

The Rebound, Renewal and Rebirth of Energy Efficiency Programs in the US: An Examination of Trends in Program Spending and Design

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Abstract

Restructuring and deregulation initiatives by states led to a dramatic decrease throughout most of the 1990s in funding of energy efficiency and other demand-side management (DSM) programs. Total state spending on energy efficiency programs fell from a peak of over \$1.7 billion in 1993 to just over \$900 million by 1998. The future of such programs seemed in doubt. This paper examines recent data on state energy efficiency program spending and found that this earlier downward trend has reversed since 1998, with total spending climbing back to approximately \$1.1 billion in 2000. Despite an overall trend toward more energy efficiency spending, state by state spending and support for energy efficiency varies widely; the top 16 states in terms of per capita spending account for 86% of the national total program spending. In addition to quantitative data on spending, the paper also takes a qualitative look at the nation's leading energy efficiency programs based on nominations received by ACEEE in a nationwide search for "exemplary" programs. This latter research effort shows that today's leading programs are providing customers of all types with a wide range of quality services that result in reduced energy costs and other benefits. Rather than being abandoned, publicly supported energy efficiency programs experienced a renewal in recent years, which underlies the overall aggregate trend observed of a modest rebound in total funding on these programs.

Introduction

It has been nearly a decade since the movement toward deregulated, restructured energy markets began in the US. With the rise of this movement came questions about the need for utility demand-side management programs under a more competitive market structure. The immediate outcome of the many uncertainties that were created as states began to consider and implement restructuring was that funding for DSM programs fell dramatically, with annual spending declining by nearly half from 1993 to 1998. This rapid decline created serious doubts about the future of such programs.

By the late 1990s it was difficult to determine exactly where publicly supported energy efficiency programs (either through utility rates or newly established "system benefits charges") were heading. Were they unnecessary in restructured energy markets? Were they to be abandoned? Used as part of a short-term transition strategy? Or were they to be established as an integral and on-going part of both regulated and restructured markets?

In this paper we examine trends in publicly supported energy efficiency programs across the U.S., drawing upon research we recently completed (York & Kushler 2002). We tracked and analyzed a number of quantitative indicators, including reported state-by-state spending on utility DSM and public benefits programs from 1993-2000, as well as savings estimates. We examined trends in spending by states on programs and analyzed the underlying reasons behind these trends.

In this paper we also are able to draw upon recent research we completed on "best practices" within energy efficiency programs (York & Kushler 2003). We examined about 130 programs nominated as "exemplary" by industry professionals, program managers, and other stakeholders. Our analysis of the types of programs nominated and specific features of the "best" of these programs

revealed a great deal about how energy efficiency programs have evolved to best meet the needs of customers under changed and changing energy markets, funding levels and sources, and means of administration and implementation.

This paper presents key findings from these two research efforts: (1) analysis of state and national funding trends, and (2) analysis of energy efficiency programs “best practices.” Together these analyses document aggregate trends in overall level of support for energy efficiency programs and reveal important details about individual program design and implementation of American’s leading programs.

Analysis of State and National Funding Trends for Energy Efficiency Programs

As restructuring initiatives spread around the United States in the latter half of the 1990s, spending on energy efficiency in the form of utility DSM programs fell dramatically, from a peak of over \$1.7 billion in 1993 to just over \$900 million by 1998 (see Figure 1). This rapid drop resulted in large part from elimination of requirements by state public service commissions and legislatures for utilities to conduct integrated resource planning (IRP) and implement associated DSM programs. The over-riding policy model seemed to be that IRP and DSM were not appropriate under restructured, competitive electricity markets. Investments and related spending on energy efficiency would be left principally to market forces.

Recent research (Kushler & Witte 2001a), however, suggests that utility energy efficiency programs and services are not likely to be replaced by private entities in the competitive market, especially for certain market segments and end-use technologies. As a result, the pace of improvement in the energy efficiency of our economy would likely be slowed if public support for energy efficiency programs were reduced.

Fortunately, policymakers in many states recognized the likely adverse effects of restructuring on certain areas of societal benefits, such as energy efficiency, and as a result, restructuring legislation in many states has included explicit provisions to establish or maintain commitments to such programs. These “public benefits programs” are taking a variety of forms. In some cases, utilities are given this responsibility. In other cases, other entities, such as state energy offices or nonprofit organizations, have been given this responsibility. Kushler & Witte (2000; 2001b) provide a comprehensive review and summary of state public benefits policies and programs across the United States; York et al. (2002) examined in more detail the public benefits programs in four states with diverse approaches to public benefits administration and implementation.

Although restructuring of the electric utility industry has stalled in many states, and recent events (such as California’s 2001 energy crisis and the fall of Enron) have caused regulators and other policy makers to reconsider the claimed benefits of greater competition, support for public benefits policies regarding energy efficiency has remained high. In fact, four states (California, Massachusetts, New York, and Rhode Island) have taken action to officially extend their original public benefits funding mechanism, and at least two states (Wisconsin and Vermont) have enacted public benefits programs without restructuring their electric industry.

With the forces put in motion in the mid-1990s by efforts to restructure electric utility markets across the country, “traditional” utility DSM might be perceived as an activity rapidly on the decline. Nadel et al. (2000) documented this rapid decline using data reported by the Energy Information Administration. Although total spending on utility DSM still was close to a billion dollar activity in 1998, it was much below the higher levels reached earlier in the 1990s. However, in recent years some of that decline has been compensated for by the growth in public benefits funding for energy efficiency. We re-visited the research by Nadel et al. (2000) to update the state by state and national data on energy efficiency programs in order to continue to track these trends and see if public support for energy

efficiency through utility DSM and public benefits programs had continued the dramatic decrease documented in this previous research.

Data Sources and Methodology

The primary source for utility data on DSM programs was the Energy Information Administration (EIA) within the U.S. Department of Energy (DOE). EIA collects and publishes data on utility sales, revenues, DSM spending, DSM savings, and other parameters (EIA 2002a; 2002b). An important secondary source of utility data—particularly state break-downs of electricity sales and revenues for utilities serving multiple states—was the Edison Electric Institute (2002). For utilities serving multiple states, we use pro-rata shares based on electricity sales in each state to apportion DSM spending and savings values to individual states.

A major caveat with the data and resulting state and national summaries is that the EIA data is self-reported and not independently verified as to accuracy. Not all utilities report these DSM data to EIA, and those that do may use different methods to estimate savings data. Consequently, the EIA data is somewhat incomplete, and data from utility to utility may not be exactly comparable. A further complication is that spending on public benefits programs may not be within the domain of utility operations in certain states, and therefore, would not be reported to EIA. To address some of these problems, we contacted selected utility or state regulatory or administrative staff, or relied on published program and planning documents to fill in missing data and otherwise check the accuracy of reported data (Brensdal 2002; Efficiency Vermont 2001; Hermetet 2002; Keating 2002; Meier 2002; NYSERDA 2002; Ward 2002). We also relied on other research on public benefits programs (Kushler & Witte 2000, 2001b).

Results: Trends in Aggregate Spending on Energy Efficiency Programs

The most obvious and important result is that apparently 1998 marked the low point in publicly supported energy efficiency programs. The data for 2000 show that spending on energy efficiency has rebounded somewhat since the sharp decline noted from 1993 to 1998. Total spending—including both utility DSM and emerging public benefits programs—increased modestly, but significantly, from 1998 to 2000. Total spending on energy efficiency programs was \$1.10 billion in 2000 (see Figure 1). Utility spending (including both traditional DSM and newer public benefits mechanisms for which the utilities still provide programs and services) appears to have increased modestly from 1998 to 2000 (from about \$913 million to \$1.02 billion), while public benefits program spending by entities other than utilities has increased rapidly (from essentially zero in 1998 to about \$77 million in 2000).

Public benefits spending, whether by non-utility entities or utilities, is likely to continue to increase based on other research performed by ACEEE (Kushler & Witte 2001b). This research documented that close to \$1 billion is authorized for spending on energy efficiency programs funded by public goods charges in states that have established or are establishing such programs. Actual spending in 2000 on public benefits programs is less than this due to the transition period “ramp up” occurring in many states, including New York, Vermont, and Wisconsin among others. We estimate that total public benefits program spending in 2000 was about \$720 million. Of this total, public benefits programs implemented by utilities accounted for the largest share—about \$643 million. The remainder—about \$77 million—was spending by non-utility entities on state public benefits programs. Utility DSM spending on energy efficiency was \$376 million in 2000. Figure 2 shows the shares of total spending according to these categories. Public benefit data are somewhat tricky to track as some states will show this as a distinct budget, while in others (such as California and Texas) such activities may continue to be reported through utility DSM activities. We conducted additional research as necessary to determine

whether EIA data on utility DSM accounted for public benefits spending or if there were separate budgets that should be included.

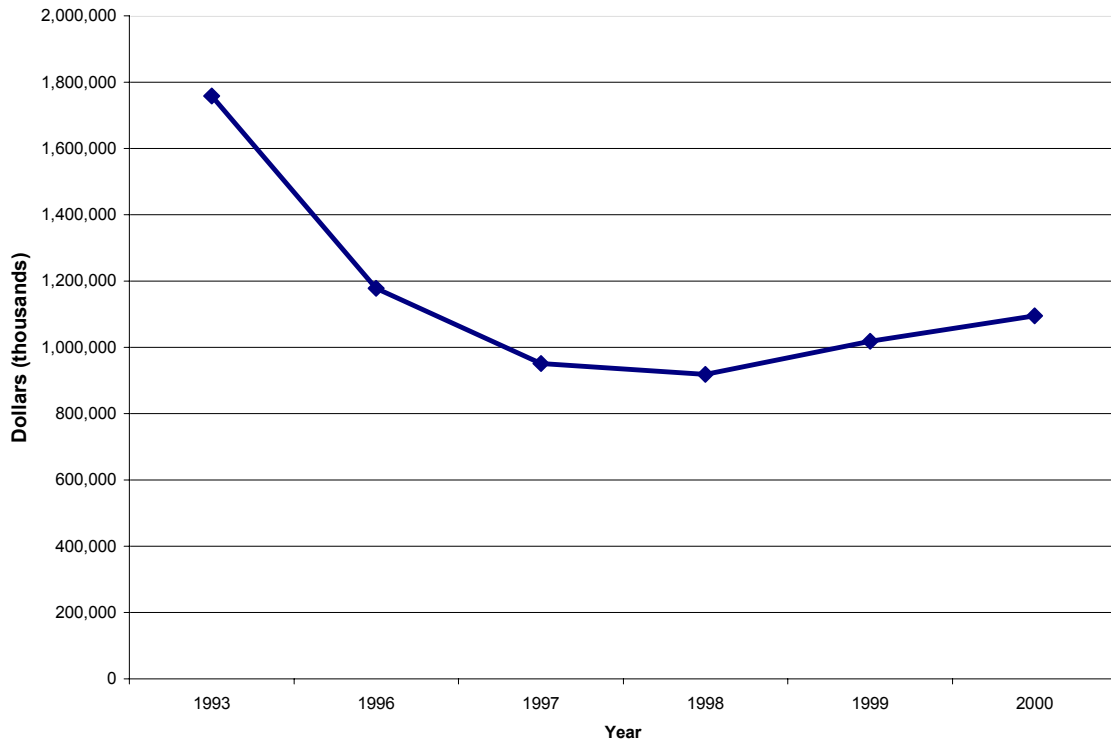


Figure 1. Total Nationwide State Energy Efficiency Spending, 1993-2000

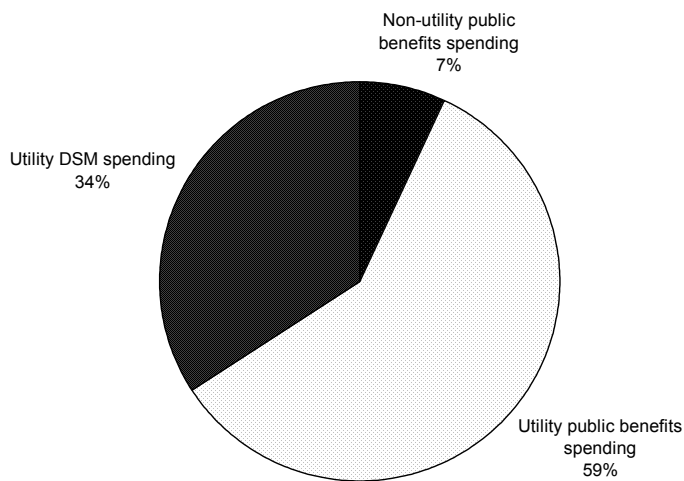


Figure 2. Energy Efficiency Spending by Program and Organization Type, Year 2000

Total savings from energy efficiency programs for the period 1993–2000 is shown in Figure 3. The overall trend varies from that of total spending, with savings peaking in 1996 and declining slightly from that total for the years 1997–2000. The main difference in this trend from that of spending is that total

savings represent the annual savings achieved from implementation of all program measures from both the reporting year *and* prior program years. This reflects the fact that even if a program were to be eliminated entirely, the measures implemented previously would continue to achieve savings beyond the program's termination. Thus there is both a time lag and dampening of the impact of spending declines in total program savings.

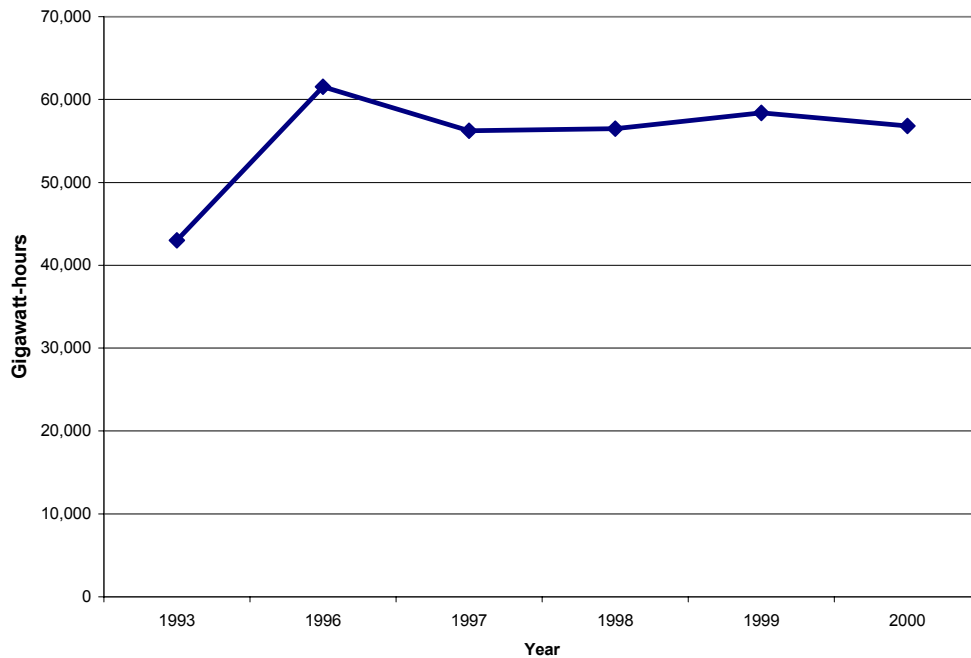


Figure 3. Total Nationwide State Program Savings, 1993-2000

In 2000, the states with the highest spending on energy efficiency programs per capita according to our estimates were (in ranked order):

1. Connecticut (\$19.48/capita)
2. Massachusetts (\$15.60)
3. Rhode Island (\$13.33)
4. New Jersey (\$13.20)
5. Vermont (\$10.30)
6. Maine (\$9.87)
7. Wisconsin (\$9.16)
8. Hawaii (\$9.07)
9. New York (\$8.57)
10. California (\$8.43)

The next quintile of spending per capita in this update includes Washington, Minnesota, Iowa, Oregon, Montana, New Hampshire, Idaho, Florida, North Dakota, and Delaware.

Examination of the top-ranked states for energy efficiency activity shows that about one-third of the states account for the bulk of energy efficiency program activity. In our ranking of states according to "spending per capita," the 16 states that exceeded the national average spending level of \$3.88 per capita account for 86% of the total national spending on energy efficiency programs (York & Kushler

2002). Further examination of these states shows that most of these states have been long-time leaders in providing energy efficiency programs and services.

Going beyond this upper third, one-half of the states (25) account for essentially all (95%) of total spending on efficiency programs. Even within this top half of states, there is great variability in the amount of spending on energy efficiency: the spending per capita ranges from \$1.16 to \$19.48—a factor of about 17 from lowest to highest.

The overall modest upward trend in energy efficiency program funding reflects a growing recognition among states that energy efficiency programs provide important economic and environmental benefits. Whether funded through traditional utility DSM or emerging public benefits programs, many individual states are showing renewed commitment to ensuring that energy efficiency is a strategic element in meeting present and future energy demand.

Analysis of Best Practices for Energy Efficiency Programs

Given the level of spending on energy efficiency programs, it is vitally important that policymakers, regulators, utilities and other involved parties have up-to-date information on the best energy efficiency program designs and implementation practices. To this end, ACEEE conducted a national review and assessment of current utility-sector energy efficiency efforts in order to identify exemplary energy efficiency programs that might be replicated by those in other jurisdictions (York & Kushler 2003). In this paper we draw out some of the main observations of this project.

Solicitation of Program Nominations

ACEEE actively solicited nominations nationally for programs to be recognized as “exemplary.” ACEEE staff notified key contacts at state public service commissions, utilities, state energy offices, regional market transformation organizations, state research and development organizations, and other allied organizations and industry professionals. We also contacted national experts. Our intent was to cast a wide net to ensure that we had sufficient numbers of top quality programs from which to make selections for the project.

We identified “factors to be considered in identifying exemplary programs.” These factors were:

1. *Direct Energy Savings.* Demonstrated ability of the program to deliver substantial immediate kWh and KW savings from energy efficiency. Programs could be noteworthy due to overall total magnitude of impact (i.e., very large programs) or in terms of amount of impact per dollar spent (i.e., very cost-effective programs).
2. *Market Transforming Effects.* Demonstrated ability of the program to produce desirable and lasting improvements in the energy efficiency characteristics and performance of the targeted market.
3. *Evaluation Results.* Programs that have used good quality ex post evaluation/verification methodologies to document savings impact and/or market effects achieved by the program will receive more favorable consideration.
4. *Qualitative Assessment.* Achievements of the program in terms of noteworthy program implementation performance, customer participation, participant satisfaction, stakeholder support, etc.
5. *Innovation.* The incorporation of particularly innovative designs and/or implementation techniques that are judged to hold significant promise for the future.
6. *Replicability.* Programs that are well documented and have characteristics amenable to replicating the program design in other settings.

Expert Panel Review and Selection

ACEEE convened an expert panel, which consisted of 3 external industry experts and 3 ACEEE staff. Each panelist received copies of all nominations for review and ranking. While the panel used a rough scoring system initially as a means to help rank and select programs, the decisions to select a program for one of two awards—“exemplary program” or “honorable mention”—were all reached through discussion and consensus. ACEEE staff and the external panelists conducted additional research on programs as necessary to supplement the information provided in the program nominations. While the panel relied on as much objective data and descriptive material as possible, ultimately the decisions were subjective based on group discussion of available information and collective judgments regarding each program.

Results

Response to ACEEE’s call for nominations of *exemplary programs* was overwhelming. We received far more nominations—about 130 total—than we had expected (perhaps 50). We viewed this as a positive sign of the quantity and quality of work on-going around the nation to reap the economic and environmental benefits of energy efficiency. The overall quality of the nominations was high. The expert panel selected 32 programs to be recognized as “exemplary” and 31 programs as “honorable mention.” York & Kushler (2003) provide a complete listing of the sets of programs and summary profiles of each.

Analysis of Nominations

While a primary objective of this project was to recognize outstanding programs and provide brief profiles of each individual program selected, another objective was to analyze the nominated programs as a group representing current best practices. Today’s energy efficiency programs have evolved from 20-30 years of experience gained through utility and related energy programs first offered in the 1970s. The best programs of today then embody and reflect this extensive history and experience with providing programs and services to customers to improve the efficiency of energy use within their homes, buildings, facilities and factories.

ACEEE received nominations for programs serving customers in a total of 31 states, from Washington to Florida and from Arizona to Maine—and even Alaska and Hawaii. We also received nominations for a handful of national level programs. This result demonstrates that customers across the US are being served by quality energy efficiency programs.

Three regions accounted for particularly large shares of program nominations—the Pacific Northwest (Washington, Oregon, Idaho and Montana), the Northeast (the Middle Atlantic States and New England), and the State of California. All three of these regions have long records of utility and public programs to support energy efficiency. Other regions and states that showed reasonably strong showings in terms of the numbers of nominations were the Midwest and Texas. This result mirrors our analysis of statewide spending on energy efficiency programs and related indicators.

In addition to wide geographic diversity in the nominations, we also had great diversity in the types of organizations that fund, administer and implement programs that were nominated. The types of organizations nominated for their programs include:

- Utilities: investor-owned, municipal, federal and cooperatives.
- State public benefits programs
- Regional market transformation organizations
- Private businesses

- Non-profit organizations
- Municipal government
- State government
- Federal agencies
- “Collaboratives” of various types of organizations

The types of programs nominated showed wide variation as well along three main dimensions:

- (1) *Sectors served*, which included residential, commercial (small and large), industrial, agricultural, institutional and municipal.
- (2) *Targeted end-uses and technologies*, which included lighting, HVAC, industrial processes, appliances, building envelope, compressed air systems, wastewater, industrial motors/drives and traffic signals.
- (3) *Types of program services*, which included financial incentives (rebates), technical assistance, consumer education, marketing, customized services, professional education, performance contracting/bidding, appliance recycling, and technical support for codes and standard development.

Observations and Common Traits of Leading Programs

In reviewing the set of nominated programs, we observed a number of common traits in many similar programs, as well as other noteworthy features that help define “best practices” for today’s top energy efficiency programs. Below we highlight these observations on “best practices:”

- *“Comprehensive” approaches are being taken in all customer segments.* By “comprehensive” we mean services targeted not just to a small set of end-uses, but rather that seek to improve the energy efficiency of entire buildings or industrial processes by examining the systems and technologies that function together within the building or process.
- *Customized services and customer-focused approaches are common.* A large number of programs across sectors are clearly working to address customer needs and offer user-friendly and customer-focused services. Customized services reflects growing recognition of the unique needs of customers within a given customer class, especially commercial and industrial.
- *Programs sell more than energy efficiency.* While saving energy through energy efficiency is clearly the overall objective of most programs, to realize these savings requires that the products and services promoted offer other attributes that meet customer needs, such as comfort, enhanced asset value, convenience, superior product performance, energy cost savings, improved productivity, reduced operating and maintenance costs, greater reliability, and improved aesthetics.
- *There are also very successful programs that are tightly focused on a single technology or service.* Despite some apparent trends toward comprehensive and customized programs, there are clearly very successful programs that target a single end-use technology—such as residential lighting, residential windows, commercial HVAC and compressed air. But while the focus of many programs may be narrow, we also observed that the approaches used to market the product or service tend to be comprehensive and well integrated.

- *Program marketing and support services are essential for program success.* Effective marketing was an essential ingredient in achieving the high participation rates exhibited by the programs recognized as exemplary. In addition, effective training and technical assistance were important program features to achieve high savings.
- *Financial incentives (including rebates) have not gone away.* Rebates and other types of financial incentives are still an important and integral part of many programs, including some that are labeled “market transformation”. They are clearly an important marketing tool, whether they go to customers directly or to retailers, distributors or other market participants.
- *“Resource acquisition” as a program objective has not gone away.* Our set of nominations demonstrates clearly that “resource acquisition” is still an important part of energy resource and energy program portfolios. We observed some programs that specifically targeted very near-term energy and demand savings as a strategy to help relieve wider energy resource shortages, such as occurred in the summer of 2001 in California, the Northeast and other regions of the country.
- *Market transformation is a significant program objective and program model.* We received a large number of nominations of market transformation programs, and many of these are having significant impacts on their targeted markets. Residential market transformation programs tend to target specific products and technologies. In commercial and industrial markets, programs are seeking to transform professional practices in addition to markets for energy-efficient technologies, such as motors, lighting and HVAC equipment.
- *Utilities are still major providers of energy efficiency services.* Energy utilities (both electric and natural gas), whether operating in restructured, competitive markets or in traditional, regulated markets, continue to be the largest delivery mechanism for energy efficiency programs in the U.S.
- *Non-utility programs are increasing.* The number of non-utility program administrators and providers is increasing across the nation. Some states, such as New York, Oregon, Vermont and Wisconsin, have established new non-utility organizations or charged existing non-utility organizations with administering and implementing energy efficiency programs.
- *Partnerships and collaboratives that bring together a wide variety of market actors are keys to achieving significant market impacts.* We observed that a common trait of highly successful programs is that they rely on numerous partnerships, alliances and collaborations that bring together diverse organizations that share a common interest in achieving a significant market impact.
- *Effective “supporting” programs and services are important to achieve program success.* Other types of programs, notably R&D (research and development) and broader energy education (K-12, technical, university and professional) can work in concert with those programs focused on a specific end-use technology or service.
- *ENERGY STAR® features prominently in many of these programs.* The U.S. EPA/DOE ENERGY STAR Program is a very central element in a majority of the programs nominated in this project. ENERGY STAR clearly provides a platform and standard for energy efficiency that enables local,

state and regional programs to have significant impacts in targeted markets. ENERGY STAR has become more and more widely recognized as the brand for energy efficiency, which is a huge boost to program marketing and customer purchase behavior.

Conclusions

These two complementary research efforts show that publicly supported energy efficiency programs remain an important component of energy resource portfolios. After a dramatic decline from 1993-1998 in overall spending on efficiency, we have witnessed a modest rebound as states have reaffirmed their commitment to energy efficiency as a way to maintain and increase the public benefits associated with increased levels of energy efficiency within their economies. Our analysis of best practices clearly demonstrates the wide range of high quality energy efficiency programs that are being offered in various areas of the U.S. today. Long-standing, successful programs are being renewed and continue to evolve to meet customer needs. Energy efficiency programs in many states are being reborn under new organizational structures. These programs all are working with energy customers of all types to improve the energy efficiency of their homes, buildings and factories. Exemplary programs are being offered across the full range of customer technologies and services tied to energy use and by a broad spectrum of organizations.

Rather than abandoning utility efforts to provide DSM, many states have continued to require that utilities offer such services—whether the utilities are under traditional rate regulation or under a competitive retail market structure. State regulatory agencies, legislatures, and governors in a significant number of states are looking beyond the rhetorical claims made by restructuring advocates that “market forces” alone will assure that consumers make optimal decisions regarding energy efficiency investments. The resulting decision to provide public support for energy efficiency clearly demonstrates an ongoing commitment regardless of market restructuring and increased competition within the industry.

Despite the emergence and growth of public benefits programs as a complement or replacement for utility demand-side management programs, there remains a vast resource of energy efficiency opportunities in the United States that is being largely untapped. Two-thirds of the states provide little or no funding support for improving the energy efficiency of their economies. These states have virtually no spending through utility DSM or state public benefits programs and are thereby missing significant opportunities to increase the energy efficiency of their homes, businesses, and industries.

Finally, we caution that we so far have only seen a modest rebound and increase in support for these programs. Certain signs suggest further increases are pending, yet the countervailing forces that led to the initial steep decline can still affect these trends, as could the widespread budget deficits being experienced in many states. However, the overall positive trend in energy efficiency activity in recent years reflects a growing recognition among states that energy efficiency programs provide important economic and environmental benefits. Such benefits are the direct result of the success of the utility and non-utility energy efficiency programs to date. And that success, in turn, is the result of the exemplary practices being followed by many of today’s programs.

Acknowledgements

We thank Doug Baston of Northeast by Northwest, Jeff Schlegel of Schlegel and Associates, LLC, Ed Vine of Lawrence Berkeley National Laboratory, and Steve Nadel of ACEEE for their work as members of the expert panel that reviewed and selected programs to be recognized as part of ACEEE’s “Best Practices Project.” These four individuals and the authors comprised the six-member expert panel.

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