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# REPORT *brief*

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**Electric utility energy efficiency programs have great potential to achieve significant energy savings**

America's electric utilities are finding that helping their customers use energy more efficiently can be a cost-effective and reliable alternative for meeting electricity demand growth. The opportunities for efficiency improvements are myriad and potential savings real, but consumers and utilities have been slow to invest in the most cost-effective energy-efficient technologies available. OTA's report, **Energy Efficiency: Challenges and Trends for Electric Utilities**, examines the prospects for advancing U.S. energy efficiency through technology improvements and regulatory changes in the utility sector and related Federal and State initiatives.

The energy efficiency of today's buildings and electric equipment and appliances falls far short of what is technically attainable. This efficiency gap has been attributed to a variety of market, institutional, technical, and behavioral constraints. Electric utility energy efficiency programs have great potential to narrow this gap and achieve significant energy savings.

Utility energy efficiency programs also promise savings for consumers and utilities, profits for shareholders, improvements in industrial productivity, enhanced international competitiveness, and reduced environmental impacts. But along with opportunities, greater reliance on energy efficiency as a resource to meet future electricity needs also entails risks—that efficient technologies will not perform as well as promised, that anticipated savings will not be truly cost-effective in practice, and that the costs and benefits of energy-efficiency programs will not be shared equitably among utility customers.

## MEETING FUTURE ELECTRICITY NEEDS

In 1992 utility power generation accounted for 36 percent of total primary energy use in the United States, and electricity consumption is growing faster than overall energy use. Current growth forecasts range from 1 to 3.5 percent per year over the next decade. Meeting this new demand could require construction of the equivalent of 50 to 220 new 1,000-megawatt powerplants over 10 years. The differences in estimated new capacity needs reflect hundreds of billions of dollars for utility ratepayers. Of course, future electricity demand growth rates are uncertain, adding to the risks that utilities face in planning and building for the future.

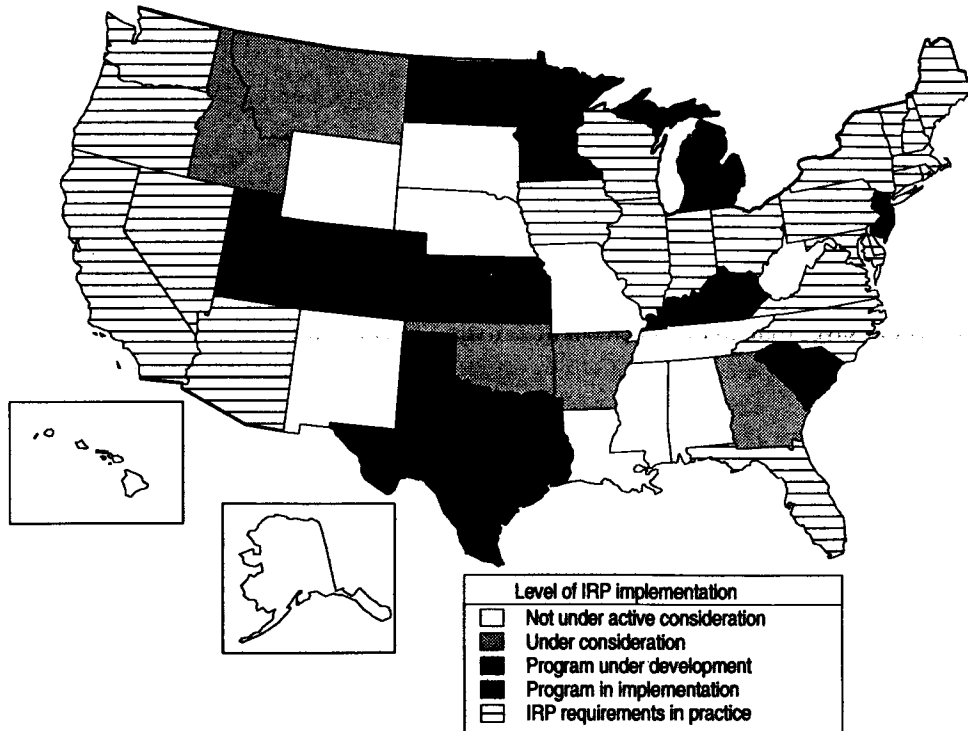
Energy efficiency advocates have long maintained that it can be cheaper for ratepayers and better for the environment and society to save energy rather than build new powerplants. This view is now embraced by many utilities, regulators, shareholders, and customers and is already shaping our future. With more than 10 years of experience with utility energy efficiency programs, initial results are promising, but many uncertainties remain.

Efforts to harness the utility sector to achieve greater energy efficiency have focused on three strategies:

- *Demand-side management (DSM) programs*—utility-led efforts intended to affect the timing or amount of customer energy use. Examples include rebates, loans, energy audits, utility installation of efficient equipment, and load management programs.

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## Status of IRP implementation across the States, 1992



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OTA's basic  
function is to help  
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- *Integrated resource planning (IRP)*—a technique used by utilities and regulators to develop flexible plans for providing reliable and economic electricity supply through a process that explicitly compares supply- and demand-side resource options on a consistent basis and usually has opportunities for public participation.
- *Regulatory incentives* for investment in energy saving technologies adopted to offset the bias against energy efficiency investments in traditional ratemaking methods. Typically, utility profits have been based on the total value of capital invested and the amount of power sold—creating a strong financial disincentive against energy efficiency or other investments that could reduce power sales and utility revenues. Examples include mechanisms decoupling utility revenues from

power sales, cost recovery or ratebasing of efficiency program expenditures, and performance bonuses and penalties.

Over 30 States have adopted utility IRP and DSM requirements, and programs are being developed rapidly in most of the remaining States.

### ENERGY SAVINGS

There are ample untapped and cost-effective opportunities to use electricity more efficiently in all sectors of the U.S. economy. Energy efficiency investments allow consumers to avoid the costs and pollution from new powerplants while still enjoying the same level of energy services—warm showers, cold drinks, comfortable surroundings—and a vigorous economy.

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The most promising energy-saving opportunities include improved building thermal integrity, more efficient electric equipment, high-efficiency lighting technologies, energy management control systems, and net energy savings from converting industrial processes from fossil fuels to electricity.

According to various estimates, full adoption of currently available efficiency technologies could save from 20 to 45 percent of present electricity use by the year 2000. The higher estimates would require replacing much of the existing stock of electric equipment with the most efficient models available and mobilization of staggering amounts of capital to finance the transition even though it could result in significant long-term savings in energy costs.

Even without such aggressive action, present trends in energy efficiency gains due to energy prices, standards, technological advances, and existing utility DSM efforts will yield energy savings. As a result of these trends, electricity use in 2000 is projected to be about 9 percent less than what it would be if efficiency levels were "frozen" at current levels. Many energy analysts believe that energy efficient technologies can cut electricity demand growth further and perhaps even reduce overall electricity demand in the future.

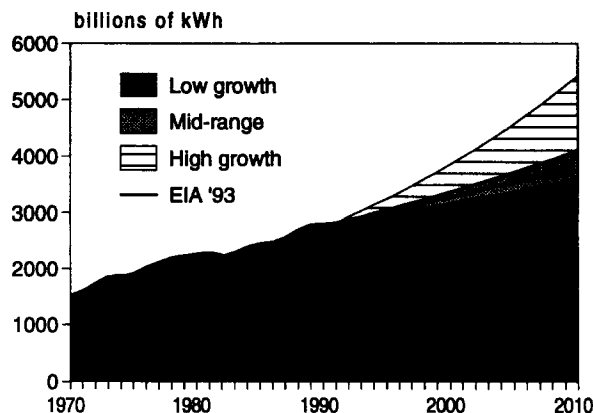
## UTILITIES AND ENERGY EFFICIENCY

Increasingly, utilities are finding that energy efficiency programs make good business sense. Investments in customer DSM measures and more efficient generation and transmission technologies can provide reliable, flexible, and lower-cost alternatives to

conventional generating options, improve the economic operation of existing powerplants, reduce financial risks, and create goodwill among customers. Energy efficiency also can be an effective environmental compliance strategy to cut emissions of sulfur dioxides, nitrogen oxides, carbon dioxide, and other pollutants.

With the growth of State regulatory incentives for DSM investments, utility energy efficiency programs offer new profit opportunities. Utility DSM programs have in fact become big business with an estimated \$2 billion spent on DSM measures in 1991 and plans to spend significantly more in years to come.

Utility energy efficiency investments also offer benefits to the Nation in improved productivity, lower energy costs, and enhanced international competitiveness of U.S. businesses. The availability of DSM measures to displace oil-fired generation in emergencies



## Electricity demand growth, actual and projected, 1970-2010

Actual growth is shown in 1970-92. Projected growth range of 1 to 3.5 percent shown for 1993-2010.

helps lessen our oil import vulnerability. Moreover, demand-side efficiency investments tend to create more jobs for lower-skilled workers than conventional supply-side construction projects.

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## Options for Congress

Among the options available to Congress to advance energy efficiency through the utility sector are:

- Increasing Federal financial and technical assistance for research, evaluation, and program development for IRP and DSM programs, and innovative regulatory initiatives.
- Expanding the energy efficiency programs for customer utilities of the Tennessee Valley Authority and the Federal power marketing administrations.
- Requiring the Federal Energy Regulatory Commission to advance utility IRP and energy efficiency programs through its regulatory responsibilities.
- Continuing support for the commercialization of energy-efficient technologies through Federal research, development, and demonstration programs and technology transfer activities.
- Strengthening and expanding Federal energy efficiency standards and information labeling requirements for buildings and electric equipment.
- Increasing Federal agency participation in utility DSM programs to improve the energy efficiency of Federal buildings and operations.
- Expanding support for voluntary public-private energy efficiency initiatives such as the Environmental Protection Agency's Green Lights Program.

Well-designed and implemented utility energy efficiency programs have demonstrated sustained, reliable, and cost-effective electricity savings. But, there have been disappointments, too. In many programs, participation rates have been low and actual savings have been well below cost-effective technical potential. Even the best programs have experienced some gaps between technical potential and actual savings. In part this is due to the recent vintage and limited scope of many utility programs. In coming years, utilities will have to narrow the savings gap and expand customer participation to make energy efficiency programs the true equal of new generating units and other supply-side options in meeting customer energy needs.

DSM programs entail both technology and regulatory risks that the savings will not be as

high or as durable as expected or that consumers will be asked to pay more than necessary to achieve them. DSM programs and IRP methods are evolving to take advantage of lessons learned and to target a broader range of electricity saving opportunities.

## POLICY INITIATIVES

Because of their jurisdiction over utility resource decisions and retail operations, State agencies will play a dominant role in encouraging utility energy efficiency programs. Many States already have aggressively pursued energy efficiency initiatives through the utility sector. There remain, however, a number of areas where the Federal Government can contribute. Policy initiatives for some of these are listed in the box above.

Copies of the report for congressional use are available by calling 4-9241.

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