** of correcting such market failures would be to impose taxes on various energy sources that reflected the costs they imposed on society and the environment. In fact, in Europe and Japan, high energy taxes perform this function in some respects. Energy taxes have proven to be a controversial and unpopular approach for attaining energy policy goals in the United States. Recently, there has been renewed interest in energy taxes, not only as a means to promote energy and environmental policy goals via the

[11] See OTA's report, *Electric power Wheeling and Dealing: Technological Considerations for Increased Competition*, supra *note* 2.

''market-based mechanisms' currently in vogue among some policy analysts, but also as a means of increasing Federal revenues to reduce budget deficits. The Clinton Administration's Btu tax proposal would have imposed a small tax on a broad range of energy sources, but was rejected by Congress in favor of an increase in the transportation fuels tax.

Internalizing Social and Environmental Costs

An alternative to energy taxes is to use a surrogate price adjustment in the resource planning process so that relative costs of energy options are more adequately reflected and energy choices compete on a more level playing field. One method, for example, would be requiring that States and utilities include consideration of social and environmental costs/' 'externalities' in evaluating supply- and demand-side resources in developing least-cost plans. Including adjustments for externalities in the planning process avoids most of the political and economic impacts of direct energy taxes, while offsetting market imperfections in energy choices. Many conservation and renewable energy advocates believe that consideration of externalities in cost-effectiveness determinations would boost prospects for these options being selected in utility resource plans. However, some economists would say that the choice of a perhaps higher-priced energy option would impose a hidden environmental/ social energy tax.

Consideration of externalities in resource choices is already required in many States, but experience is limited and the State efforts have proved highly contentious and politically controversial. Moreover, economists are deeply divided over whether and how to fashion mechanisms to internalize such costs in energy decisionmaking. Some States, such as Massachusetts and California, have attempted to set a specific quantitative value on external environmental costs to be used in evaluating competing resource choices, while other States have opted for a more qualitative approach. Various legislative proposals have been made that would require Federal agencies and utilities to consider life-cycle costs of energy options, including environmental and social costs and benefits to the maximum extent possible, in developing least-cost energy plans.

Whatever the conceptual difficulties of attempting to include externalities in integrated resource planning, as a practical matter State regulators and utilities are already doing it to some extent and proposals for expanding this approach to other States and Federal actions will increase. Given experience to date, there is no clearly preferred or accepted method of addressing the externalities problem. This suggests that any Federal action to require explicit quantification of externalities is premature. Congress could direct DOE to support research on alternative methods for assessing and quantifying environmental, social, and other externalities in least-cost planning and to report back on the experience to date, additional research needs, and the feasibility of including external costs in Federal least-cost planning.