

What's Working Well: Lessons from a National Review of Exemplary Energy Efficiency Programs

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ABSTRACT

Utility sector programs have been in place and providing beneficial services to customers for more than 20 years in many states and regions. More recently, the role of energy efficiency as a utility system resource has grown rapidly in response to rising costs of new supply and in response to heightened environmental concerns. Given this background, it can be very useful to identify and examine leading energy efficiency programs. Early in 2007 we initiated a project to identify and profile a selected set of such programs. Our goal was to offer a set of programs that stood out as models of exemplary energy efficiency programs for various customer types and end-use applications. After a national search, we selected a set of 90 programs that span the full range of customer types and end-use technologies.

In this paper we present the summary results from this national review. We focus on practical information gleaned from the wide range of program categories and types of programs we selected. We discuss our observations and analysis of these programs as to what makes them exemplary. As the energy efficiency industry seeks to expand and capture greater amounts of energy savings, it will be important to draw upon outstanding program examples for both guidance and inspiration. This paper provides an overview and summary of the lessons learned from our recently completed national review of leading energy efficiency programs.

Introduction

Utility sector programs have been in place and providing beneficial services to customers for more than 20 years in many states and regions. More recently, the role of energy efficiency as a utility system resource has grown rapidly in response to rising costs of new supply and in response to heightened environmental concerns.

Given this background, it can be very useful to identify and examine leading energy efficiency programs. Early in 2007 we initiated a project to identify and profile a selected set of such programs. Our goal was to offer a set of programs that stood out as models of exemplary energy efficiency programs for various customer types and end-use applications. After a national search, we selected a set of 90 programs that span the full range of customer types and end-use technologies. The search began with an open call for nominations through various communication channels. A panel comprised of independent energy efficiency program experts and ACEEE staff reviewed the nominations and selected programs to be recognized. Key selection criteria included energy savings results, market impacts, innovation and transferability.

In this paper we present the summary results from this national review. We focus on practical information gleaned from the wide range of program categories and types of programs we selected. We discuss our observations and analysis of these programs as to what makes them exemplary. We also examine trends within program categories, and summarize available information about program costs and performance.

Background

In 2003 ACEEE completed its first national review of exemplary energy efficiency programs, *America's Best: Profiles of America's Leading Energy Efficiency Programs* (York and Kushler 2003). This report included profiles of 63 programs selected as models for recognition and emulation for their success in helping customers increase the energy efficiency of their homes, offices, businesses, and industries. These leading programs were selected from a large set of nominations received by ACEEE. The selected programs represented the diversity of the types of programs available as well as the diversity of organizations that administer and provide them.

The success of this initial project, which encompassed a broad spectrum of program types serving customers in all major categories (low-income, residential, commercial, and industrial), led to two follow-up projects, one that focused on natural gas energy efficiency programs (Kushler, York, and Witte 2003) and one that focused on low-income energy efficiency programs (Kushler, York, and Witte 2005).

The success of these initial efforts by ACEEE to review and recognize exemplary program was the genesis for what became ACEEE's second such national review. In the five years since ACEEE's first review, there have been numerous developments that have had significant impacts on utility-sector energy efficiency programs. These include:

- Global climate change has moved from an issue of debate to an issue of action.
- A new wave of power plant construction is being vigorously discussed and undertaken, with the potential for tens of billions of dollars being invested in new power generation plants.
- Costs of new power plant construction have risen dramatically, making alternatives to conventional fossil fuel plants even more economically attractive.
- Energy fuel costs have risen dramatically, which appears to be a long-term trend.
- Consumer interest in “going green” has never been higher.
- Momentum toward further utility restructuring has largely vanished as a state regulatory policy issue.
- A much more stable environment has emerged for utility-sector energy efficiency programs.
- There is a rapidly growing demand to increase savings from energy efficiency improvements to meet both environmental and economic objectives.
- There has been a noticeable return to long-term, integrated resource planning (IRP)—if not in name, in practice.
- Technological advances have continued for energy-efficient products and practices.

Apart from all the above changes, the passage of 5 years from ACEEE's 1st national review of exemplary programs also means that sufficient time had elapsed for new programs to have been developed and implemented. It also allowed for sufficient time for long-standing programs to have added to their records of success.

As with ACEEE's 1st national review of exemplary programs, this 2nd national review has two main objectives: (1) to provide information about top quality energy efficiency program designs and implementation techniques that might help others to improve their programs or serve as models for new programs and initiatives; and (2) to provide recognition to those who are doing an excellent job in their energy efficiency efforts.

Methodology

ACEEE solicited nominations nationally for this 2nd national review of exemplary energy efficiency programs through a number of communications. The solicitation included announcements via electronic mail list-serves, ACEEE's electronic newsletter, inserts in printed program materials at the 2007 National Symposium on Market Transformation, and posting on ACEEE's web site. The nomination process was open-ended. ACEEE sought leading examples of energy efficiency programs of all types and for all customer sectors (residential, commercial, industrial, and agricultural) and end-use technologies. The only constraint was that they had to be utility-sector energy efficiency programs (i.e., funded by utility rates, public benefits charges, or other similar utility revenue mechanisms). The programs could be administered by utilities, government agencies, or third-party independent administrators. Both electric and natural gas programs were eligible. Load management programs, including demand response, were not eligible. Similarly, programs targeting supply-side energy efficiency, such as combined heat and power, were not eligible.

The key criteria for recognition by ACEEE were:

1. *Direct energy savings.* Demonstrated ability of the program to deliver substantial direct kilowatt-hour and kilowatt savings from energy efficiency---noteworthy either in overall total magnitude of impact (large absolute savings) or in terms of amount of impact per dollar spent (cost-effectiveness).
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 (those that follow well established industry practices for energy program evaluation) 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. *Transferability.* Programs that are well documented and have characteristics amenable to replicating the program design in other settings

Nominations could be submitted by personnel directly involved with a program or from others familiar with the program. An expert panel convened by ACEEE, consisting of 3 ACEEE staff and 3 external industry experts, evaluated the nominations and selected the programs to be recognized.

Results

ACEEE received a strong response to its call for nominations. The overall quality of the nominations was high, reflecting the depth of experience we now have after such programs have been offered and operated for over 20 years in many cases. The expert panel selected a total of 90 programs across 20 different program categories to be recognized. These categories were established by the expert panel after receiving and reviewing the nominations in order to group similar types of programs together to facilitate the selection process. ACEEE purposely did not define program categories in advance in its "call for nominations", so as to not inhibit submissions in innovative areas. For the full listing of selected programs see York et al. (2008).

As in the preceding national review, ACEEE selected programs to recognize in this 2nd national review according to two categories of awards—"exemplary programs" and "honorable mention." The distinction between these two categories is perhaps a small one, based solely on the collective judgment of the expert panel using the factors listed earlier as to which category an honored program best fit. Typically "honorable mention" was used to recognize programs that appear to be very innovative and promising, but might have been too new to have had a sufficient record of results upon which to fully evaluate its level of success. In other cases, certain special features or techniques that merit highlighting, rather than the overall program, might have resulted in an "honorable mention" selection to highlight those features.

Analysis of Nominations

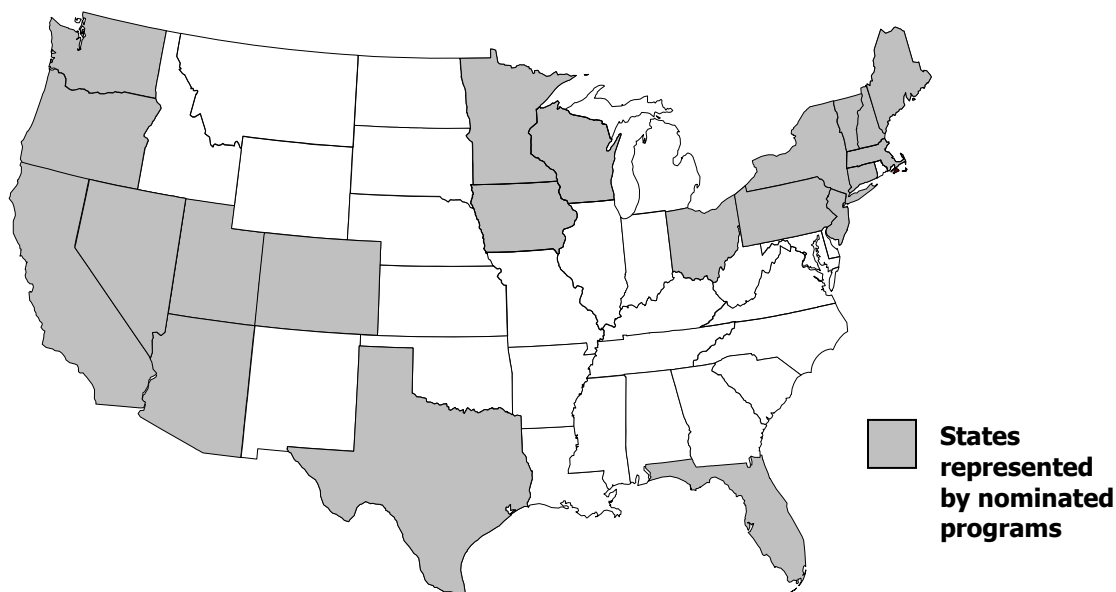
While a primary objective of this project was to recognize outstanding programs and provide brief profiles of each individual program selected, another objective was to analyze the nominated programs as a group representing current best practices. Today's energy efficiency programs have evolved from 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 from programs serving customers in a total of 22 states plus 2 Canadian provinces.¹ Two regions, the Northeast and the Midwest, plus the state of California accounted for particularly large numbers of program nominations. All three of these areas have long records of utility and public programs to support energy efficiency. This result

¹ ACEEE did not solicit nominations from Canadian organizations, but accepted those it did receive. There were no specific requirements in the call for nominations that organizations had to be from the United States.

suggests that while large numbers of customers across the U.S. are being served by quality energy efficiency programs, there are still many states and regions where customers lack availability of such programs.

Figure 1. Geographic Distribution of Program Nominations



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 (with the percentages of total nominations they represented) include:

- Utilities: investor-owned and public (71% of total nominations)
- Non-utility public benefits organizations (7%)
- State agencies or authorities (14%)
- Regional market transformation organizations (3%)
- “Collaboratives” of various types of organizations (5%)

Investor-owned utilities as a group submitted by far the greatest number of nominations, with state agencies and non-utility public benefits organizations as the next largest groupings.

The types of programs nominated showed wide variation as well along three main dimensions: (1) sector served; (2) targeted end-uses and technologies; and (3) program services. Sectors served by nominated programs covered the full range of customers, namely residential, commercial (small and large), industrial, agricultural, institutional, and municipal. Targeted end-uses and technologies covered the full spectrum, including lighting, HVAC, industrial processes, appliances, building envelope, compressed air systems, wastewater, industrial motors/drives, and traffic signals. The types of program services similarly covered a broad spectrum, including financial incentives (rebates), technical assistance (particularly design assistance), marketing,

customized services, appliance recycling, and technical support for codes and standard development.

The nominations also illustrated that two fundamental program models or approaches are in place: (1) market transformation (facilitating fundamental changes in markets that lead to greater shares of energy-efficient products and services) and (2) resource acquisition (seeking to achieve direct, measurable savings customer-by-customer). Many programs really meld these approaches and seek both outcomes—fundamental changes in markets *and* direct, measurable energy savings.

Collective Impacts and Costs of the Selected Programs

While the programs recognized in this project represent only a portion of all energy efficiency programs offered across the U.S., these programs are having significant impacts and represent a large investment in energy efficiency. The combined total annual expenditures of the 90 programs recognized by ACEEE in this review are over \$700 million (both electric and natural gas programs). Annual budgets for programs ranged from \$75,000 to \$90 million. The average program budget of programs selected was \$7.8 million and the median was \$3.8 million.

The total annual electricity savings achieved by programs in 2006 from new savings measures implemented were about 2,400 GWh with peak demand impacts of nearly 400 MW.² Annual natural gas savings of programs that include or target natural gas total over 125 million therms. Clearly these efficiency programs constitute a significant energy resource, and represent an important component of energy resource portfolios for many utilities and states.

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 today’s exemplary energy efficiency programs:

Proven approaches. In many categories of programs, the approaches used are proven and are providing consistent, reliable, and cost-effective savings. We are definitely seeing a certain maturity to programs and program approaches. Program managers, administrators, and implementers have really figured out “what works” and “what doesn’t” after many years of experience with different approaches and program structures. Program categories that especially demonstrate and apply proven program approaches include:

- commercial lighting
- commercial new buildings
- commercial/industrial retrofits
- low-income residential
- residential lighting and appliances

² These are rough estimates; not all programs in this review reported annual energy savings or peak demand impacts. Different organizations have different reporting conventions and assumptions as well.

- residential new homes
- small business

Innovation. There are also many innovative programs—programs using new approaches, promoting new technologies, and targeting customer segments that haven’t been well-served or even have been entirely missed by past programs. Examples include programs targeting industrial processes, agriculture, high tech industries (such as data centers), and the food service industry.

Personal contacts. Personal contacts with customers by program representatives yield strong results. Utility key accounts representatives or their equivalent from non-utility organizations administering programs play important roles for many programs. Such representatives earn customer trust and confidence in the programs and services offered by their organizations through sustained relationships. Personal contacts seem especially important to the success of these types of programs:

- Residential retrofits
- Low-income
- Commercial retrofit
- Commercial new buildings
- Industrial process
- Agriculture

Industry experts. For many types of programs, bringing in recognized industry experts that echo the energy efficiency message while focusing on key industry objectives seems an approach that’s particularly successful. This approach seems especially useful in industrial, agriculture, and new commercial construction programs.

Comprehensive program portfolios. Energy efficiency program portfolios available to customers are comprehensive. Such portfolios of programs provide extensive coverage for all types of customers at all types of decision points, primarily: (1) equipment purchase/replacement, (2) retrofit, and (3) new construction (and major renovations and additions).

Comprehensive program designs. Programs themselves are increasingly comprehensive, offering a full menu of services (including incentives, marketing, technical assistance, training, and education) for a full menu of customer end-use applications—lighting, appliances, HVAC, building envelope, and other systems and technologies. Many leading programs offer a single portal or program contact to access a full range of applicable program services.

Successful long-standing and start-up programs. There are organizations with long-standing, well-established programs that continue to be very successful, as well as many new organizations that have just initiated—or re-established—programs and have done well with rapid start-ups. In these latter cases of successful rapid start-ups, these programs have often benefited from transferring lessons and experiences from other organizations and programs, thereby enabling them to more quickly achieve full-scale implementation.

Collaborations. Collaborations among stakeholders and market participants are key elements of numerous successful programs. Energy efficiency programs increasingly involve a broad spectrum of allies, including architects, consulting engineers, designers, contractors, manufacturers, suppliers, retailers, government agencies, local governments, and other decision-making bodies. Collaboration among program administrators and providers is a successful approach, a way to leverage resources and reach broader areas with common and consistent program services and messages.

Statewide approaches. There is an increasing emphasis on statewide approaches and programs, even if not delivered by the same entity to all customers. For example, the utilities in the states of California, Connecticut, Iowa, New Hampshire, and Massachusetts offer many programs based on a common program platform of services. In other states with non-utility program administrators, offering statewide programs is fundamental to their mission. These states include New York, Oregon, Vermont, New Jersey, Maine and Wisconsin.

Prominence of ENERGY STAR®

The U.S. EPA/DOE ENERGY STAR® program is prominent within applicable programs, especially consumer products and new homes, and is increasing in commercial areas. The ENERGY STAR® brand is common among a growing roster of different types of programs—moving beyond products and into services, such as home and business retrofits.

Avoiding Lost Opportunities

There are many exemplary new construction programs, both residential and commercial/industrial. This emphasis reflects overall program portfolio goals of avoiding “lost opportunities” (building new, inefficient buildings).

Deeper Savings

There are programs continuing to innovate to try to achieve deeper savings with program participants, such as boosting incentives and services for customers who choose to implement large sets of recommendations, rather than single measures or small sets of measures. Comprehensive approaches are being taken in all customer segments—programs seek to improve the energy efficiency of entire buildings or industrial processes.

Conclusions

A strong and common conclusion emerged from our review of these programs: energy efficiency works. Today’s programs are having significant impacts on customer markets and energy use. This success is both wide and deep. We found exemplary programs across the entire spectrum of customers, including residential, small business, schools, offices, industries, and agriculture. We also found programs that are achieving deep savings with individual customers—programs that are facilitating the implementation of comprehensive packages of energy efficiency measures that together work to achieve significant energy savings.

Our review of exemplary programs gives strong evidence that there is a very solid foundation in place upon which to build a greater role for energy efficiency in the energy resource portfolios of today and tomorrow. There are programs in place that have been successfully delivering significant energy and cost savings for years, even decades. There also are programs newly put into place to address new types of customers and under-served customers from past programs. Many programs have not only affected energy use among participating customers, but are having broader impacts on the markets for products and services.

Despite the strong records and continuing innovation and success demonstrated by the programs selected and profiled in this compendium, there are still large parts of the U.S. not served by such programs. A key practical lesson from this research is that such states can have confidence that well-proven program models exist, which can be replicated in their service territories. We encourage decision-makers and leaders in such under-served areas to examine the success of these exemplary programs and implement the policy changes necessary to bring such successful program models to work for customers in their states and regions.

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