STATES STEPPING FORWARD: BEST PRACTICES FOR STATE-LED ENERGY EFFICIENCY PROGRAMS

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EXECUTIVE SUMMARY

The American Council for an Energy-Efficient Economy (ACEEE) presents its first-ever awards project for exceptional state-led energy efficiency programs, modeled after previous projects focusing on utility programs. As new funding sources become available to states through federal stimulus, cap-and-trade initiatives, and other state and federal sources, state governments are stepping forward and taking on greater responsibilities implementing energy efficiency programs. The report highlights many leading states that have been running energy efficiency programs for decades, as well as programs recently developed with new sources of funding.

ACEEE accepted nominations from programs administered by state institutions and an expert panel examined the field of nominations. The panel decided on five award winners, ten honorable mentions, and three emerging programs. The winners come from every region of the country and represent numerous useful models for energy efficiency program implementation. The programs address many sectors including residential, commercial, institutional, industrial, agricultural, and transportation.

While the programs differ in their approach, they all achieve substantial energy savings for customers, lowering energy costs and reducing the negative environmental impacts of energy use. Each program highlights how state governments can implement successful, cost-effective energy efficiency programs and complement the existing program landscape offered by utilities and third-party program administrators. Many programs demonstrate collaboration between public and private stakeholders, serving as models for effectively coordinated and highly leveraged programs.

AWARD WINNERS

Colorado Governor's Energy Office: ENERGY STAR® for New Homes Program

The Colorado ENERGY STAR New Homes Program (ESNH) presents an excellent model in which the state energy office forms regional partnerships with counties, cities, nonprofit organizations, and utilities to offer locally tailored programs to promote ENERGY STAR certification in new residential construction. The program is supported by the Clean Energy Fund, created by Governor Ritter, which directs nearly $7 million to the Governor's Energy Office (GEO) to develop and implement energy efficiency and renewable energy programs in all sectors. Local and regional partnerships compete for a portion of state funding based on numerous criteria, including the partnership's capacity to implement an aggressive ESNH effort that would work best for their local market and align with existing efforts; the partnership's ability to develop additional relationships with stakeholders in their region; and the partnership's ability to contribute matching funds for their local program. Launched in 2008, the program has resulted in impressive market penetration in the residential market for ENERGY STAR-certified new homes in Colorado from 8.9% in 2007 to 32.7% in 2009. The GEO estimates the 2,354 new ENERGY STAR homes built in 2009 will save residents 11,000 MWh of electricity, 102 MMBtu of natural gas, and $2 million in energy costs.

New York State Energy Research and Development Authority (NYSERDA): Combined Heat and Power Demonstration Program

The Combined Heat and Power (CHP) Demonstration Program is a competitive cost-share program that provides financial support for the permanent installation of CHP systems. For a single site, NYSERDA may provide up to 50% of the project cost up to $2 million. Recently, NYSERDA added a Fleet Demonstration category in which it may provide 30–50% of the project cost up to $4 million for the installation of CHP systems at multiple sites under common control. During the project lifecycle, NYSERDA provides technical and contractual support. There are currently 107 sites within NYSERDA's portfolio; 65 of those sites, embodied in 59 projects, are operational. Once all the projects in NYSERDA's portfolio are constructed and fully operational, they will result in a peak

reduction of 203 MW and an installed capacity of 138 MW. Due to the addition of absorption chillers at some sites, those projects are able to reduce electric load by shifting cooling away from electric chillers. As of December 2009, 59 installed CHP systems are seeing an annual savings of 109,461 MWh/year.

NYSERDA: Wastewater Efficiency Program

The Wastewater Efficiency Program is a young program that has already proven to be a model program design for states intent on improving the energy efficiency of wastewater systems. By approaching wastewater energy efficiency with a comprehensive approach using a baseline standard practice, this program promises to reveal new opportunities for public sector energy efficiency initiatives. During 2009, the designs for 25 capital projects with an estimated project cost of $421 million were reviewed in less than 6 months. More than 16,100 MWh/year and nearly 53,000 MMBtu/year in savings were identified (when compared to the baseline standard practices that could have been used to achieve the treatment objectives). Every dollar spent on energy evaluations helped leverage an anticipated $3.60 of annual energy savings for customers when compared to the energy use of the Baseline Standard Practice for relevant treatment processes.

Hawaii Department of Business, Economic Development, and Tourism: Lead by Example Program

The State of Hawaii promotes energy efficiency in the public sector through its Lead by Example Program (LBE) to demonstrate how investments in energy efficiency save taxpayer money and help transition the state toward a clean energy economy. The program consists of energy saving goals and mandates; a support structure that offers training, information, and technical assistance to agencies as they work to meet the goals and mandates; and a data collection effort to measure the impact of individual agency activity. State agencies operated using 5.8% less electricity in FY 2009 than in FY 2008 as a result of the program. Savings in 2009 electricity consumption translated to an estimated savings of $10 million in general funds, which could be allocated to other important programs.

Maryland Energy Administration: Statewide Farm Energy Audit Program

The Maryland Statewide Farm Energy Audit Program evolved from a pilot audit program to a model full-scale agricultural energy efficiency program, now offering audits, technical assistance, and financial assistance for Maryland agricultural producers. The program shows how prudent re-investment of Regional Greenhouse Gas Initiative carbon allowance proceeds into energy efficiency programs can lower energy costs and jumpstart advanced technological deployment across the state. To date, the program has saved 1,789 MWh, 27,189 gallons of propane, and 52,700 MMBtu of natural gas. The program has saved approximately $578,726 in energy costs for Maryland's agricultural producers annually.

HONORABLE MENTION AND EMERGING PROGRAMS

	Program Administrator	Program Name
Honorable Mention	Alaska Housing Finance Corporation	Home Energy Rebate Program
	Center for Energy and Environmental Resources, the University of Texas at Austin	Texas Industries of the Future
	Connecticut Energy Efficiency Fund and the State of Connecticut Office of Policy and Management	Connecticut Home Energy Solutions Joint Program
	Louisiana Department of Natural Resources	Louisiana Home Energy Rebate Option
	Massachusetts Department of Agricultural Resources	Farm Energy Program
	Minnesota Department of Administration and the Department of Commerce	Portfolio of Sustainable Public Building Programs
	Minnesota Pollution Control Agency	Retired Engineers Technical Assistance Program
	New York State Energy Research and Development Authority	New York Energy $mart^{SM} Commercial Lighting Program
	South Carolina Energy Office and the South Carolina Department of Revenue	South Carolina Manufactured Housing Tax Credit
	Washington State University Extension Energy Program	WSU Energy Services Industrial Program
Emerging Programs	California Air Resources Board and CALSTART	California Hybrid Truck and Bus Voucher Incentive Project (HVIP)
	Massachusetts Department of Housing & Community Development	Chapter 40R / Smart Growth Zoning Overlay Districts
	New Jersey Clean Energy Program	New Jersey Pay for Performance

BACKGROUND

In 2003 and 2008, ACEEE released the two editions of its *Compendium of Champions, a National Review of Exemplary Energy Efficiency Programs*, which examined programs funded through utility rates (York and Kushler 2003; York, Kushler & Witte 2008). The Compendium was well received by the energy efficiency community. Program providers greatly appreciated the recognition and the catalog of programs also is a popular and well-used reference tool. The welcome reception of the successive Compendiums set the stage for this current project, which mirrors its methodology and objectives but only seeks to recognize programs administered by state institutions. We also hope this report can reach an audience beyond the energy efficiency community, as numerous federal, state, and local stakeholders have an interest in how efficiently state governments invest taxpayer funds.

The U.S. typically views energy efficiency programs through the lens of ratepayer-funded programs including utility and public benefits programs. These programs represent a major national investment in energy efficiency as most recent estimates of total electric and natural gas efficiency funding for 2009 is $4.3 billion (Molina et al. 2010). A recent study estimates that by 2020, funding will rise to between $5.4 billion and $12.4 billion (Barbose, Goldman & Schlegel 2009). While most state-led programs do not directly use utility ratepayer funds, many do coordinate and leverage these existing utility programs, rather than duplicating and thus competing with them.

Programs administered by state governments take advantage of significant levels of energy efficiency funding separate from utility ratepayers and it is critical not to overlook these efforts. State-led programs exist in every state, as each one has a state energy office that administers funding from the U.S. Department of Energy (DOE) for a State Energy Program (SEP). Many leading states are accustomed to energy efficiency program administration beyond SEP, having run effective programs for many years. A major portion of state investment comes from Energy Saving Performance Contracting (ESPC) projects, in which an Energy Service Company (ESCO) typically guarantees energy and cost savings produced by the project will equal or exceed all costs associated with project implementation. In twelve leading states, ESPC projects accounted for ~60% of their total energy efficiency investment, including utility ratepayer funded programs (Bharvirkar et al. 2008). The energy efficiency landscape is diversifying rapidly, however, and as new funding sources become available, more states are taking on energy efficiency commitments and expanding their program portfolio beyond ESPC projects.

New and robust sources of federal funding are the primary drivers of the current expansion of energy programs administered by state governments and institutions. The American Recovery and Reinvestment Act (ARRA) passed in February 2009 included the largest single investment in energy efficiency in U.S. history. Approximately $30 billion was aimed directly at programs to improve the country's energy efficiency and a substantial share of this went to the states from the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), as listed in Table 1.[1] Additional programs may indirectly fund state and local government programs, such as the Advanced Research Projects Agency-Energy (ARPA-E), which funds numerous energy efficiency research projects at state universities. Because of the even distribution of State Energy Program funding, state-led programs can be found across the country. Particularly in states minimally served by utility programs, these programs can provide an important first step to introduce consumers and decision-makers to the benefits of energy efficiency programs.

[1] An additional $15 billion was allocated to programs and projects in which funding could be used for energy efficiency improvements among numerous other modernization or renovation measures.

Table 1. Program Funding to State and Local Governments

Program	FY 2008 Budget	ARRA Funding
Weatherization Assistance Program	$227 million	$5 billion
State Energy Program	$33 million*	$3.1 billion
Energy Efficiency and Conservation Block Grant Program	N/A	$3.2 billion
Appliance Rebate Program	N/A	$300 million
Total	$260 million	$11.6 billion

* Required states to contribute funds worth 20% of the DOE grant toward energy projects supported by the grant.

Another new major source of funding to new and existing state energy efficiency programs comes from carbon auction proceeds from the Regional Greenhouse Gas Initiative (RGGI), in which 10 Northeast and Mid-Atlantic States participate.[2] A Memorandum of Understanding signed by these parties called for at least 25% of the proceeds from RGGI auctions to be allocated to energy conservation and clean energy programs in each state. Through eight auctions beginning in September 2008, proceeds from allowances sold total over $650 million.[3] The funding streams for individual states coming from RGGI proceeds have been large enough to launch new and innovative energy efficiency programs, such as the Green Homes/Green Jobs Program in New York (NY Senate 2009). In Maine, all proceeds are used for electric and fuel efficiency. New Hampshire dedicates 90% of its proceeds to energy efficiency and at least 10% to low-income energy assistance. The state established the Greenhouse Gas Emissions Reduction Fund (GHGERF) with RGGI proceeds, which will support energy efficiency and renewable energy projects and initiatives in New Hampshire. The fund has already implemented a new revolving loan fund offered to businesses and administered by the NH Business Finance Authority (NH PUC 2010).

States leverage other new revenue sources to finance energy efficiency programs, including system reliability mechanisms such as the Forward Capacity Market run by the New England Independent System Operator (ISO-NE). The capacity auction for 2012/2013 held in May 2009 saw a five-fold increase in the amount of demand resources cleared for electricity needs and for the first time, energy efficiency resources participated as well (Bowring 2009). The entity that provides these resources, such as a utility, can re-invest the money into energy efficiency, creating a new revenue stream.

The political imperative to act on energy efficiency also results in new sources of funding from within state budgets, or from proceeds derived from state bond issues. The Pennsylvania legislature, for example, established a broad $650 million Alternative Energy Investment Fund in 2008 for clean energy and energy efficiency loans, grants, low-income programs, tax credits, and research and development (R&D). The legislation provides authority to the Commonwealth Finance Agency to issue a $500 million bond and provides $150 million in general fund tax revenue to be allocated over eight years.

SCOPE AND OBJECTIVES

Similar to ACEEE's earlier Compendiums, this project has two main objectives: (1) To provide information about top quality state energy efficiency program designs and implementation methods that might help others to improve their programs or serve as models for new programs and initiatives; and (2) to recognize programs that are exemplary in reducing energy use and energy costs through energy efficiency, and providing economic benefits to customers and taxpayers.

[2] Participating states include: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.
[3] Regional Greenhouse Gas Initiative: http://www.rggi.org

The growing responsibility of state governments to deliver energy efficiency services requires research and analysis of exemplary programs for planners, developers, administrators, and state officials to understand barriers, opportunities, and best practices. The robust resources and their rapid pace of deployment for energy efficiency programs demands up-to-date, quality data and information about leading program designs and results.

This review of exemplary state-led programs will help lay the groundwork for further, systematic research on all state-led energy efficiency programs. ACEEE hopes to broaden its annual State Energy Efficiency Scorecard to encompass state-led program spending and savings, and examine sub-sets of spending, such as state spending levels on Energy Saving Performance Contracting.

This report shares the advantages of specific models of state-led programs, but does not approach the important considerations a state must make in determining the appropriateness of state-led programs in the years ahead. As ARRA funding diminishes, states must decide on the proper role for state-led programs in the long term. For a thorough analysis of the advantages and disadvantages of utility, state-led, and third-party administered funding and administrative models, the U.S. Environmental Protection Agency's (EPA) *Clean Energy Funds Manual* provides an excellent primary resource (EPA 2008).

SOLICITATION OF PROGRAM NOMINATIONS

Beginning in January 2010, ACEEE openly solicited stakeholders in the private, public, and non-governmental sector at the federal, state, and regional level for nominations. The primary mode of communication about the call for nominations was via e-mail. ACEEE also used newsletters and conferences to disseminate the message. Using a robust set of contacts from its internal database, ACEEE attempted to contact any state-level stakeholder involved in energy efficiency programs. The call for nominations circulated throughout the energy efficiency community from different groups such as the EPA State and Local Climate Program, the National Association of State Community Service Programs (NASCSP), and the National Association of State Energy Officials (NASEO). The nomination deadline was March 16th.

Program Eligibility

A “state-led program” includes any energy efficiency program run by a state institution or agency. Programs targeting any customer sector were considered eligible, including:

- Residential
- Public Sector
- Commercial
- Industrial
- Workforce Development
- Low-Income
- Agriculture
- Transportation and Planning
- Research, Development & Demonstration
- Cross-Cutting/Other

The nomination form noted that programs would only be considered if they achieved success beyond standard practice in their category. State programs offered nationwide such as the Weatherization Assistance Program and State Energy Program would only be considered if they presented innovative models and achieved unprecedented results. Nominations could be submitted by personnel directly involved with a program or from others familiar with the program.

ACEEE attempted to create a framework that would allow state governments to be recognized for outstanding achievement in energy efficiency program delivery. In some cases, state governments

delegate the responsibility for energy efficiency program administration to third parties, as is the case in Wisconsin, Oregon, and Vermont. The third-party program administrators (Focus on Energy, Energy Trust of Oregon, and Efficiency Vermont) in these three states were deemed ineligible for this national review because they receive funds directly through ratepayers and therefore are more readily defined as utility-sector programs than governmental programs. Similarly, utility programs operating with oversight from state utility commissions or independent bodies were ineligible as well. ACEEE applauds the robust efforts of these states despite their exclusion from this report. Programs from these operators were awarded in the last Compendium of ratepayer-funded energy efficiency programs and will again be eligible for the next iteration of that report.

In some instances, state agencies accept ratepayer funding to support their energy efficiency activities. Stakeholders noted this caveat mid-way through the call for nominations and resulted in ACEEE amending its eligibility requirements in order to recognize the important role state governments play as program administrators. The original criteria for eligibility required at least 20% of funding to come from sources other than utility rates. We removed this requirement when it became clear that it prohibited exemplary state-led programs from entering the competition. In order to ensure the clarity of the amendment, ACEEE extended the deadline and replicated the call for nominations it had completed weeks before. States that use ratepayer funding were contacted directly to make them aware of the change, including California, Minnesota, Illinois, Maine, New Jersey, and New York.

Criteria for Recognition

Adopted from the previous ACEEE program awards, the key criteria for recognition by ACEEE are:

- Direct Energy and Emissions Savings and Other Benefits: Demonstrated ability of the program to deliver significant immediate and long-term kWh and kW (and/or therm, fuel) savings from energy efficiency. Demonstrated emissions savings or other benefits were also factored into this criterion.

- Market Impacts: Demonstrated ability of the program to produce desirable and lasting improvements in the energy efficiency characteristics and performance of the targeted market.

- Cost-Effectiveness: Demonstrated ability to yield significant energy savings and related benefits relative to the costs of the program.

- Customer Service and Satisfaction: High quality of services available and provided to customers participating in programs.

- Innovation: Incorporation of particularly innovative designs and/or implementation techniques that have achieved positive near-term results and promise significant future impacts.

- Transferability: Well-documented programs with characteristics amenable to replicating the program design in other similar settings.

EXPERT PANEL REVIEW AND SELECTION

ACEEE compiled nominations and presented them to a panel of expert judges. The panel included: Stefanie Aschmann, USDA Natural Resources Conservation Service; Brian Castelli, Alliance to Save Energy; Niko Dietsch, U.S. Environmental Protection Agency; George Edgar, Wisconsin Energy Conservation Corporation; Sonia Hamel, independent consultant; and David Terry, National Association of State Energy Offices. While the panel initially used a rough scoring system as a means to help rank and select programs, the decisions to select a program for one of three awards (“award

winner," “honorable mention," or “emerging program”) were all reached through discussion and consensus.

After an initial first round of scoring, the panel assembled on a conference call to discuss the program nominations. The experts constructively analyzed the programs, adding insight to familiar programs and seeking clarification or comment on unfamiliar ones. ACEEE staff conducted additional research on programs as necessary to supplement the information provided in the program nominations. ACEEE staff also categorized programs and guided the panel discussion to compare programs that targeted similar customer sectors or technologies in order to make “apples to apples” comparisons.

The panel took the findings of the first call to inform a second round of scoring. After the second round, the panel assembled for a second call to discuss their final determinations. The objective of the panel’s selections first and foremost was to select those programs the experts felt merited recognition for achievements that offered excellent models for emulation and replication by others.

A secondary objective of the expert panel was to present a set of programs that covered numerous customer sectors and were diverse in their administrative models, funding sources, and type of program. While the expert panel hoped to achieve a diverse set of programs, the ultimate test for selection of each program was that it had to merit selection as an exemplary program in the perspective of the panelists.

RESULTS

ACEEE received forty-two nominations, a satisfactory response to its call for nominations. Given that this is the first attempt by ACEEE to award energy efficiency programs run by state institutions, we are encouraged that our nomination pool was sufficient enough to determine and award exemplary programs confidently. Judging by the different program types and geographical dispersion of organizations and agencies nominating programs, we are confident the call for nominations reached a wide audience. A handful of nominations were deemed ineligible as they were utility programs with no involvement from a state agency or institution aside from the public utility commission. Our hope is that after this first review, program administrators will have a better idea of whether their programs fit our definition of “state-led programs” for the next iteration.

The quality of nominations was generally impressive to ACEEE staff and the expert panel. Most programs were run very competently and showed real success in improving energy efficiency. The strength of the pool of programs assures that those awarded will highlight some of the most promising and proven state-led models in existence today. In determining the difference between “exemplary programs” and “honorable mention," the expert panel attempted to distinguish programs’ track record of success, and also how the programs advanced innovative energy efficiency program models. Programs receiving “honorable mention” generally represent the best examples of common program models. In some cases, certain features or techniques that merit recognition, rather than the program overall, might have resulted in an “honorable mention” selection to highlight these features. A third category, “emerging programs," attempts to capture some programs the expert panel felt deserved some recognition as an innovative program type in early stages of implementation.

Analysis of Nominations

Aside from a few well-established programs, most nominations featured programs that began in the past 5-10 years, reflecting the new role for state governments in administering energy efficiency programs. Unlike utility programs running since the 1970s, state governments unevenly participated in the energy efficiency program sector until recently. The nominations and award winners thus contained both well-established and newly successful program models.

ACEEE received nominations from programs serving customers in 23 states. The Northeast submitted the most nominations, but every region had some representation in the nomination pool.

Aside from the Southeast, which only had two nominations, the distribution of nominations was generally even. This can be attributed to the even allocation of federal funds for state energy programs, which support a great deal of activity. The heavy concentration of nominations in the Northeast reflects the historical support for energy efficiency programs in that region and the collaborative approach taken by states and utilities, which often combine resources to offer programs funded by state and ratepayer funds.

In addition to a wide geographic diversity, nominations came from a diverse set of organizations utilizing different sources of funding. The administrators included:

- State energy offices
- Departments of general administration or services
- Air quality agencies
- Universities
- Housing departments or authorities
- Agricultural departments

State energy offices as a group nominated the most programs, while other administrators nominated in comparable numbers. Funding sources for nominated programs included state appropriations, DOE grants, ARRA, RGGI, ratepayer funds, and utility savings for ESPC programs.

The type of programs nominated varied widely, serving many sectors and offering a range of services. Programs target customers in virtually every sector: residential, commercial, industry, agriculture, transportation, institutional, and municipal. Many nominated programs target niche sub-sectors unique to state economies. Programs offer a broad range of services, including financial incentives, technical assistance, marketing, customized services, education, and training.

Key Features of Leading Programs

- While many are in their first decade of development, the approaches taken by state-led programs are delivering consistent, reliable savings for customers. Drawing on experience from utility programs and historically successful state programs, program managers and administrators are achieving significant energy savings that puts money back in the pockets of consumers to reinvest in local and state economies.

- Careful not to duplicate efforts and create unnecessary competition, leading programs coordinate with and leverage existing utility ratepayer funded programs to supplement the existing energy efficiency program landscape with innovative and effective offerings.

- Many programs leveraged significant private sector capital by requiring participants to pay some upfront cost if they receive technical assistance or services from the program. Even without an explicit cost-share requirement, many program dollars leverage significant investment simply by supplying information and recommendations on energy efficiency improvements.

- While state energy offices function as a vital entity in state governments' efforts to promote energy efficiency, many other agencies play important roles in administering energy efficiency programs. Particularly for programs covering public sector buildings, transportation, and industry, other agencies and institutions can run effective programs.

- Administratively, many successful programs can be led by one or two dedicated staff persons within an agency who coordinate resources and help collaborate with partners or contractors to administer programs. Programs also benefit from designated communications staff to brand the services and distribute information with an informed strategy.

Collaboration is critical

- Collaboration with other public sector entities is critical for programs to coordinate resources cost-effectively. Some leading programs partner with universities to take advantage of training and research or with other departments within the state government specific to the program's targeted sector.

- Collaboration with private sector stakeholders is imperative for programs to gain expertise and recognition in the sectors they assist. Many programs recognized for this project emphasized the importance of collaborating with businesses, utilities, and energy service companies to form partnerships and leverage the resources of these stakeholders.

- In practice, relationships with the private sector may take time to develop, but many programs collaborate by initiating personal meetings, conferences, and discussions to determine how to successfully utilize the program resources and complement existing energy efficiency programs.

- Many state programs use the help of third parties and contractors to conduct technical elements of programs, such as assistance with equipment or installation measures.

Energy tracking and data collection sets up success

- Some programs place a major focus on benchmarking and data collection to accurately capture the potential for energy savings for projects. Some programs that received awards are solely audit or benchmarking programs, highlighting the essential nature of this task. Particularly for public sector building programs, benchmarking energy usage is a critical element in supporting cost-effective energy efficiency improvements.

- Once a successful program completes an energy audit, follow-up tests or surveys take place to track and report on the implementation of energy efficiency measures and future energy consumption data. Tracking and reporting is critical to ensure program effectiveness.

- Benchmarking programs (i.e., those that track and report energy consumption data) can easily be complemented by, or evolve into, technical assistance programs and direct-install programs once the data allows for the identification of facilities where deployment would be most cost-effective.

Communications strategies produce program efficiencies

- Education and outreach to the targeted program customer is critical for success, but strategies vary widely depending on customer type. Many state programs target public sector facilities and in turn, public sector employees. Other targeted audiences include mid-market actors such as homebuilders, contractors, and retailers.

- Many innovative state-led programs target sectors unique to their state, such as agriculture or manufactured housing. In many instances, these sectors have little experience with energy efficiency programs and tend to have significant savings potential.

Types of state-led programs vary widely

- As with utility programs, state-led program models seek multiple objectives: market transformation (accelerating the market penetration of energy-efficient products and services) and resource acquisition (achieving direct, measurable customer savings). Many programs blend these approaches and seek both outcomes—fundamental changes in markets *and* direct, measurable energy savings.

- State programs achieve success by targeting sectors underserved by utility programs. In particular, utility programs are usually not as equipped to conduct public sector; industrial; and research, development, and deployment (RD&D) programs as they are for traditional residential and commercial building programs. In some cases, such as with oil-heated home retrofits, state-led programs can latch on to existing utility programs to offer more complete services.

- Training plays an important component of some programs, particularly in the institutional and commercial buildings where facility managers and employees may need education on how to incorporate energy-efficient practices into everyday routines.

Existing resources, aggressive policies underpin success

- Many state programs smartly utilize existing resources from the federal government. Technical resources and tools provided by the EPA and DOE are utilized consistently by programs recognized in this review. In particular, the EPA/DOE ENERGY STAR® program plays a prominent role in many of the state-led offerings. The ENERGY STAR Portfolio Manager is a widely used tool for benchmarking energy consumption in public sector facilities.

- Underpinning policy goals push programs to higher levels of achievement. A number of programs were developed in response to aggressive savings targets set by state governments for energy consumption in public buildings. Other goals and policies related to energy-efficient homes and transportation, and statewide energy consumption helped spur programs to improve performance.

CONCLUSIONS

Our review of state-led energy efficiency programs demonstrates that investments in cost-effective, energy-saving technologies and services improve economic competitiveness. Simply put, energy efficiency works. The programs detailed in this project reach diverse sectors—residential, commercial, transportation, industrial, agricultural, and institutional—and prove in each case that reducing energy consumption makes environmental and economic sense. These state programs benefit customers in numerous ways, generating significant energy savings, training thousands of professionals, providing technical assistance, and offering financial incentives for implementation. Aside from the direct benefits of each program, many programs spark innovation and help usher in more efficient technologies into the marketplace.

The political imperative attached to energy policy now requires our institutions to carry out programs, and whether mandated from the federal or state level, state energy offices, universities, and other state agencies have the capacity to step forward and fill this role. Many states have benefited greatly from tools and guidance from the federal government (i.e., EPA and DOE) and national organizations (i.e., NASEO and the National Governor's Association) to rapidly deploy energy efficiency in a cost-effective manner. This report intends to build upon these resources and highlight exemplary programs to provide helpful information for states intending to develop new or existing programs. The report offers states well-earned recognition for their efforts and shows the potential for state-led programs to save consumers energy and money by adopting cost-effective energy efficiency technologies and practices. As long as the federal government and states continue to make energy efficiency a policy priority, state programs like those highlighted here will serve as excellent models for years to come.

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APPENDIX

COLORADO ENERGY STAR NEW HOMES PROGRAM

Colorado Governor's Energy Office

Program Description

In April of 2007, newly elected Governor Bill Ritter, Jr. renamed Colorado's Office of Energy Management and Conservation as the Governor's Energy Office (GEO) and tasked it with advancing energy efficiency and renewable energy throughout the state of Colorado. Governor Ritter helped create a Clean Energy Fund, which directed nearly $7 million to the GEO to develop and implement energy efficiency and renewable energy programs in all sectors. The GEO's residential team designated a new and aggressive statewide ENERGY STAR New Homes (ESNH) Program for 2008 as its key energy efficiency strategy for Colorado's residential new construction sector.

The GEO began to assess the potential for a Colorado ESNH Program and designed a program implementation model for Colorado's stakeholders. The GEO gathered input from local government officials, individual homebuilders, trade associations, and HERS Raters, while surveying the state's existing green building programs and building codes. EPA's Region 8 ENERGY STAR Program Manager was a critical member in the planning process. Through this market assessment, several barriers to success were quickly identified:

- Aside from EPA's Region 8 ENERGY STAR Program Manager, there was not a clear local Colorado champion for an ENERGY STAR New Homes Program in the state.
- Colorado had reported relatively low ESNH market penetration for the past four years (2004 = 4.2%, 2005 = 5.7%, 2006 = 7.8%, and 2007 = 8.9%).
- There were numerous "green building" programs throughout the state; typically ENERGY STAR was only an optional component and lacked participation. The variety of programs also created confusion.
- As a home-rule state, Colorado had no consistent energy code requirements for its 329 code jurisdictions, suggesting that performance testing for new homes was not common practice.
- Several Colorado counties were in the process of designing voluntary green building programs, yet very few were collaborating or using a standard energy performance minimum.
- Colorado was home to highly qualified HERS Provider and HERS Rater companies, but most were only serving the larger metropolitan parts of the state.
- Colorado's building industry, as in much of the rest of the country, was starting to experience a significant reduction in production and sales.

Using resources provided by the EPA, such as the "Best Practices" guide for ESNH Program sponsors, the GEO created a strategic implementation plan based on the information it gathered in the preliminary market assessment. The plan outlined an innovative hub-and-spoke ESNH Program model to be directed and managed by the GEO but implemented regionally by multiple local governments, nonprofit organizations, and utility partners. Each regional program would have different goals, strategies, and local barriers to address but all would be based on a common Colorado ESNH platform. The GEO quickly scheduled presentations and meetings with County Commissioners, City Council Members, and Utility Managers to engage their support for a new GEO sponsored, regionally focused ESNH Program. The GEO focused on providing clear leadership and support for the development and implementation of local partnerships with the opportunity to customize local programs based on local conditions and needs. The GEO would provide support and resources to the local programs to increase the number of ENERGY STAR qualified New Homes built and purchased in their community.

In 2008, the GEO awarded up to $25,000 in matching grant funds to cities, counties, nonprofit organizations, and utilities to implement a regional ESNH Program. Each partnership identified a specific set of tasks to address key barriers, which ranged from marketing and outreach to training and education activities. Many of the tasks addressed critical statewide challenges but included strategies to address regional barriers as well. A majority of the activities targeted homebuilders, contractors and homebuyers in particular. An emphasis was placed on integrating the ESNH Program with local green building programs and utility demand-side management (DSM) efforts. Activities addressed various areas of implementation including homebuilder engagement, delivery of trainings, and marketing efforts.

The GEO based funding awards on three key components:

1. The regional partnership's capacity to implement an aggressive ESNH effort that would work best for their local market and align with existing efforts

2. The partnership's ability to develop additional relationships with stakeholders in their region

3. The partnership's ability to contribute matching funds for their local program

To roll out the programs, marketing campaigns became a key component of Colorado ESNH. Campaigns included more than 2,400 ENERGY STAR television ads and an additional 598 promotional ads. In early 2009 the GEO kicked off an effective statewide marketing campaign promoting ENERGY STAR New Homes through radio, television, and print. Around the same time, a stand-alone Web site, www.coloradoenergystarhomes.com, was launched to serve as a landing page for all marketing efforts. From this site, homebuyers, homebuilders, and local partners could navigate through program information and have easy access to various resources.

Program Performance

In 2008, thirteen regional ESNH Program partnerships were formed across Colorado. More than 46 partners including counties, cities, nonprofit organizations, and utilities were awarded matching funds. In total, the GEO issued $224,000 in grants and leveraged $329,000 in matching funds, combining for $553,000 in program funding. The GEO also assisted five of its ESNH Program Partners with securing additional financial support from the EPA. These partners all received $15,000 Outreach Grants for an ENERGY STAR messaging campaign. In 2008, the program delivered more than 50 ENERGY STAR trainings to over 900 individuals. Market penetration for ENERGY STAR Homes in Colorado more than doubled to a record 19.4%. The GEO estimates the program saved 11,181 MWh in 2009 and 1,028 MMBtu of natural gas, resulting in savings of approximately $2 million.

In 2009, eleven additional regional ESNH Program partnerships were established. More than 54 partners including counties, cities, nonprofit organizations, and utilities were awarded matching funds. Again, each partnership cited a specific set of tasks to address the challenges in their region. Activities focused on the same areas as the previous year but expanded to provide additional outreach to contractors, real estate professionals and appraisers. In total, the GEO issued $248,500 in grants and leveraged $465,700 in matching funds, combining for $714,200 in program funding. The GEO also assisted three of its ESNH Program Partners in securing additional financial support from the EPA for local outreach and messaging. The GEO registered over 70 new ENERGY STAR New Homebuilders, increasing its partner total to 356. All of these homebuilders were registered ENERGY STAR homebuilders with the EPA, many of which were actively engaged with stakeholders at the local level. The program also conducted 57 ENERGY STAR focused trainings, reaching over 1,880 attendees year to date.

Market penetration for Colorado has reached an all-time high of 32.7% through 2009. In that year alone, Colorado labeled 2,350 ENERGY STAR New Homes. The GEO estimates the annual utility bill savings of these homes to be than $880 a year each, or $2 million total. The GEO and its partners

were recognized for this program delivery model by earning the Partner of the Year 2009 Award from the EPA.

Lessons Learned

One of the initial challenges for program administrators was developing local awareness of the ENERGY STAR New Homes program. Some localities had already designed and implemented new homes programs for their constituents, which created some initial resistance to incorporating ENERGY STAR. To build awareness and support, ENERGY STAR program administrators traveled throughout the state meeting with local groups to discuss how ENERGY STAR New Homes can work with local programs by providing resources at the state level such as matching local funding with GEO funds. ENERGY STAR New Homes also found a niche in providing the energy component to existing green homes programs.

Two crucial activities for local partners have been bimonthly partner update conference calls and statewide partner visits performed by the GEO. Representation in the field has proved to be a positive and highly welcomed form of support. The GEO has placed a strong importance on being receptive to local partners' needs by providing the specific resources they need to ensure a successful program.

Additional milestones included the introduction of new financial incentives from the GEO. By engaging Xcel Energy, the state's largest investor-owned utility which serves approximately 70% of the state, GEO successfully aligned its gas DSM efforts with the ESNH Program. Along with a number of smaller utilities, rebates were offered to homebuilders who earned the ENERGY STAR label. For homes built in an area without a utility rebate, the GEO provided a fixed rebate opportunity of $300 per home. To accompany this offer, the GEO developed the Colorado ENERGY STAR Mortgage pilot program. The benefit offers customers a "discount point" that can be used to access a lower interest rate on a new home loan. The program yields savings on monthly utility bills and lowers monthly payments over the life of the loan, providing unparalleled savings. Funding for the discount point is split between the lender and the GEO. The ENERGY STAR Mortgage program is available to residents both with and without an applicable utility rebate. In its efforts to target industry representatives, the GEO also offers training for builders and contractors, and has assisted HERS Raters with the purchase of new energy auditing equipment.

Program at a Glance

Program Name: Colorado ENERGY STAR New Homes Program

Targeted Customer Segment: Residential New Construction

Program Start Date: January 2009

Annual Energy Savings: Estimated savings of 11,181 MWh; 1,028 MMBtu of natural gas in 2009.

Other Measures of Program Results to Date: Approximately $2 million in utility bill savings. Market penetration of ENERGY STAR New Homes increased from 8.9% in 2007 to 32.7% in 2009.

Budget: $714,200 in 2009

Funding Sources: $248,500 of State Energy Plan funding from the DOE leveraging $465,700 in matching funds for a total program budget of $714,200 in 2009.

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COMBINED HEAT AND POWER DEMONSTRATION PROGRAM

New York State Energy Research and Development Authority (NYSERDA)

Program Description

NYSERDA's research and development group runs the Combined Heat and Power (CHP) Demonstration Program as a competitive cost-share program. The program provides financial support for the permanent installation of CHP systems as demonstration projects. For a single site demonstration, NYSERDA may provide up to 50% of the project cost up to $2 million. Recently, NYSERDA added a Fleet Demonstration category in which NYSERDA may provide 30-50% of the project cost up to $4 million for the installation of CHP systems at multiple sites similar in load and layout that are under common control. The program also offers 50% of project costs up to $75,000 for re-commissioning studies and 75% of project costs up to $100,000 for market transformation/technology transfer activities. Demonstration projects are not limited by technology, fuel, or application, but must meet an evolving set of performance requirements, which currently include: a minimum design overall annual fuel energy utilization of 60% (Higher Heating Value), NOx emissions of less than 1.6 lbs/MWh, and the capability of providing power to priority loads during grid outages.

The program announces one solicitation each year, which includes several rounds with different due dates. For each round, a Technical Evaluation Panel (TEP) reviews and ranks all of the submitted proposals. The TEP consists of external and internal CHP experts. The highly ranked proposals found to be technically meritorious are then awarded co-funding. The most recent solicitation (PON 1241) had three rounds with the final due date in 2009. PON 1241 announced the availability of $25 million dollars, TEP received 42 proposals of which 26 were deemed technically meritorious, and NYSERDA management allocated $28 million to fund all 26 meritorious projects.

During the project lifecycle, NYSERDA provides technical and contractual support. Per the agreement, NYSERDA pays the contractor by way of a Milestone Payment Schedule. As the contractor meets major milestones and proves them to the satisfaction of the NYSERDA Project Manager, NYSERDA will pay that portion of the total award. To ensure that the project provides the all-important performance data once the project is completed, NYSERDA holds a portion of the funding for two years following the initial submittal of performance data. Each project site collects hourly performance data for a period of at least four years. The Web site chp.nyserda.org makes these data available to the public.

Program Performance

Once all the projects in NYSERDA's portfolio are constructed and fully operational, they will result in a peak reduction of 203 MW and an installed capacity of 138 MW. Due to the addition of absorption chillers at some sites, those projects are able to reduce electric load by shifting cooling away from electric chillers. As of December 2009, 59 installed CHP systems are seeing an annual savings of 109,461 MWh/year.

In 2009, the USEPA CHP Partnership estimated the program's operational projects saved 0.141 million metric tons of carbon equivalents, which is equivalent to removing the emissions of 28,446 passenger vehicles. Although the CHP Demonstration Program is not run as a peak load reduction program, a considerable amount of peak load reduction occurs because of the program. Presented in terms of incentives paid per peak kW reduction achieved, based on the portfolio average for all of NYSERDA's CHP Demonstration projects, NYSERDA is seeing an average of $390 per peak kW reduction.

There are currently 107 sites within NYSERDA's portfolio; 65 of those sites, embodied in 59 projects, are operational. Of the 107 sites, over 53 have stand-alone capability, 8 are deemed Facilities of Refuge by their County Emergency Management Office, and 25 are considered to be critical

infrastructure. NYSERDA continuously pushes the envelope of system performance. The program offers incentives for a variety of CHP systems that strengthen energy reliability and continuity since stand-alone capable CHP systems have proven to be more reliable than emergency backup generators. NYSERDA recognizes that stand-alone operations present greater challenges for interconnection with the grid, particularly in dense urban environments; therefore, the CHP Demonstration Program addresses this challenge head on. For example, New York's Madison Oneida BOCES was the first installation of the Tecogen Premium Power Module at a customer site. The Tecogen Premium Power Module offers a potential solution for grid-connected systems that also have stand-alone capability.

Being a research and development effort, NYSERDA's CHP Demonstration Program also focuses heavily on educating the market about CHP systems. Since the inception of the program in 2000, NYSERDA has funded over 30 studies, hosted and/or sponsored seven conferences dedicated to CHP technologies, and posted hourly performance data for operational projects on chp.nyserda.org.

NYSERDA has received several prior awards for the CHP Demonstration Program. Eighteen projects have obtained the EPA ENERGY STAR CHP Award. NYSERDA's CHP Demonstration Program has received recognition from the USEPA CHP Partnership for emissions reductions in the years 2006, 2007, 2008, and 2009.

Lessons Learned

NYSERDA has learned a lot since the inception of the program in 2000. Most of the lessons fall under three categories: programmatic, technical, and market.

NYSERDA and its staff learned that in order to best serve the marketplace, and for the Technical Evaluation Panel to effectively review proposals, it had to offer multiple rounds of each solicitation per year. Offering multiple rounds resulted in a higher quality of proposals and gave reviewers a better opportunity to effectively score and rank each proposal. Another programmatic lesson involved the implementation of the Fleet Program. NYSERDA learned the importance of establishing long-term partnerships in order to achieve economies of scale. If a supermarket installs a system, this can inspire the supermarket chain to install the same system at its other similar locations more cost effectively.

NYSERDA learned that CHP systems that operate during grid outages provide benefits to the site beyond that provided by a traditional back-up generator. During the August 2003 blackout, most back-up generators at sites of critical infrastructure did not perform as expected and caused serious issues with business continuity and public safety. Another technical lesson learned is that pre-engineered, factory-assembled systems are more cost effective and may be more reliable than systems that are custom designed and assembled on-site. Lastly, one of the most important technical lessons that NYSERDA learned is how to protect the grid and synchronous parallel interconnected systems during a fault. NYSERDA's project at the New York Presbyterian Hospital in New York City solved this issue by using a "pyrotechnic fuse" that is capable of isolating the site from the Con Edison grid in 1/240th of a second (faster than the blink of an eye). Con Edison deemed this protective device acceptable as a universal technique that any CHP project can use to gain synchronous-parallel interconnection approval from Con Edison.

As NYSERDA gained experience with CHP systems in New York State, it became apparent that improved and standardized standby tariffs and interconnection procedures would be necessary to enable the growth of the CHP market. NYSERDA partnered with the New York State Department of Public Service and State Utilities to develop procedures and tariffs that facilitate the installation of CHP systems at sites across New York. Several of NYSERDA's projects were used as the basis to assess the need for and impacts of improved standby tariffs and interconnect requirements.

Program at a Glance

Program Name: Combined Heat and Power Demonstration Program

Targeted Customer Segment: Commercial, Industrial, Public Sector, Institutional, Multifamily facilities.

Program Start Date: 2000

Program Participants: 146 active participants, (including 101 demonstration projects), 26 technology transfer projects, and 19 feasibility studies.

Annual Energy Savings Achieved: As of December 2009, 59 installed CHP systems are showing savings of 109,461 MWh/year.

Peak Demand Savings Achieved: Once all the projects in NYSERDA's portfolio are constructed and fully operational, they will result in a peak reduction of 203 MW.

Other Measures of Program Results to Date: Once completed, projects will result in installed capacity of 138 MW.

Budget: $28 million awarded in 2009. NYSERDA was allocated $84 million to administer the CHP Demonstration Program from July 2006 to June 2011.

Funding Sources: Systems Benefit Charge (SBC) collected and administered by New York's Department of Public Service

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WASTEWATER EFFICIENCY PROGRAM

New York State Energy Research and Development Authority (NYSERDA) and New York State Environmental Facilities Corporation (NYSEFC)

Program Description

The New York State Energy Research and Development Authority (NYSERDA) and the New York State Environmental Facilities Corporation (NYSEFC) jointly administer the Waste Water Efficiency Program (WWEP). The primary focus of the WWEP is to promote the inclusion of energy efficiency technologies into wastewater infrastructure projects, which receive funding administered by NYSEFC through New York State's Clean Water Revolving Loan Fund (CWSRF) and the American Recovery and Reinvestment Act of 2009 (ARRA). By combining the existing capabilities of the two state organizations, the WWEP delivered energy efficiency services within the time constraints associated with ARRA funding.

ARRA resulted in significant funding increases directed to the public sector through NYSEFC and placed a new emphasis on energy efficiency through the Green Project Reserve requirements. ARRA required that at least 20% of the funds be used for water efficiency, green infrastructure, environmentally innovative, or energy-efficient efforts; this 20% of the funding was designated as the Green Project Reserve. NYSERDA received additional funding from the Regional Greenhouse Gas Initiative (RGGI) in New York State. With the increased funding came aggressive implementation schedules concurrent with ARRA funding. In recognition of this unprecedented opportunity to deploy energy efficiency within the waste water infrastructure of New York State, NYSEFC and NYSERDA collaboratively developed the WWEP.

Unlike the building sector in which the Building Energy Code establishes a baseline for energy use, no similar baseline existed for the water and wastewater sector. Existing research conducted throughout the United States and the findings of a Statewide Energy Assessment completed by NYSERDA were combined to develop a Baseline Standard Practice representative of New York State's water and wastewater sector. NYSERDA's Flexible Technical Assistance (FlexTech) consultants then evaluated projects for energy efficiency identified by NYSEFC. The baseline standard practices served as a basis of comparison to identify the relative energy efficiency of proposed designs and opportunities for additional energy efficiency measures.

The projects reviewed include significant renovations of existing and new municipal-owned wastewater plants, which resulted in increased treatment capacity and/or increased treatment levels. The focus of the design review was twofold: evaluating energy-efficient components compared to a baseline; and identifying potential energy efficiency opportunities to incorporate into projects. The FlexTech consultant identifies energy efficiency opportunities and estimates the energy and energy cost savings and installation costs. The results of the evaluations are then provided to the community's design consultant, who may modify designs to include some or all of the recommended energy efficiency measures.

Program Performance

The WWEP has been administered for less than one year. However, the findings to date have been very promising. The WWEP provides an excellent framework for rewarding energy-efficient design, promoting inclusion of energy efficiency technologies, and creating cultural change within the sector to focus on the life-cycle cost of infrastructure improvements rather than focusing exclusively on the up-front capital costs. Due to strict time constraints associated with the administration of ARRA funds, many of the projects that received energy evaluations had designs that were almost finalized. However, with the continuation of the Green Project Reserve requirements, for the Federal Fiscal Year (FFY) 2010 CWSRF capitalization grant, greater opportunity will be available to begin the energy review process during early stages of project design and maximize the opportunity for including additional energy efficiency measures.

During 2009, the designs for 25 capital projects with an estimated project cost of $421 million were reviewed in less than 6 months. More than 16,100,000 kWh/year and nearly 53,000 MMBtu/year in savings were identified (when compared to the baseline standard practices that could have been used to achieve the treatment objectives). Every dollar spent on energy evaluations helped leverage an anticipated $3.60 of annual energy savings for customers when compared to the energy use of the Baseline Standard Practice for relevant treatment processes.

The collaboration established between NYSEFC and NYSERDA should ensure many of New York State's future wastewater infrastructure projects will consider energy efficiency during the design phase. By drawing upon its existing pool of qualified FlexTech consultants, NYSERDA quickly and efficiently completed the energy evaluations. The results of these energy evaluations led to the development of technical memoranda, which NYSEFC used to solicit approval of the projects for Green Project Reserve funding from the EPA.

The NYSEFC used the findings of these energy evaluations to secure approval from EPA for over $98,000,000 of Green Project Reserve funding (a subset of ARRA funding only to be used for providing financial incentives aimed at implementation of energy efficiency and "Green" projects) to support implementation of these projects. With a program budget of $720,000, every dollar spent on energy evaluation helped leverage $135 of implementation incentives in the form of Green Project Reserve Funding through ARRA. The program model is suitable for use by other teams of state organizations with diverse skill sets and common goals. The Baseline Standard Practices can be used as a starting point for all states, with adjustment based on local conditions and treatment requirements.

Lessons Learned

- Statewide assessment is essential to identify the most cost-effective projects.
- ARRA funding was instrumental in providing incentives for municipalities to adopt and incorporate the identified energy efficiency measures into the approved design documents.
- The implementers stressed the importance of engaging municipalities and their design teams as early in the process as practical.
- Two state organizations with different funding can pool their areas of expertise to maximize the benefits for their citizens.

Program at a Glance

Program Name: Wastewater Efficiency Program **Targeted Customer Segment:** Wastewater treatment facilities (~700 statewide) **Program Start Date:** May 2009 **Program Participants:** 25 projects received Green Project Reserve funding for energy efficiency. **Annual Energy Savings Identified:** 16,100,000 kWh/year and 53,000 MMBtu/year	**Other Measures of Program Results to Date:** 25 projects with a total estimated construction cost of $421 million were evaluated. Every dollar spent on energy evaluation helped leverage $135 of implementation incentives in the form of Green Project Reserve Funding through ARRA. **Budget:** $720,000 in 2009 **Funding Sources:** Regional Greenhouse Gas Initiative (RGGI) proceeds, Recovery Act **Best Person to Contact for Information about the Program:** Mark Decker NYSERDA 518-862-1090 ext. 3494 md3@nyserda.org

HAWAII LEAD BY EXAMPLE PROGRAM

Hawaii State Department of Business, Economic Development and Tourism (DBEDT)

Program Description

An Administrative Directive prompted by and signed by Governor Linda Lingle established Hawaii's Lead by Example Program in 2006. The Directive, which the 2006 Legislature codified into statute, recognized the vulnerability of the state to volatile oil prices, growing energy demand, and increasing costs of state operations. The Directive ordered agencies to commit to the implementation of innovative and resource-efficient operations and management techniques. In 2008 the state of Hawaii and the U.S. Department of Energy (DOE) signed an unprecedented Memorandum of Understanding that established the Hawaii Clean Energy Initiative (HCEI), which set a goal of 70% clean energy use by 2030. The HCEI added momentum to LBE and assisted the LBE program with further technical assistance from DOE.

In its initial phases, agency representatives formed an LBE Leadership Group composed of high-level representatives of executive departments and the University of Hawaii. Three working groups support the leadership group, which address buildings, transportation, and environmental practices and procurement areas. In the first stages of the program, each working group developed plans and recommendations, which the leadership group reviewed.

Each state executive agency has representation in the LBE leadership and working groups, which meet quarterly to exchange information and discuss overall direction. The leadership group members ensure efficient communication and commitment to developing effective policies and plans for each department. The effort is led by the four largest agencies in terms of energy consumption: the University of Hawaii (27.5%), the Department of Education (21%), the Department of Transportation – Airports (19.5%), and the Department of Accounting and General Services (7%). Other partners of the LBE Initiative are of a wide variety and include the Hawaiian Electric Company (HECO), Environmental Protection Agency, the Hawaii State Procurement Office (DAGS), Cadmus Group, ENERGY STAR®, the State Public Utilities Commission, the Hawaii State Legislature, and Hawaii Energy.

Act 207 of 2008 gave new responsibilities to the Director of the Department of Business, Economic Development and Tourism (DBEDT) as the state's Energy Resources Coordinator. Under this role, DBEDT administers and facilitates the LBE Program. The program has one full-time staff supported by other DBEDT staff, as well as student interns. Executive agencies also continue to train their personnel in subjects such as building commissioning, performance contracting, financing, green building design and construction, energy-efficient equipment, green purchasing, and photovoltaics. DBEDT offers technical assistance in building energy audits, indoor environment testing, performance contracting, retro-commissioning, the ENERGY STAR Portfolio Manager benchmarking tool, and environmentally preferable purchasing. DBEDT also collects data on electricity consumption, cost, and demand-side management measures.

In 2006 the LBE program established baseline data for kWh consumption for all state agencies to measure progress. In 2008 all agencies agreed to allow DBEDT to collect and analyze electric utility data for each agency directly from HECO. Since the program's inception, the type of data collected has grown to include electricity cost data, building specifications, indoor environmental measures, and the implementation of efficiency measures. Analysis of the data is undertaken by the Strategic Industries Division (SID) and Research and Economic Analysis Division (READ) of DBEDT.

To track the progress of the LBE program, DBEDT provides an annual report to the Hawaii State Legislature outlining agency activities and quantifiable metrics. Each participating agency may detail their activities to be included in the LBE report. The LBE report is a combination of quantitative data and qualitative agency narrative. The full *Report to the 2010 Hawaii State Legislature—Lead by Example* can be accessed at: http://hawaii.gov/dbedt/info/energy/efficiency/state/lbe/stateemployees.

Program Performance

As a result of the Administration's LBE program, during fiscal year 2009, total state agency electric consumption dropped 5.8% from 2008 and 2.5% from the baseline year of 2005. The decline represents the largest single-year decrease since the LBE program began in 2006, and the first time that overall consumption has been lower than the 2005 baseline levels. The cost savings resulting from these efficiency gains are tremendous due to the 57.4% rise in energy costs from 2005 to 2009. It is estimated that the savings in 2009 electricity consumption translated to savings of $10 million in general funds.

Hawaii is one of the top states in the nation for performance contracting investment per capita. The State's Department of Accounting and General Services (DAGS), which manages and services over 150 state buildings, has entered into an energy savings performance contract for ten downtown state office buildings, including the State Capitol. DAGS expects these projects to save over 6.3 million kWh of electricity per year, reducing utility bills by 30%, which equals approximately $3.2 million per year in operational savings. DAGS is in the process of executing a Phase 2 performance contract, which will cover the remainder of their building portfolio.

Six state buildings have received ENERGY STAR labels, acknowledging that they rank in the top 25% of similar buildings nationwide in energy performance. As part of a new benchmarking requirement (discussed below), agencies are reviewing buildings to re-certify existing buildings and to identify new buildings for labels. Six state buildings are LEED® certified. An additional 52 LEED projects are in the process of obtaining certification. The Department of Education and the University of Hawai'i now design and construct all new buildings to meet LEED Silver standards. There are now 20 LEED Accredited Professionals (AP) in state government. This number has grown considerably since 2005, when there was one LEED AP.

Act 155 passed in 2009 requires all public facilities to be benchmarked using ENERGY STAR Portfolio Manager by the end of 2010. Benchmarking is still underway, but 56 state facilities have already been benchmarked. Benchmarking provides building managers and owners with an analysis of their building's energy profile and allows for comparisons across a large set of similar buildings, so that good candidates for implementation of efficiency measures can be easily identified. Improved facility energy profile information should improve decision-making and drive even greater efficiency in state buildings.

While the focus of this award falls on energy efficiency, it should be noted that the Hawaii LBE Program facilitates the deployment of renewable energy as well. The University of Hawaii—Hilo is in the process of installing over 230 kW of photovoltaic (PV) solar capacity. The Department of Transportation's (DOT) Airports Division executed a power purchase agreement to install photovoltaic systems with a combined capacity of 875 kW as part of the Department's Photovoltaic Energy Systems Project. The new renewable energy generation systems will reduce operating costs by obtaining a stable rate for electrical power that is independent of price fluctuations caused by changes in oil prices. This significant and long-term investment in renewable energy sources will further reduce the state's carbon dioxide emissions as well.

Lessons Learned

The Lead by Example Program relies upon two important components for success: the partnerships forged within state departments and between the public and private sectors; and the support offered to agencies in the form of technical assistance and training. Agencies openly share experiences, recommendations, and documents produced in the process of implementing efficiency measures. Quarterly working group meetings facilitate this exchange. The program's emphasis on partnerships creates an atmosphere of collaboration, rather than competition, which DBEDT believes will be critical to continued long-term success.

The agencies receive support in the form of training, education on the value of the LBE program, and technical assistance. DBEDT provides much of the technical assistance, but the program found it valuable to have agencies take the lead on each project. This support structure has been critical to enabling agencies to learn about opportunities and taking steps to implement them.

The DAGS performance contract project demonstrates how both partnerships and support have helped make LBE an effective program. When DBEDT introduced the concept of performance contracting statewide, it began by providing technical assistance and training staff at the DAGS to transfer primary program responsibilities to DAGS. This initial partnership served as the model for future inter-agency collaborations. DAGS and DBEDT now offer trainings to other agencies for performance contracting and supply model documents. As a result of this established model of technical assistance and collaboration, the Department of Transportation and UH Community Colleges now execute their own performance contracts.

Program at a Glance

Program Name: Hawaii Lead by Example

Targeted Customer Segment: Government executive agencies

Program Start Date: May 2006

Program Participants: All 26 state departments and executive agencies

Annual Energy Savings: 16,970,000 kWh in FY09, or 2.5% below 2005 baseline

Other Measures of Program Results to Date: $10 million saved annually. Six LEED certified state buildings, 52 pending. Six ENERGY STAR certified buildings. 56 buildings benchmarked.

Budget: Initial investment of $500,000 in FY 2007. Approx. $100,000 annually.

Funding Sources: State appropriations

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MARYLAND STATEWIDE FARM ENERGY AUDIT PROGRAM

Maryland Energy Administration

Program Description

The Maryland Statewide Farm Energy Audit Program offers a mix of energy audits, technical assistance, and cash incentives for Maryland agricultural producers. The technical assistance offers customized calculations to farmers who have a new and innovative technology, or a project that is outside the realm of the program's equipment specifications. This is the third program cycle of two earlier programs. The Maryland Farm Energy Audit Program Phase I served farmers in two eastern Maryland counties and provided audits only; Maryland Farm Energy Audit Program Phase II served farmers in five western Maryland counties with audits and some funds for incentives; and Maryland Farm Energy Audit Program Phase III serves all producers statewide and offers audits, technical assistance, and incentives.

The Maryland Energy Administration administers the program through a grant to Eastern Shore Resource Conservation & Development Council, which in turn contracts with EnSave, Inc., a firm with a 19-year history of delivering farm energy efficiency programs. EnSave's role includes marketing, farmer enrollment, delivery of energy audits and technical assistance, delivery of incentives, tracking, and reporting.

This is a robust program with many program partners, including the USDA Natural Resources Conservation Service, USDA Rural Development, Maryland Department of Agriculture, Maryland Association of Soil Conservation Districts, Sustainable Agriculture Research & Education, Western Maryland Resource Conservation & Development Council, and Washington County Soil Conservation District. These program partners help promote the program offering to their constituents and help connect participants to other sources of funding they administer.

The program began in 2007 when USDA Natural Resources Conservation Service (NRCS) wanted to provide energy audits to farmers who had signed up to receive them through the Conservation Security Program (now called the Conservation Stewardship Program). Lacking a local contractor to do the work, NRCS worked with the Eastern Shore Resource Conservation & Development Council to hire EnSave, Inc. to provide the audits. The effort attracted the attention of the Maryland Energy Administration as well as the Maryland Department of Agriculture, both of whom lent financial and programmatic support. Twenty-five energy audits, funded by NRCS, Maryland Energy Administration, and Maryland Department of Agriculture, were completed during the first phase of the program.

In 2008, the Maryland Energy Administration, the Natural Resources Conservation Service and the Maryland Department of Agriculture funded a more comprehensive program, which extended the reach to five dairy-intensive counties in Western Maryland. Because producers were not pre-identified, this second phase included a marketing and outreach component to enroll farmers, and offered incentives to farmers who received audits. This program provided 75 energy audits, and 75% of those audited moved forward to install equipment.

Because of the success of Phase II, in 2009, the program expanded yet again, this time funded wholly by the Maryland Energy Administration with its Regional Greenhouse Gas Initiative (RGGI) funds. So far, the program is on track to achieve its goals of 2.4 million kWh savings, 50,000 gallons of propane, 200 technical assistance reports, and 100 energy audits.

Thus far during Phase III, the program has completed energy audits on 26 operations and technical assistance for an additional six operations around the state. At this time, approximately 38% of those audited during Phase III have moved forward with a project on their operations. That number is expected to increase as the program moves forward.

The program identifies multiple cost-effective opportunities for several dairy, poultry, grain, greenhouse, horse, and beef farms across the state in order to help improve the efficiency of their operations and increase the sustainability of their businesses. Many of Maryland's dairy farms have significantly reduced their electric loads by making improvements to their milk harvesting and milk cooling systems. For example, they have installed variable speed drives (VSD) on vacuum pumps to reduce electricity used to pump milk and/or installed pre-coolers that use ground temperature well water to cool milk down as much as possible before relying on refrigeration systems to continue cooling and maintaining milk at its target temperature.

Poultry farms across the Eastern Shore of Maryland significantly enhance the efficiency of their houses by adding more insulation to ceilings and walls, upgrading to more efficient radiant tube heating instead of forced hot air systems, and installing electronic controls. Each of these improvements in poultry houses can save a significant amount of propane annually, and farmers will benefit from not only the reduction of propane bills but can also see an increase in bird health and production benefits.

Program Performance

The Maryland Statewide Farm Energy Audit Program demonstrates the success of a multi-stakeholder program to deliver an energy efficiency programs to an often-underserved sector: agriculture. To date, the program has saved 1,789,422 kWh, 27,189 gallons of propane, and 52,800 MMBtu. Using an average cost of electricity at $0.0125 per kWh, an average cost of propane at $2.75 per gallon, and an average cost of natural gas at $9.31 per 1,000 cubic feet, it is estimated that this program has saved approximately $578,726 in energy costs for Maryland's agricultural producers annually. Critical for climate policy discussions, this program illustrates how states can use RGGI funds to implement energy efficiency programs for all fuels, not just electricity, to reduce energy costs for businesses consumers affected by a cap on carbon.

The involvement of state agencies, state offices of federal agencies, private industry, and nonprofit organizations shows what can be achieved when many areas of expertise come together to deliver a program. By working with branches of the USDA, Maryland Energy Administration is helping fulfill those agencies' energy goals while leveraging their support for a state energy program. This process of collaboration helps all parties involved address their energy efficiency mission, while also delivering a superior experience for the farmer.

Program information has reached nearly every agricultural producer in Maryland by leveraging the outreach support of the program partners. EnSave has also directly reached out to equipment manufacturers, equipment dealers, agricultural community members, and farmers. Thus, the program has affected upstream, midstream, and downstream market actors.

The technical assistance available for custom measures lends help to producers interested in new or innovative technologies. The program also captures renewable energy interest at the time of the audit, which is then passed along to Maryland Energy Administration's renewable energy program.

This program is easily transferable to other states, especially states that have access to auction funds from greenhouse gas allowances. By working with the USDA agencies, Maryland Energy Administration has tapped into a source that can help promote an agricultural program and also leverage funding. This program exemplifies how a program can have a local presence through the involvement of local and state organizations, while being managed by a contractor with national expertise in the area of program focus.

Lessons Learned

Throughout the four-year history of the program, EnSave notes particular advantages to making this program available statewide rather than in specific regions. Partners from the agricultural community

are much more likely to promote a program if they know all producers they represent are able to participate. The three phases of the program demonstrated the importance of engaging traditional trade allies (manufacturers and equipment dealers) as well as the agricultural community. Each year of the program brings new partners into the fold. The partnerships help with marketing efforts, as producers are more likely to take a second look at an offering when they see familiar organizations sponsoring the program. Recognizable logos on the program flyers and application help legitimize the program for producers who might otherwise be skeptical. In addition, placing a minimum energy consumption requirement for program eligibility allowed the program to allocate resources in a more efficient manner. Finally, the implementers learned the importance of developing its audit program comprehensively. This includes marketing, audits, technical assistance, and—most importantly—installation incentives. Participants in the program are much more likely to move forward with audit recommendations if incentives are available on the backend.

Program at a Glance

Program Name: Maryland Statewide Farm Energy Audit Program	**Budget:** 2009-2011: $900,000; total funding for all three programs is $1,137,000.
Targeted Customer Segment: Maryland agricultural producers	**Funding Sources:** Regional Greenhouse Gas Initiative
Program Start Date: First phase began in 2006	**Best Person to Contact for Information about the Program:**
Program Participants: 103	Chris Rice Program Manager
Annual Energy Savings: 1,356,027 kWh, 12,123 gallons of propane, and 52,800 MMBtu of natural gas captured in Phases 1-3.	Maryland Energy Administration 410-260-7207 crice@energy.state.md.us
Other Measures of Program Results to Date: 75% of those audited moved forward to install equipment in 2008.	**Program Web Site:** http://www.ensave.com/maryland-statewide-farm-energy-audit-program.html

ALASKA HOME ENERGY REBATE PROGRAM

Alaska Housing Finance Corporation

Program Description

In response to the run-up in oil prices in early 2008, Alaska's legislature authorized a major ramp-up to a former Home Energy Rebate program administered by the Alaska Housing Finance Corporation (AHFC). The program allows rebates of up to $10,000 based on improved efficiency and eligible receipts. Energy ratings are required before and after the home improvements to provide expert advice and to track savings. Since the legislature wanted participants to be invested in the program, individuals were required to pay upfront for improvements before being rebated. The legislature allocated a total of $160 million to the program. Additionally, allocations were developed for different regions of the state to ensure appropriate distribution of funding based on climate, population, and energy costs.

In a little over a month, AHFC finalized and rolled out the expanded weatherization program and the new Alaska Home Energy Rebate program. AHFC utilized its existing resources, including well-developed energy rating software (AkWarm) for analyzing homes, a number of experienced home energy raters, and experienced building science trainers. To make residents aware of the program, a postcard was sent to every resident in the state directing them to Web-based information and a central information toll-free number. AHFC generated additional press and gave presentations for groups and the media regarding the programs.

In the initial rebate plan, raters would be reimbursed directly by AHFC up to $325 for the "before" rating on a home and $175 for an "after improvement" rating on the home in addition to the rebate amount. However, just days before the program launch, AHFC modified the approach due to liability issues. Instead, energy raters charged the customer, and AHFC reimbursed the customer the above amounts. This solution enabled the program to continue forward on schedule without months of delay.

After the initial rating, which includes a blower door test, the software generates an "improvement options" report and provides the client with a customized list of eligible improvements, with unique points for each improvement. The rating software provides a unique snapshot of home energy use, providing homeowners with information to allow them to make informed choices on what improvements to pursue. The maximum rebate is $10,000.

In less than 2 years since the program began, all funds are fully encumbered for potential rebates pending the successful completion of improvements in 18 months. As some participants' 18-month timeline expires, the encumbered funds will roll back into the program so more individuals have the opportunity to participate.

Additionally, AHFC coordinates its home improvement program with a program for newly constructed 5 Star Plus homes, which provides a $7,500 rebate for the home purchaser. This program uses the same pot of money as the retrofit rebate program and pushes the market to the next level of efficiency.

Program Performance

The rapid deployment and speed of implementation constituted the program's first major success, demonstrating AHFC's capacity for flexible corrective action in resolving program problems. AHFC utilized experienced personnel from within and outside of the organization, and enlisted key industry partners to assist in program implementation.

As of June 1, 2010, the program counts over 22,000 participants who have had an initial energy rating and applied for a rebate. Approximately 70% of all individuals receiving an initial rating follow

through with the program and receive a rebate. Those participants spend $10,500 on average on improvements, receive a rebate averaging $6,100, and achieve projected annual energy savings of $1,400 and a 30% reduction in energy use. As of June 2010, AHFC paid out almost 6,000 home rebates for improvements totaling approximately 525,000 MMBtu of energy saved. The average retrofitted home saves 95 MMBtu annually and cuts carbon emissions by 12,000 lbs per year. Additionally, AHFC paid out 720 rebates for new 5 Star Plus homes, spurring the construction industry to adopt energy-efficient practices.

The program raised awareness of energy efficiency and jump-started energy efficiency education for both consumers and professionals—the energy rating data provides a plethora of useful statistics on Alaska's housing characteristics and energy use. Additionally, having individuals pay "up front" and encumbering funds for 18 months to assure rebate payments creates a mindset of responsibility and security for those interested in investing in their home.

Lessons Learned

Customer feedback was critical in improving the functionality of this program. Initially, customers called energy raters to schedule an energy rating, which quickly resulted in overwhelming available raters and frustrating customers. AHFC implemented a centralized call center and waitlist to dispatch energy raters to customers in an orderly fashion. Individuals now sign up online or by phone for a rating and can check their place on the waitlist. When an individual's name gets to the top of the list, the call center dispatches a rater. When the rater calls to make the appointment, if the individual does not like the fee quoted by the rater, they re-contact the call center and request a different rater. (The client's name does not drop on the list for doing so.)

Initially participants had 12 months to complete work and have the follow-up energy rating. However, this was soon extended to 18 months to allow people two building seasons in Alaska's harsh climate. Again, an adaptable solution based on consumer feedback allowed for a more successful program.

Program at a Glance

Program Name: Alaska Home Energy Rebate Program	**Budget:** $160 million allocated in 2008 until funds expended.
Targeted Customer Segment: Residential	**Funding Sources:** State general funds
Program Start Date: May 2008	**Best Person to Contact for Information about the Program:** Cary Bolling 907-330-8164 cbolling@ahfc.state.ak.us
Program Participants: Over 22,000 as of June 1, 2010.	
Estimated Annual Energy Saved as of 6/1/10: Approximately 525,000 MMBtu	**Program Web Site:** www.ahfc.us/energy

CONNECTICUT HOME ENERGY SOLUTIONS JOINT PROGRAM

Connecticut Energy Efficiency Fund and the State of Connecticut Office of Policy and Management

Program Description

Connecticut's state and utility program administrators collaborated and combined two separate offerings to help deliver services to customers that were greater than the sum of the parts. The combined offering consisted of the Home Energy Solutions (HES) program, which is a residential weatherization and retrofit program offered through the Connecticut Energy Efficiency Fund, with a legislatively initiated program administered by the State of Connecticut Office of Policy and Management (OPM). The OPM program provided clean, tune and test (CT&T) repairs of residential oil- and propane-heating systems.

HES is a utility-administered program available to residential customers in Connecticut. HES is funded by electric and natural gas ratepayers in Connecticut and offers both a complete home assessment along with a direct install component. Approved vendors are selected through a formal "Request for Proposal" (RFP) process. Vendors that are chosen must agree to set pricing for measures such as air sealing, duct sealing, compact fluorescent light bulb installation, hot water-saving devices, power monitors, etc. Through HES, vendors analyze appliance and insulation levels, identify upgrades, and provide utility program rebate forms and/or information on other available efficiency and renewable energy offerings such as federal tax credits. HES technicians are Building Performance Institute-certified and work in two-person crews, typically completing two jobs per day. The average value per job is $750 and annual average savings per household is approximately $200. Customers are solicited through many marketing channels, including letter campaigns, electric and gas utility bill inserts, public relations efforts, print advertising, and word-of-mouth.

Prior to the HES/OPM partnership, the Home Energy Solutions program served residential electric heat and natural gas heat customers. These electric and natural gas heat customers were responsible for a $75 co-pay. Because oil and propane customers pay less into the energy efficiency fund compared to residents who heat with electric or natural gas, they had to make a $300 co-payment for the same service. The higher co-pay resulted in a program that underserved Connecticut's oil and propane customers who represented approximately 60% of the state.

In August 2008, the passage of Public Act 08-2 directed the State of Connecticut OPM to provide monies for the repair of oil and propane equipment. Rather than create a new program, the OPM and the Energy Efficiency Fund worked together to administer this new funding created by the Public Act through the existing Home Energy Solutions program. This joint program allowed oil and propane customers to participate equally with natural gas and electric heat customers. Those customers received a diagnostic clean, tune and test of their fossil fuel heating system in addition to the comprehensive Home Energy Solutions service for a single $75 co-payment.

This joint program offering Home Energy Solutions and CT&T remained in place per the legislation through June 2009. In December 2009, OPM received an American Recovery and Reinvestment Act (ARRA) federal grant that allowed the Fund to continue to offer the lower $75 co-pay for the Home Energy Solutions program for oil and propane-heating customers. The CT&T portion of the earlier program did not continue due to lack of grant funding.

Program Performance

An innovative and collaborative agreement between the State of Connecticut Office of Policy and Management and the Connecticut Energy Efficiency Fund spurred the success of this joint program. The joint program ran for approximately six months. During that time, the annual fossil fuel savings realized through the program was 17,170 MMBtu with a lifetime fossil fuel savings of 343,400 MMBtu. The annual electric savings was 1,280 MWh with a lifetime electric savings of approximately 8,700

MWh. The number of clean, test and tune customers served was 4,283. The number of Home Energy Solutions customers serviced was 2,638.

With this program, the Total Resource Benefit Cost Ratio for the electric and fossil fuel combined was 4.7. This reflects data collected from all jobs submitted through the duration of the joint State of Connecticut OPM program and the Energy Efficiency Fund's Home Energy Solutions program. The effectiveness, cost per benefit, and customer acceptance made this program popular with customers, vendors, and policymakers.

Lessons Learned

The Connecticut Home Energy Solutions joint program combined utility and state programs to offer residents a full menu of services through a single program, improving the accessibility of retrofit opportunities for oil- and propane-heated homes. The joint program model offers policymakers a lesson in how to leverage Recovery Act funds or other outside sources of funding to supplement and compliment existing state and utility energy efficiency programs.

Program at a Glance

Program Name: Connecticut Home Energy Solutions Joint Program

Targeted Customer Segment: Residential

Program Start Date: December 2008 for the Joint Program

Program Participants:
4283 HVAC Clean Tune and Tests
2683 Home Energy Solutions

Annual Energy Savings: 1,280 MWh; 17,170 MMBtu

Budget: $1,152,175

Funding Sources: Connecticut Energy Efficiency Fund and American Recovery and Reinvestment Act Funds

Best Person to Contact for Information about the Program:
Joseph Swift
(860) 832-4936
swiftjr@nu.com

LOUISIANA HOME ENERGY REBATE OPTION

Louisiana Department of Natural Resources (State Energy Office)

Program Description

The Louisiana Home Energy Rebate Option (HERO) offers a cash rebate of up to $2,000 to Louisiana residents who improve the efficiency of their existing home by at least 30%. The HERO program is administered by the Louisiana Department of Natural Resources (DNR). To participate in the HERO program, the participant must reside in the state of Louisiana, and the existing home must be located in the state of Louisiana. The home's existing efficiency is established by a baseline, or preliminary rating conducted on the home prior to any efficiency improvements. A verifying or final rating must be conducted on the home after the energy efficiency improvements are made to the home to determine if the home actually meets the 30% efficiency requirement. Rebates are determined by either multiplying the home's present value of energy savings by 20%, or by multiplying the cost of the energy efficiency improvements that are made to the home by 20%, whichever is the lesser of the two. The rebate is the result of this calculation, up to a maximum of $2,000.

The HERO Program is funded 100% with Petroleum Violation Escrow (PVE) allocated to Louisiana to be used for energy efficiency and conservation programs. The Louisiana's PVE funding for HERO is utilized in conjunction with the State Energy Program and governed by the rules and regulations set by U.S. Department of Energy.

Program Performance

Each participating existing home, as estimated by the Energy Office, achieves savings equal to 107 MMBtu per year over 20 years, or 2,140 MMBtu total savings per each home. Each participating new home achieves average savings of 65 MMBtu per year over 20 years, or 1,300 MMBtu total savings per each home. The program advances statewide standard building practices by encouraging higher standards through participation in the program. For example, HVAC contractors throughout the state have adopted mastic sealant on their installed duct systems in order to qualify for the program. Every participating home that adds a new duct system must include mastic sealant to be eligible for the maximum rebate. In response to the program, the use of mastic sealant is becoming common in order for customers to receive the maximum rebate.

Rebate funding of 20% leverages 80% of the project financing from the participant. The HERO program is one of the state's most popular programs with residents. As of June 2010, the amount of money spent on rebates amounts to $25.5 million, leveraging a minimum of $127.5 million from homeowners. The program received six consecutive ENERGY STAR "High Achievement Awards" between 2002 and 2006 for certifying an average of 800 new ENERGY STAR Homes per year throughout the state.

Lessons Learned

- A statewide program such as the HERO Program cannot succeed without a well-trained, widely distributed group of home energy raters.
- An open line of communication between the administrator and the home energy raters is imperative to ensure criteria for rebates are well understood and reasonable. It also improves the customer experience so that the program deliverers on all sides give constant messages.
- A successful program depends on an application procedure that closely guides participants throughout the entire process.

- The program found it beneficial to establish a detailed question-and-answer process that allows the administrator to monitor ongoing activities and respond quickly to participant needs as well as program anomalies.

- The program expressed the importance of communications and messaging to make sure the public is made aware of the economic and environmental benefits of such a program.

Program at a Glance

Program Name: Louisiana Home Energy Rebate

Targeted Customer Segment: public sector, residential, commercial

Program Start Date: 1999

Program Participants: Over 17,700

Estimated Annual Energy Savings: 8.9 million MMBtu

Other Measures of Program Results to Date: Six consecutive ENERGY STAR "High Achievement Awards" between 2002 and 2006 for certifying an average of 800 new ENERGY STAR Homes per year throughout the state.

Budget: $2.3 million/year

Funding Sources: Petroleum Violation Escrow (PVE)

Best Person to Contact for Information about the Program:
T. Michael French
225-342-1399
mike.french@la.gov

Program Web Site:
www.dnr.louisiana.gov/home.energy.rebate.option

MASSACHUSETTS FARM ENERGY PROGRAM

Massachusetts Department of Agricultural Resources

Program Description

The Massachusetts Farm Energy Program (MFEP) is a statewide collaborative effort, bringing together federal, state, industry, and private support to streamline technical and financial assistance available to Massachusetts farmers for reducing their energy demand and increasing their profits. Berkshire-Pioneer Resource Conservation and Development (RC&D) Area, Inc. developed and implemented the program, with assistance from the Massachusetts Department of Agricultural Resources (MDAR), the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), and Patriot RC&D.

Berkshire-Pioneer RC&D administers the program and, in partnership with MDAR and NRCS, provides direct technical assistance for energy-related projects to farmers across the Commonwealth. The MFEP has funding available to help farmers pay for energy audits and renewable energy assessments, conducted by MFEP technical assistance consultants. MFEP pays 75% of the cost of an audit, assessment, or consultation with the farmer responsible for the remaining 25%. MFEP also pays incentives of up to $7,500, based on energy savings, to implement the recommendations. In addition, MFEP makes referrals and will pay incentives for measures identified in audits prepared by public utility programs and independent consultants hired by the agricultural producers. MFEP audits and incentives are paid by Berkshire-Pioneer RC&D with MDAR (state) and NRCS (federal) funding.

The MFEP incentives are based on energy savings of:

- $0.15 incentive per kWh of electricity
- $2.50 incentive per therm of natural gas
- $2.75 incentive per gallon of propane
- $3.00 incentive per gallon of fuel oil
- $250 incentive per cord of wood

Investments in farm energy audits must be tied to energy savings and generation accomplished through implementation. This is a central focus of the Massachusetts Farm Energy Program. It is a full-service farm energy program that provides project support from concept through implementation, with emphasis on energy savings. The MFEP gives higher priority to farmers with less access to other audit and incentives programs, especially those on municipal power, and those not eligible for USDA-Rural Energy for America Program (REAP) and/or MA Renewable Energy Trust (MRET) funding.

Technical assistance is available to guide customers through numerous opportunities to leverage other funding sources, including MDAR grants and Farm Energy Discount Program (10% discount for electricity & gas), electric and gas public utility energy conservation and efficiency programs, net metering, the Massachusetts Renewable Energy Trust/Clean Energy Center Initiatives, the Investment Tax Credit & Treasury Check, the USDA/Rural Development Rural Energy for America Program (REAP), MDAR's Ag Environmental Enhancement Program (AEEP) and Ag Energy Grant. The MFEP, with support from the MA Woodlands Institute and Rural Development, provides grant writing assistance for applications to USDA-REAP.

Program Performance

Approximately 200 farms have participated to date. MFEP assisted 20 producers in applying to REAP in 2008 and 2009, with 19 funded through REAP and/or some other program(s). In 2010, MFEP provided REAP grant-writing assistance to 15 producers and funding notifications are still pending. The MFEP Audits & Incentives program began in April 2009, with 25 MFEP audits completed. To date, 25 energy efficiency projects have been installed with technical and/or financial assistance from MFEP. Several more have contracts with MFEP for installation over the coming months.

Total project costs for efficiency projects are $748,255, averaging $30,000 per farm. With MFEP assistance, 49% of these costs were covered by federal & state grants and public utilities incentives (41%) and MFEP Incentives (8%). Thus far, the program has achieved annual energy savings of $278,762 or average $11,150 per farm for efficiency projects, representing a significant reinvestment into the local economy. As of June 2010, about $295,000 of the original $400,000 funding has been spent on the program resulting in installations of 25 energy efficiency and 12 renewable energy projects, totaling $2.2 million. MFEP has assisted these farms in leveraging about 64% or $1.4 million of the project costs.

The program is transferable to other geographic regions or states in which state, federal, and nonprofit agricultural entities have a strong partnership and desire to develop a full-service farm energy program, or portions of the program. The MFEP's USDA-REAP Grant Writing Assistance program has already been transferred to Eastern CT RC&D.

Lessons Learned

- The administrators of MFEP found that farmer interest in energy audits and efficiency improvements fluctuates with energy prices, so continual technical assistance is needed to move a project from concept to implementation.

- Partnerships and collaboration with federal and state agencies, public utilities, and other nonprofits are required to get projects off the ground because most agricultural operations in Massachusetts cannot afford energy projects without significant technical assistance and multiple funding sources.

- Renewable energy receives so much attention that many people don't realize or believe energy efficiency is by far the best investment per dollar. It is imperative to show data to prove efficiency investments are sound.

- Agricultural entities will not typically implement energy audit recommendations without multiple follow-up contacts and technical support to assist in applying for funding to other programs.

Program at a Glance

Program Name: Massachusetts Farm Energy Program

Targeted Customer Segment: Agricultural energy users

Program Start Date: October 2007

Program Participants: 100+/year

Estimated Annual Energy Efficiency Savings Over Program Lifetime (installed):
128,694 gallons propane
10,386 therms gas
12,335 gallons oil
19 cords wood
258,225 kWh

Other Measures of Program Results to Date: Average annual energy savings $11,150 per farm; MFEP assists in leveraging 49% of project costs

Budget: $300,000 for 2009

Funding Sources: MDAR provided 62.5% funding, NRCS provided 37.5% funding

Best Person to Contact for Information about the Program:
Darlene Monds
413-256-1607
Darlene.Monds@ma.usda.gov

Program Web Site:
http://www.berkshirepioneerrcd.org/mfep/index.php

MINNESOTA PORTFOLIO OF SUSTAINABLE PUBLIC BUILDING PROGRAMS

Minnesota Department of Administration and the Department of Commerce

Program Description

Over the past decade, the state of Minnesota has shown its commitment to sustainable buildings by providing leadership, setting high performance standards, and putting forward an integrated framework of programs that provide a comprehensive system for designing, managing, and improving building energy performance. Minnesota's four complementary programs provide information, visibility, and accountability to help public sector property managers increase energy efficiency, reduce greenhouse gases, and improve operating costs. This integrated, four-program framework is unique for public sector buildings and designed to integrate with federal programs.

Under the Buildings, Benchmarks and Beyond (B3) project, which began in 2001, the first program established was Minnesota Sustainable Building Guidelines (MSBG), which set energy performance standards for new construction. The second program, the B3 Benchmarking Program (B3 Benchmarking), creates the tools for measuring the performance of and managing existing buildings. In 2008, The Sustainable Building 2030 (SB 2030) project was added to define an enhanced methodology for establishing energy performance goals consistent with the national Architecture 2030 Challenge. The most recent program to complete the framework, added in 2009, is the Public Buildings Enhanced Energy Efficiency Program (PBEEEP), providing assistance through an easy access approach that combines expert technical assistance, financing, and measurement and verification of energy savings for existing buildings. Together, they create awareness, provide actionable information, and set accomplishment metrics.

Minnesota Sustainable Building Guidelines (MSBG)

In 2001, the Minnesota Legislature required the Departments of Administration and Commerce, with the assistance of other agencies, to develop sustainable building design guidelines mandatory for all new buildings receiving financing from the bond proceeds fund after January 1, 2004. This biennial state bonding bill (M.S.16B.325) integrated sustainable design with existing regulatory and procedural requirements. The development process enabled departments of the state to internalize and take ownership of energy and environmental commitments that are more climate specific than national standards. In 2008, this legislation was expanded to include development of sustainable building guidelines mandatory for all major renovations receiving financing from the bond proceeds fund after January 1, 2009.

Designed to work within existing regulatory, legislative, and administrative requirements for public facilities, MSBG creates sustainable building performance standards for all public buildings that receive Minnesota bonded funds. The key energy performance standard requires all projects to develop designed-in energy savings 30% better than the Minnesota Energy Code. MSBG requires design teams and owners to evaluate and select specific energy efficiency technologies and operating practices throughout the design process.

In 2009, the performance tracking tool was transformed from an asynchronous spreadsheet data entry system to a collaborative online Web site tool that allows individual members of the design teams to easily understand the requirements, concurrently submit data, and track how the overall design project is performing.

B3 Benchmarking

The B3 Energy Benchmarking program launched in 2004. The scope of buildings served by the B3 Benchmarking program includes all public building sectors: state; cities; counties; and public school districts. The B3 Benchmarking program collects information on the design, operation, and energy performance of existing public buildings so that the state and its political subdivisions can direct

energy conservation improvements where they are most needed and most cost-effective, and where the return on investment for a capital expenditure is greatest. Information on design and operations is used to create engineering baseline models for the specific space uses in their locations. B3 Benchmarking now contains building models and consumption information for more than 5,100 public buildings in the state.

The data collection process relies on a Web-based tool through which building representatives of public buildings enter data, including building characteristics and utility bills. The users can see how their buildings compare to individualized benchmarks. B3 advances a unique approach to determining the benchmarks: a parametric model based on space-type simulations; and prescriptive requirements in the current Minnesota energy code. By comparing a building to its unique benchmark, the opportunity for energy savings can be determined. By then comparing opportunity across buildings, the user can come up with a prioritized list of buildings that offer the highest potential for cost-effective improvements to energy consumption. This systematic method of comparison will help managers justify and secure the funds necessary to complete further analysis through energy audits and, ultimately, energy conservation upgrades.

In 2009, an upgraded Web site tool provided functionality for on-going—weather normalized—operational building energy management where users can compare their buildings' energy consumption to a previous year of their choice to evaluate technology and operational improvements. B3 Benchmarking supplements an ENERGY STAR analysis in two important ways: by providing an engineered model of performance; and greater climate and space type specificity.

Sustainable Building 2030

In the spring of 2008, the Minnesota Legislature established building performance standards called Sustainable Building 2030 (SB 2030). This legislation (M.S. Statute, Chapter 216B.241) reflects the goal of the national Architecture 2030 Challenge to have a zero carbon building population by 2030.

SB 2030 mirrors the national Architecture 2030 program and has been tailored to incorporate the realities of Minnesota's public buildings. Like Architecture 2030, SB 2030 outlines specific performance targets (energy standards) for energy use in buildings until 2030. Every five years, the total carbon emissions from the operations of buildings is to be reduced so that in 2030 a 100% reduction (net zero carbon) is achieved. The steps in emissions reductions for new buildings compared to representative buildings in existence in 2003 are outlined below.

- 2010: 60% reduction in carbon producing fuel used for building energy
- 2015: 70% reduction in carbon producing fuel used for building energy
- 2020: 80% reduction in carbon producing fuel used for building energy
- 2025: 90% reduction in carbon producing fuel used for building energy
- 2030: 100% reduction in carbon producing fuel used for building energy

The SB 2030 program established cost-effective, energy efficiency performance standards for new and substantially reconstructed commercial, industrial, and institutional buildings that can significantly reduce carbon dioxide emissions by lowering energy use. SB 2030 seeks to accomplish a number of objectives: to train architects to integrate the performance standards in building design; to incorporate the performance standards in utility conservation improvement programs; and to develop procedures for ongoing monitoring of energy use in buildings that have adopted the performance standards.

SB 2030 Energy Standards are required for all state bonded buildings that have started Schematic Design after Aug.1, 2009. Energy provisions of the MSBG guidelines are replaced by the SB 2030 standard. In 2010, the SB 2030 energy standards tool will be linked to the B3 Guideline tracking site to allow custom energy standards to be developed based on a project's specific floor area, space type, and operational hours. Once a building is constructed, the ongoing actual metered energy consumption is entered into the B3 Benchmarking system to review actual performance.

Public Buildings Enhanced Energy Efficiency Program (PBEEEP)

In 2009, the state of Minnesota launched a new technical and financial assistance program called the Public Building Enhanced Energy Efficiency Program (PBEEEP). The Program targets existing public buildings owned by state agencies, cities, counties, townships, and public school districts. The Program requires data to be up-to-date in the B3 Energy Benchmarking system to qualify for participation and prioritizes projects based on these data. The B3 Energy Benchmarking system is then central to ongoing monitoring and verification activities. PBEEEP targets cost-effective energy efficiency building improvements via retrofit or retro-commissioning opportunities using pre-qualified technical providers, and third-party measurement and verification services.

PBEEEP has two components: one for state government projects that started in 2009; and one for local government projects planned to start in 2010. PBEEEP addresses energy efficiency in public buildings across Minnesota through a targeted Retro-commissioning/Recommissioning (RCx) and Retrofit focus that primarily identifies low-cost, quick payback items to improve operations and energy use. Energy-affecting and energy-consuming equipment, systems, and operations practices are evaluated to identify energy conservation opportunities that result in cost savings for the project site. Projects participating in PBEEEP follow a four-phase project process: screening; investigation; implementation; and verification. A key component of PBEEEP is that the program provides state and local agencies the opportunity to utilize lease-purchase financing without the need to have budgeted for this work in advance. Remaining project funds are then paid through tax-exempt lease purchase financing where payments are set up to ensure budget-neutral/budget-positive for the loan term.

Program Performance

The MSBG has overseen 110 new building projects representing 5.7 million square feet. Estimated annual energy savings (compared to the current Minnesota Energy Code) as a result of measures installed over the lifetime of program equal 36,200,000 kWh, 9,400 Peak kW, 205,000 MMBtu, 29,000 CO_2 metric tons, and $3,700,000.

B3 Benchmarking has worked with 1,120 public building organizations and received data from 5,150 public buildings representing 225 million square feet. Estimated annual energy savings as a result of measures installed over the lifetime of program equal 220,000,000 kWh, 1,700,000 MMBtu, 205,000 CO_2 metric tons; and $22,700,000 cost savings.

2010 Energy Standards have been established for over 44 building types. These Energy Standards are based on a 60% energy reduction from a baseline building of the same type and location with energy performance typical of the existing buildings of that type in 2003 (including buildings built prior to 2003). The PBEEEP is now working with 1,120 public building organizations and buildings representing 12 million square feet to initiate the technical assistance feature of this portfolio of programs.

The Minnesota sustainable buildings framework is highly transferable. Every state is capable of setting sustainable building guidelines for public buildings, especially now that Minnesota has provided a template for cold climate states. With the development of the B3 Benchmarking tool and the proven track record of measuring and managing existing public building performance, each state has a starting point from which to build. The investment made by the state of Minnesota in this framework can allow other states to benefit and build for their own purposes. The tools developed for Minnesota are compatible with a variety of other tools and programs, including ENERGY STAR and the U.S. Green Building Council's LEED Green Building Rating System.

Lessons Learned

Minnesota employs a philosophy of continuous improvement. At each phase, the state, consultants, and participants in the process evaluate the work and then set the next goal. MSBG Guidelines and

the B3 Benchmarking were intended to provide an iterative feedback tool that continuously improved Minnesota's building stock.

The process of creating the MSBG set the foundation for both creating an effective collaborative process and also capturing savings in new construction—but MSBG was not designed to capture existing building savings. Over time, as the goals of Architecture 2030 became clear and more broadly accepted, the lessons learned in development of the MSBG were employed to create a Minnesota-specific version of Architecture 2030 goals, namely the SB2030 goals. Were it not for the iterative collaborative process with participating experts in the field, the strong commitment to hit aggressive national targets balanced with Minnesota-specific building standards, weather normalization, and baselines, the standard-setting guideline programs would not have been as effective. With the passage of 2030, Minnesota will be moving toward a kBtu-per-square-foot standard that will create a statewide metric by which Minnesota will be able to evaluate all state buildings.

The B3 Benchmarking tool identifies the performance of existing public buildings and sets up a consistent platform for measuring, analyzing, benchmarking, and improving the energy efficiency of public buildings. One lesson learned in Benchmarking is the potential for its application to all buildings within utility service territories in order to maximize the return on investment of ratepayer dollars. With Minnesota's aggressive energy savings goals put into effect in 2007, these programs are coming into their prime just in time.

Working in consort, with a keen understanding of how buildings are constructed, how they are maintained, and how one finances improvements, Minnesota developed an exceptional portfolio of complementary and coordinated programs.

Program at a Glance

Program Name: Minnesota Portfolio of Sustainable Public Building Programs

Targeted Customer Segment: Public sector buildings

Program Start Date: MSBG: 2004; B3 Benchmarking: 2004; SB2030: 2008; PBEEEP: 2009.

Program Participants: 1,120 Public building organizations; 5,150 buildings benchmarked;

Estimated Annual Lifetime Energy Savings: MSBG: 36,200,000 kWh, 9,400 Peak kW, 205,000 MMBtu; B3: 220,000,000 kWh, 1,700,000 MMBtu

Other Measures of Program Results to Date: MSBG: $3.7 million in cost savings; B3: $22.7 million in cost savings.

Budget: B3 and MSBG: $500,000 per year; SB2030: $500,000 per year; PBEEEP: $6.922 million

Funding Sources: Funds for MSBG and B3 come from ratepayers; PBEEEP funded by ARRA.

Best Person to Contact for Information about the Program:
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janet.streff@state.mn.us

Program Web Sites:
MSBG: www.msbg.umn.edu
B3 Benchmarking: www.mnbenchmarking.com
Sustainable Buildings 2030 Guidelines: www.mn2030.umn.edu

PBEEP: www.PBEEEP.org

MINNESOTA RETIRED ENGINEERS TECHNICAL ASSISTANCE PROGRAM

The State of Minnesota Pollution Control Agency

Program Description

The Minnesota Retired Engineers Technical Assistance Program (RETAP) began in 2001 with a grant from the EPA. Its mission is to develop a service corps of retired, experienced engineers and other professionals to help Minnesota businesses and institutions reduce waste, prevent pollution, and improve energy efficiency while lowering costs. The program design has two important benefits that set it apart from most other energy efficiency programs: it allows Minnesota's skilled retirees to continue to contribute their expertise to the state on a part-time basis that makes room for their other interests and commitments; and it provides a free entry point to spur energy efficiency and waste prevention investments from Minnesota's small to mid-size businesses and organizations.

The RETAP model provides tailored technical assistance to businesses or institutional clients through onsite visits and analysis of utility bills. Assessments are voluntary, non-regulatory, and at no cost to the clients. After an assessment agreement is signed, past utility bills are collected and analyzed and the facility is benchmarked against EPA and regional standards. A team of two RETAP consultants perform an onsite visit to the client's facility to assess building systems and functions (including building envelope, HVAC, lighting, waste management, and water use), ask questions, and review operational procedures and behavioral habits. This may take anywhere from 2 hours to a full day. All data, analysis, and resulting recommendations are entered into the RETAP data management and analysis database ("Assessment System" or "A_SYS" for short), housed on the Minnesota Pollution Control Agency (MPCA) server. Finally, a written report with 10-20 specific recommendations and estimated savings is generated and sent or presented to the client. Follow-up is an important part of RETAP's quality control and ongoing program tracking. One year after the assessment, a follow-up questionnaire is sent to the client requesting information regarding implementation of report recommendations.

Currently there are 15 RETAP members. They are paid a modest hourly wage by the state of Minnesota's Pollution Control Agency, though some operate largely as volunteers and take minimal or no compensation. The program does have a small dedicated office space provided by its partner, the University of Minnesota Technical Assistance Program, but nearly all of the work is done from the RETAP members' home offices, via e-mail, and through shared access to the RETAP database. For this reason, the group values the 3 or 4 full-day meetings it has each year. Smaller groups meet, ad hoc, to consider technical issues that arise from assessments, to revise benchmarks, or review new best practices or energy efficiency innovations.

Program Performance

In 2009 alone, RETAP recommended over 3 million kWh of energy savings actions for their clients. In 2008, RETAP clients implemented over 40% of the kWh savings RETAP had identified—amounting to annual savings of 532,000 kWh. In addition, RETAP clients implemented recommendations leading to reduction of 325 tons of solid waste in 2008. In 2009 RETAP completed 49 assessments, compared to just 9 in 2004. Word of mouth and higher energy costs in 2008 increased demand to the point where RETAP is now considering expansion.

With 2008 expenses of $52,500, and 2008 client savings of $62,000, RETAP's return on investment is about 119% with a payback period of about nine months. Since 2004, funding for RETAP has generally increased, but client savings have outpaced those cost increases. The payback period has dropped over time from over two years to less than one. These are conservative calculations since some RETAP clients do not provide feedback. In 2009, RETAP undertook an analysis of assessment costs and found that almost 70% of the assessments fell between $900 and $1,099 for total costs—lower than many other similar programs.

RETAP is a small-but-mighty state energy and waste conservation program. It makes the most of very skilled retirees from 3M, Honeywell, General Mills, and other companies—retirees who are anxious to share their engineering expertise and environmental concern. RETAP provides the elusive "free lunch" for Minnesota's organizations regardless of their organizational finances. Because the service is free to clients, RETAP brings very specific energy efficiency and waste information to organizations that are hesitant to pay for an audit that they worry "might not be worth it." Because of the personal attention and follow-up, RETAP clients implement recommendations at a rate higher than many similar audit-based programs—better than 30% compared to the typical 11-15%. The RETAP members say that they relish being part of this "elite" group, and enjoy the camaraderie it fosters.

A_Sys Database and Continuous Improvement

In 2008, a talented RETAP member created the Assessment System or "A_Sys"—a database that serves administrative, analysis, and reporting functions. This system brought dramatic improvements to RETAP's efficiency of process, accuracy of analysis, and consistency of reporting. The secure system is available to all consultants from their Internet-connected home computers. The administrative module tracks client information, stores signed agreements, and registers which RETAP members are involved. The assessment module includes utility bill detail and analysis; benchmarks; details of the onsite visit and analysis of facility energy, lighting, water, and waste systems; recommendations and their estimated savings; documentation of implementation of recommendations; the final report; and many supporting documents.

Lessons Learned

Local Program Administration and Coordination.

In 2001, MPCA gave a grant to Waste Reduction and Technology Transfer (WRATT) Foundation to pilot test retiree-based waste prevention and energy efficiency technical assistance in Minnesota. Through 2003, WRATT organized and administered RETAP on a day-to-day basis. When the grant ended in 2004, RETAP separated from WRATT and became wholly administered by the MPCA and coordinated day-to-day by a RETAP consultant. This allowed more local oversight for quality control, and allowed it to be better tailored to local business and institutional needs. The new model increased administrative efficiency and provided more opportunity for face-to-face support by the consultants in the program.

Client Follow-up: Key to Increasing Implementation of Recommendations

A longtime frustration for RETAP was that their clients often left the tailored recommendations unimplemented. Rather than enthusiastically running with the report, clients often seemed unclear about next steps needed to make the recommended changes, or didn't commit funds to the work. RETAP estimated clients implemented about 10% of recommendations, clearly showing a disconnect in the process.

In 2008, RETAP began a formal and personalized system of following up with their clients within a year of the assessment. RETAP now reviews the tailored report with clients, either in person or over the phone to answer questions and help prioritize possible actions. In addition, there is a follow-up survey in the first year after the assessment to check in with clients and determine how many recommendations have been put in place. RETAP will soon also offer a list of potential vendors/contractors who could complete recommended HVAC, lighting, and other energy engineering changes.

In RETAP's most recent follow-up survey, implementation increased from 10% to 30%—and clients reported another 48% of recommendations were either in progress or would be implemented within 2 years.

Flexibility in Administration: Attrition and Expansion; Addition of Climate Change Corps Pilot

Working with retirees demands flexibility and appreciation of retirees' priorities and particular situations. RETAP originally launched in 2001 with 25 members, but quickly winnowed to about 15 committed members. By 2007, there were just 12 because of natural retiree attrition issues like relocation and failing health. In 2007, the program underwent its first "expansion," hiring several new members and starting a secondary pilot program, the Climate Change Corps, to provide support to communities and local units of governments planning for ways to reduce greenhouse gas pollution. Currently, RETAP has 15 members, including a coordinator, and the Climate Change Corps has an additional four. A separate MPCA staff person oversees the Climate Change Corps. Demand for services is currently outstripping capacity for timely service, so RETAP is considering a second expansion, if the next state budget will allow.

Program at a Glance

Program Name: Minnesota Retired Engineers Technical Assistance Program **Targeted Customer Segment:** Small and mid-size commercial and industrial businesses and nonprofit and public-sector organizations and institutions. **Program Start Date:** 2001 **Program Participants:** 143 **Estimated Annual Lifetime Energy Savings:** 1,070,881 kWh annual energy savings from 2004–2008 improvements (2009 data not yet available)	**Other Measures of Program Results to Date:** 395 tons of solid waste prevented or diverted to recycling from 2004–2008 improvements. **Budget:** $57,200 **Funding Sources:** State Environmental Fund **Best Person to Contact for Information about the Program:** Madalyn Cioci 651-757-2276 madalyn.cioci@state.mn.us **Program Web Site:** http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/assistance-and-resources/minnesota-retap.html

NEW YORK ENERGY $MART[SM] COMMERCIAL LIGHTING PROGRAM

New York State Energy Research and Development Authority

Program Description

What began as the New York Energy $mart[SM] Small Commercial Lighting Program,[4] limited to lighting projects under 10,000 square feet (sf), evolved into the Commercial Lighting Program, inclusive of lighting projects up to 100,000 sf (hereafter referred to as the Program), is unlike most energy efficiency programs. The program goes beyond simple one-for-one retrofits and prescriptive incentives for energy-efficient lighting technologies. Traditional programs typically do not address the impact of lighting quality on the people who use the affected spaces. Without first understanding the tasks performed within the space and the related lighting quality issues, lighting practitioners are not able to determine the appropriate lighting design. While saving energy was a key goal in justifying program funding, providing effective solutions—The Right Light[SM]—became the larger focus of this market transformation program.

NYSERDA established the program in 2000 by to overcome the limitations of poor lighting design, through the application of effective, energy-efficient lighting design. ICF International is the program administrator. Along with The Lighting Research Center at Rensselaer Polytechnic Institute (LRC), ICF helped developed the Program design and implements the Program for NYSERDA.

The Program design model results in lighting systems optimally designed to meet specific application and energy efficiency needs. The systems are easy to use, aesthetically pleasing, and enhance the visual capability of people using the space. This requires both the proper selection of technologies and the proper system design and layout. The result is lighting that allows people to do the work they need to do in a pleasing, comfortable environment. Utility bills are lower, and people are happier and more productive.[5]

A major component of the program is recruiting and educating the lighting practitioners who would participate in the program—and overcoming their preconceived notions that this would be yet another prescriptive rebate program. As part of the program training and outreach, lighting practitioners learn how to use the program's online evaluation tool to determine compliance with lighting power allowances, light levels, uniformity, and glare control. The Program Life Cycle Cost Tool allows them to create reports that demonstrate both the energy and cost savings over the useful life of the system. Sales training includes tips on how to use the Program Case Studies, and other third-party support materials to show their customers the benefits of installing The Right Light[SM]. A portfolio of incentives and awards paid to the Business Partners for qualifying designs and completed projects supports market transformation. While end-users are not specifically addressed by the program, NYSERDA uses Google AdWords campaigns to drive end-users interested in energy savings or improving lighting to a special page on the The Right Light[SM] Web site, where in turn they are encouraged to contact one of the program's business partners.

A key to the continuing success of the program has been its ability to incorporate many changes over the years to reflect the needs of the market and the market players who participate in the program. In order to continuously increase energy savings, the program has made changes to project size, incentive offerings and amounts, participant classifications, training and outreach methods, program metrics, and lighting power allowances. These changes, more evolutionary than revolutionary, have been implemented as a result of both formal and informal market research and program assessment activities. Most of these changes fall into one of the following categories: design criteria, incentive offerings, energy use, and training.

[4] This Program began in 2000 and was called the Small Commercial Lighting Program. In 2009 the name was changed to the Commercial Lighting Program. The use of the term Program refers to both program names.
[5] The effect of lighting quality on productivity has been documented by the Light Right Consortium (http://www.lightright.org/).

While the types of criteria have not been altered, the metrics employed have. Advances in lighting technology, such a high performance T8 (HPT8) systems, volumetric type luminaires, and emerging light emitting diode (LED) fixtures, had to be addressed. One example of a positive criteria change resulting from these emerging technologies and other industry advances was an increase in the minimum color rendering index (CRI) from 70 to 80 (in areas where CRI is important) without significant cost increases to the end-user. Other NYSERDA end-user incentive programs supported this adjustment, which only allow HPT8 systems when 4 ft, fluorescent systems are used. Linear fluorescent highbay fixtures (both HPT8 and T5HO) provided better color rendering options than the standard metal halide fixtures that previously had an "exemption" for color rendering. Additional research also showed that the luminous intensity glare criteria could be eliminated in spaces where the fixtures were mounted above 15 ft. All of these changes were in keeping with the program's goal of providing the appropriate quantity and quality of light, but opened the doors to additional technologies and solutions.

In addition to mandatory savings levels, the program implemented initiatives to encourage deeper savings. To encourage participants to aim higher than the required 10% better than code, additional incentives were offered for 20, 35, and 50% better than code. This proved to be a very successful offering, with over 90% of projects qualifying for the additional incentive. However, participant feedback showed that they would have designed to meet those levels anyway, and therefore the incentive offering was withdrawn. NYSERDA experimented with another incentive offering to encourage adoption of HPT8 systems. Participants were paid a "technology bonus" for using HPT8s. Successful market transformation (and penetration) for HPT8 systems—about 90% of the participants were specifying HPT8 when 4 ft linear fluorescents were used—allowed for the elimination of the HPT8 bonus, and funds were redirected to the specification or installation of controls. Lighting controls have thus far been largely neglected as a measure in participating projects, but present a significant opportunity for energy savings.

Program Performance

The program has partnered with over 900 mid-market companies (formerly known as "Allies" and now referred to as "business partners") on over 1,550 quality lighting design projects covering over 13 million square feet. These projects have resulted in a reduction in summer peak demand of over 21.3 MW and in energy consumption of over 78.6 GWh.

As a market transformation program, the program has had significant market impact in the way lighting practitioners approach lighting projects. The combination of the appropriate lighting quantity and lower energy use results in cost savings and an improved environment for the end-user. Unlike other "incentive-only" programs, the strong focus on training has impacted the market by providing a large network of lighting practitioners that can carry the design elements forward. Proof of this exists in one of the participating companies that reached the $50,000 per company incentive maximum, but still continues to design and install lighting that meet the program's criteria.

Even with the high startup costs associated with educating and establishing the network of qualified lighting installers, the benefits have substantially exceeded costs. A total resource cost test of the program was conducted in 2006 for the time period starting from program inception through year-end 2005. NYSERDA determined that the benefit / cost ratio was 2.5 without including non-energy impacts and 3.8 with non-energy impacts included.

Lessons Learned

For market transformation programs to remain viable and effective, they must evolve and address the changing needs of participants and end-users. NYSERDA stresses the need to be flexible enough to adjust to what is working and what is not working. Integration and conformity with other related programs, emerging technologies, and ever-changing best practices are also critical. NYSERDA consistently raises the bar to achieve the program goals. At the same time, market transformation

programs must continually be evaluated for their ability to meet energy savings goals in a cost-effective manner, and adjustments must be made when and if they are needed.

The NYSERDA Commercial Lighting Program has proven its ability to do all of this while bringing effective, energy-efficient lighting solutions—The Right Light℠—to New York State business owners through its network of trained business partners, and hopefully will continue to do so for years to come. As new energy codes are put in place, new technologies are developed, and best practices are amended, the program will continue to evolve. As the bar is raised, the market will continue to be transformed, allowing for even more effective, energy-efficient lighting solutions.

Program at a Glance

Program Name: New York Energy $mart℠ Commercial Lighting Program

Targeted Customer Segment: Mid-market actors (including contractors, distributors, manufacturer reps, energy service companies, architects, engineers, interior designers, and lighting designers) who sell, install, or design lighting projects between 1,000 and 100,000 sf in commercial, industrial, retail, healthcare, and institutional spaces.

Program Start Date: 2000

Program Participants: CLP has partnered with over 900 mid-market companies on over 1,550 quality lighting design projects covering over 13 million square feet.

Annual Energy Savings Achieved: 78.6 GWh program to date

Peak Demand Savings Achieved: 21.3 MW program to date

Budget: July 2009 through June 30, 2010 funding approximately $1.2 million for implementation and marketing, $300,000 for incentives.

Funding Sources: Systems Benefit Charge (SBC) collected and administered by New York's Department of Public Service

Best Person to Contact for Information about the Program:
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Program Web Site:
http://www.therightlight.org

SOUTH CAROLINA MANUFACTURED HOUSING TAX CREDIT

South Carolina Energy Office and South Carolina Department of Revenue

Program Description

Twenty percent of South Carolinians live in manufactured housing, the highest percentage in the nation. Older manufactured homes, built before 1980, consume an average of 53% more energy per square foot compared to all other types of homes. Fifty-five percent of these households have incomes below 150% of the federal poverty level. These low- to moderate-income residents cannot afford higher than average energy bills. Indeed, anecdotal evidence from utilities and other organizations suggest that some residents have lost their homes not because they cannot afford to pay the mortgage, but because they cannot afford to pay the utility bill. Therefore, any measures that reduce energy use, and thus energy bills, for residents of manufactured housing will contribute significantly to the overall economic well-being of South Carolina residents living in manufactured homes.

In 1992, legislation established South Carolina-specific criteria for energy-efficient manufactured homes (S.C. Code 12-36-2110 B)(4). Manufacturers constructing homes that meet the criteria order labels from the SC Energy Office and affix them to the more energy-efficient homes, and individuals purchasing the more efficient homes pay no more than $300 in sales tax. New legislation enacted in 2008 (S.C. Code 48-52-870) created more significant incentives for ENERGY STAR labeled homes, which are even more energy efficient than the state-specific energy-efficient criteria from 1992. These incentives include the elimination of all sales tax on ENERGY STAR manufactured homes and a $750 nonrefundable state income tax credit for eligible homebuyers.

The SC Department of Revenue asked the SC Energy Office to approve applications to ensure they met ENERGY STAR criteria. The Energy Office and the Manufactured Housing Institute of S.C. publicize the program through press releases, presentations, social media, and newsletter articles. In addition, the Manufactured Housing Institute supplies retailers with a letter template to remind customers to apply for their ENERGY STAR tax credit. Instructions to retailers are available through the Manufactured Housing Institute, and application forms are available through the Manufactured Housing Institute and the SC Energy Office. Homebuyers complete the application form and send it to the Energy Office along with a copy of their bill of sale (to ensure that the credit is sought for a home that was actually purchased by the applicant) and a copy of the ENERGY STAR installation check list. If all information is provided, the Energy Office returns an approved application to the home buyer within a few days of receipt, or sooner if an e-mail address is supplied. The homebuyer attaches the approved form to his/her South Carolina tax return or retains it with other records if he/she files electronically.

Program Performance

The benefits of an ENERGY STAR qualified manufactured home are well understood. Because of controls in the factory, construction is tight, windows and doors are of high quality, and interior fittings and appliances are designed to save energy. Site installation requirements ensure that those factors outside the control of the manufacturer are handled correctly. Based on the sizes of homes included in early requests for tax credit approval, the program expects savings averaging 15 MMBtu per year per home, with an associated reduction in CO_2 averaging 5,710 lbs/year/home.

While the economy dampened sales in the past few years, 1,473 homes were sold in 2009. Of the homes sold during the first 6 months of the incentive program (presumably around 700), approximately 85 (12%) were ENERGY STAR qualified. Assuming half the ENERGY STAR homes are purchased because of state incentives, the program achieves savings of 1,277 MMBtu per year overall, or 12,771 MMBtu over the life of the program. Anecdotal evidence suggests that several retailers are committed to selling nothing but ENERGY STAR homes within the next several years.

The SC Energy Office estimates that these energy efficiency standards will save South Carolinians as much as $122.4 million over the expected life of homes purchased, based on an estimated annual savings of $152 for a standard manufactured home and $252 in annual savings for a doublewide home. The lost revenue to the state's general fund of $750 per home in income tax and approximately $300 per home in sales tax is relatively minor.

Focusing on energy efficiency in the manufactured housing market is extremely important for the Southeast and South Carolina in particular, and targets an underserved customer sector in need of energy and cost savings.

Lessons Learned

The SC Energy Office explained that one of the most important lessons learned to date is the difficulty of getting the word out to retailers and homebuyers, who simply do not know that there is a tax credit associated with ENERGY STAR purchases. Another problem is that all "energy efficiency" terminology sounds alike.

When this legislation passed, some supporters tried to eliminate the old 1992 sales tax incentive, arguing that the 1992 standards were now industry norms. However, the legislation also retained the old incentive, leading to some understandable confusion. Thus, the Energy Office fielded a number of calls from homebuyers saying "I have an energy-efficient home, and I need to find the right form to apply for a tax credit."

Another lesson is that, while the manufactured housing market is a large one in South Carolina, energy efficiency in manufactured homes is less marketable than some other measures, such as tax credits for solar or wind power. The media is less interested in writing about the incentives and the demographic most likely to be interested in manufactured housing is less likely to access social media tools such as Twitter or newsletters to spread information about the program.

Finally, because the tax credit is non-refundable, meaning taxpayers can't receive a credit larger than what they owe in taxes, some homebuyers can't take full advantage of the incentive. A refundable credit might be more useful as an incentive. Even more attractive would be a rebate, although at the time the legislation passed, little or no precedent existed for rebates from the South Carolina state government.

Program at a Glance

Program Name: South Carolina Manufactured Housing Tax Credit **Targeted Customer Segment:** Residential (primarily low-income) **Program Start Date:** July 2009 **Program Participants:** 85 **Estimated Annual Energy Savings:** Average annual savings per home of 15 MMBtu	**Other Measures of Program Results to Date:** $152 for a standard manufactured home and $252 in annual savings for a doublewide home; $122.4 million over the expected life of homes purchased **Budget:** $750 income tax credit **Funding Sources:** State general funds (in form of foregone tax revenues) **Best Person to Contact for Information about the Program:** Trish Jerman Manager, Energy Efficiency and Outreach 803-737-8025 tjerman@energy.sc.gov **Program Web Site:** http://www.energy.sc.gov/index.aspx?m=3&t=24

TEXAS INDUSTRIES OF THE FUTURE

Center for Energy and Environmental Resources, the University of Texas at Austin

Program Description

The purpose of the Texas Industries of the Future (IOF) program is to facilitate the development, demonstration, and adoption of advanced technologies and best practices that reduce industrial energy usage, resulting in improved competitive performance.

Texas' industrial sector is the most energy intensive of all states, as a result of the significant presence of chemical manufacturers and refineries. Texas's 27 petroleum refineries account for more than one-fourth of total U.S. refining capacity. According to the Energy Information Administration, Texas consumes 18% of the energy used by industry in the U.S. The next largest industrial energy consumer is Louisiana, at 7% of the U.S. total. Fifty percent of the energy used in Texas is consumed by the industrial sector. Nationally, only 32% of the energy used is consumed by industry.

Although the specific activities of the program have shifted in response to the changing needs of the industrial sector in Texas, the program has consistently focused on outreach, training, and facilitating information transfer and access to resources. Because of the limited funding available to the program, this approach leverages the available federal and state resources, as well as the extensive expertise that resides in the Texas manufacturing community.

Currently, Texas IOF concentrates on the chemical and refining industries. The program raises industry and government awareness of the benefits and the need for integration of industry energy efficiency and environmental technology and practice improvements through workshops, training, conferences, and other outreach mechanisms. Texas IOF also strengthens partnerships among Texas industries, universities, associations, governments, and NGOs to focus research and projects on high priority areas.

Since its founding in 2001, the program has organized 48 workshops, Industrial Energy Management Forums, Technology Showcases, roundtables and conferences, with a total of over 2,300 attendees on energy efficiency topics. The program offers training and workshops from the DOE Industrial Technologies Program. It facilitates sharing of Best Energy Practices among the state's largest industries, primarily along the Texas Gulf Coast, through conferences and Forums. Texas IOF develops tools of interest to Texas industries, such as the NOx/Energy tool and the Texas Sized Energy Savings tool, which calculates potential energy savings. New initiatives are developed in response to the direction of the program's Chemical and Refining Advisory Committee. Examples of successful initiatives include Superior Energy Performance, a plant-based energy efficiency certification program piloted in Texas in 2008-2009 and scheduled for a national launch in 2011. Another initiative is the Texas Industrial Energy Management Forums, which regularly draw 100–175 engineers from the process industries to hear the latest on industrial energy topics.

Program Performance

Because the program does not install or pay for the installation of more efficient equipment at industrial sites, there are no direct calculable savings. However, savings of 1.791 million MMBtu/yr have been estimated for the Best Practice workshops organized by Texas IOF from 2001 to 2007. The estimate comes from the Oak Ridge National Laboratory (ORNL) methodology for impacts of Industrial Technologies Program (ITP) Best Practice workshops. The Texas IOF manual and calculator to help small and medium-sized manufacturers assess energy savings opportunities is in use by the Texas Manufacturing Assistance Center, and has identified savings of $660,000 at 9 facilities, with replication opportunity at another 13 sites. It is now in use by the Manufacturing Extension Partnership (MEP) engineers throughout the state and is being updated to better serve the customer base.

Texas IOF provides a focused platform where industrial energy engineers, energy managers, and plant managers can share and learn non-proprietary, proven energy-saving technologies and processes. The program offerings allow these domestic plants to operate more cost competitively in the global market. For example, they might learn from each other how to address common challenges, such as how to involve and motivate operators to achieve energy efficiency targets.

Texas IOF contributes greatly to the success of the DOE programs in Texas through its marketing and outreach efforts. For example, Texas plants had a high participation rate in the early Save Energy Now (SEN) assessment program. In 2006, 30 of the 200 assessments conducted by DOE under the SEN program were at Texas plants. This represents 15% of the assessments conducted, double the expected participation rate based on the percent of large plants located in Texas (8%). Texas IOF events achieved great success as well: 59 out of the top 195 or 30% of Texas's largest industrial sites have staff that attended events, exceeding the program goal of 25%.

The Superior Energy Performance (SEP) program, which was piloted in Texas in 2008–2009, promises to have a significant impact on the demand for energy efficiency services. The SEP is now being demonstrated in 28 states with DOE funding. Plans call for a national launch in 2011. The SEP program is based on the proposed ISO 50001 management standard for energy. In addition to implementing an energy management system, SEP requires demonstrated energy intensity improvements. A plant meeting these requirements will become certified through an ANSI process for three years. An organization seeking to demonstrate to a customer or stakeholder the plant's energy intensity improvements or a corresponding carbon footprint reduction will find the SEP an extremely useful tool.

The centerpiece of the program's success has been the ongoing involvement of managers and staff engineers from the chemical and refining sectors in the Texas IOF advisory committee and the development of a strategic plan in 2003. An analysis of the 2003 Strategic Plan conducted in June 2007 shows that most of the activities identified by the advisory committee were successfully implemented. The Strategic Plan process has been an extremely helpful tool for identifying projects for funding. In a few cases, funding was not available or circumstances changed such that the original tasks were no longer relevant. The Strategic Plan is viewed as a dynamic document; if the situation changes, some actions may no longer be relevant. This flexible approach to program planning has worked well and allows the program to be responsive to the changing needs of industry and new ideas that emerge from the advisory committee. An update to the plan was finalized in 2010.

Lessons Learned

- Find champions for the program. Texas IOF involved key industry leaders early, particularly chemical manufacturers and refiners. It is also important to engage key state agencies such as the state energy office and state environmental agency as well as federal agencies such as the Department of Energy.

- Think strategically. Texas IOF places a major emphasis on goals and strategies in the chemical and refining sectors. The goal in place from 2002–2010 was to achieve a 15% reduction in energy intensity.

- Offer immediate paybacks. While long-term goals are important, it is equally imperative to offer immediate paybacks for program participation. Texas IOF offered training, energy consumption tool development, and peer networking and conferences.

- Be responsive to customer demands. Texas industries wanted solutions to stay competitive in the face of rising energy prices and more stringent NOx reduction regulations. In response, Texas IOF organized a major showcase event and two conferences on these topics.

- Build a virtual team. Work through partnerships in a state and regional network.

- There is strength in diversity. The integrated approach of involving industry-focused government agencies, research organizations, and environmental and energy experts is essential for industrial energy efficiency.

- All implementation is local. Provide local training opportunities, focus on plant and operations staff, and work with local training organizations.

- Focus in a geographical area, sector, or topic. Once credibility is proven, transfer to other sectors and areas. Use local partners to help facilitate this transfer.

Program at a Glance

Program Name: Texas Industries of the Future

Targeted Customer Segment: Industrial End Use

Program Start Date: 2001

Program Participants: 59 out of the top 195 or 30% of the largest industrial sites have staff that attended Texas IOF events. Leading chemical companies and refinery energy staff participate on the program advisory committee.

Annual Energy Savings Identified: Best Practice workshops are estimated to have saved 1.791 million MMBtu as a result of attendees using the software and implementing energy saving projects back at their plants.

Other Measures of Program Results to Date: An analysis of program results is available on the Texas IOF Web site.

Budget: Typically $187,000/yr; $395,800 in FY2009

Funding Sources: Texas State Energy Conservation Office, U.S. Department of Energy, Texas Committee on Environmental Quality

Best Person to Contact for Information about the Program:
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Texas Industries of the Future
Center for Energy and Environmental Resources
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Program Web Site
http://TexasIOF.ces.utexas.edu/

WSU ENERGY SERVICES INDUSTRIAL PROGRAM

Washington State University Extension Energy Program

Program Description

The Washington State University (WSU) Extension Energy Program is a self-supported department within the University's Extension Service. It receives project funding from federal and state government agencies, federal power marketing agencies, private corporations, the nonprofit Northwest Energy Efficiency Alliance, and several other sources. The Energy Program has a budget of about $24 million and a staff of approximately 110 working in Olympia, Spokane, and other satellite locations. Program customers range from industrial plants to private consulting firms, businesses, government agencies, and utilities. In addition to services described below, WSU develops industrial energy system optimization software (now available in five languages); helps with the identification, selection, and assessment of new and emerging technologies; performs building science research and training; promotes and supports renewable energy development; and responds to inquiries about energy efficiency from across the country—thousands of inquiries in a typical week. These activities help to generate the depth and breadth of expertise and experience among its staff to help Northwest manufacturers effectively develop and implement solutions that can generate energy savings that are cost-effective, reliable, and persistent while having a net-positive impact on plant operations.

WSU has been a leader in industrial energy efficiency programs and services since the 1970s and plays a key role in creating a strong and cohesive network of Northwest regional stakeholders. WSU is a go-to point for industry and other organizations wanting to learn about and work with the many industrial energy efficiency resources available throughout Washington State and the Northwest.

The WSU industrial program is comprised of professional energy engineers and energy specialists experienced in industrial process systems, as well as software developers and experienced project managers and coordinators. Several of the engineers are DOE Qualified Specialists certified in steam, process heating, and pumping system energy software tools and training. Support currently available through WSU includes plant assessments, industrial best practices trainings, technical assistance, policy advocacy, and project technical and financial support. WSU also has a comprehensive onsite Energy Library that supports the industrial program with Research Librarians and full access to University information resources. While WSU's services are available on a fee basis, the work it currently conducts in the Northwest is funded through state and federal agencies, allowing it to provide this support at no direct cost to industry.

WSU is almost entirely grant and contract funded; it receives no funding through the university or the legislature for the industrial program. As a result, it has become very creative at leveraging existing resources to compliment its budget, thus helping to create a more robust program offering to industry. WSU recognized early on that by leveraging the existing network of resources with those available through WSU, not only would it achieve success but it would also help strengthen the region's energy efficiency infrastructure so that energy efficiency improvements would continue independently of any particular program or organization. This approach is a key factor in the success and longevity of WSU's industrial program.

History

During the early 1990s, WSU began to manage DOE industrial information clearinghouse programs including the *Motor Challenge* initiative. WSU's industrial engineering expertise was "on call" for industries throughout the nation while WSU became deeply familiar with the DOE program portfolio of products and services. During this time period, WSU also contracted with the Bonneville Power Administration and the Western Area Power Administration to provide technical assistance services to an audience that included regional industrial customers and utilities. WSU's industrial staff capacity grew, the WSU Energy Library collection of industrial resources expanded, and opportunities to develop stakeholder relationships blossomed.

In 1997, WSU received a grant to assess the information needs of Washington and Oregon industries and gauge their awareness of industrial programs and resources available through DOE. In 2000, WSU received contract funding to promote DOE's Industries of the Future (IOF) program throughout the region. Working with the state energy offices in Oregon and Idaho, WSU delivered technical assistance services regionally, while further developing the regional infrastructure.

The WSU portfolio of programs, resources and expertise solidified during this first decade. This set the stage for subsequent DOE-funded efforts and regional cooperation such as popular and well-attended energy conferences and events, industrial best practices trainings, plant assessments, and customized technical assistance. WSU built upon the technical and program expertise to develop a comprehensive program for industries. To help strengthen the regional infrastructure, WSU focused on maintaining productive relationships with stakeholders, customers, and program funders including the Bonneville Power Administration, Northwest Food Processors Association, Northwest Energy Efficiency Alliance, Impact Washington (formerly Washington Manufacturing Services), energy offices in Idaho and Oregon, regional utilities, and industrial end-users. Those relationships assist the program planners, technical assistance providers, event planners, and librarians, and are the foundation for future success.

During the second decade of WSU's industrial program, topical expertise expanded and opportunities to provide financial incentives directly to industries allowed WSU to stimulate industry project implementation.

In 2004, DOE contracted with WSU to manage the CHP (Combined Heat and Power) Regional Application Center. The Application Center assists organizations with CHP projects that are economically viable and make efficient use of energy in Alaska, Idaho, Montana, Oregon, and Washington.

In 2006, the Washington State Attorney General appointed WSU to distribute state natural gas overcharge settlement funds to identify and implement energy efficiency improvements at manufacturing facilities in Washington State. The funding provided for technical assistance and assessment support, as well as industrial best practices trainings, policy advocacy, and project support for CHP efforts. The funds also allowed WSU to provide cash incentives to help buy-down project costs for energy-efficient capital improvements at industrial plants in the state.

WSU currently has a three-year DOE State Energy Program (SEP) contract in place working with the Oregon Department of Energy to provide technical energy efficiency support for industrial end-users in Oregon and Washington. Most recently, WSU received ARRA funds through DOE's Save Energy Now program to expand upon the SEP regional activities. This new award includes subcontracts with the Idaho Office of Energy Resources and the Montana Department of Environmental Quality to help promote technical resources for industries in Montana and Idaho, while expanding program delivery in Oregon and Washington.

Program Performance

For over a decade, the WSU Industrial Services program has raised awareness of industrial energy efficiency opportunities in the region. A central theme in the success of the program is the collaborative relationships it has developed and nurtured with stakeholders, which includes industrial end-users, other State Energy Offices and state agencies, trade associations, utilities, and other energy efficiency organizations. The program is very effective at working with others to "turn a little into a lot." WSU views itself as more than a single entity working on improving the energy intensity of the region, and more as part of a regional collaborative that is working both together and independently to positively influence industry's awareness of energy efficiency as a priority. Its successful collaborations with stakeholders go back many years, via the grant-funded efforts mentioned above and more, as well as collaborations for "the good of the order." WSU is currently a member of three energy advisory committees that meet quarterly, annually, and (in some cases) monthly to identify and create opportunities for making progress in the regional goal of energy

intensity reduction. The Northwest is viewed by many as a national leader in industrial energy efficiency, and WSU has played a key role in helping the region achieve this reputation.

Between 2004 and 2009, WSU helped conduct 46 trainings on Industrial best practices, training a total of 1,026 students. While previous industrial projects at WSU did not track direct energy savings or emissions benefits, since 2006 WSU has tracked savings data more closely. However, while attaching energy and cost savings to a recommended efficiency measure is relatively easy to calculate, attaching energy and cost savings to a technical assistance phone call or site visit is considerably more challenging. A follow-up effort conducted by WSU staff through DOE's EERE Information Center to quantify the success of technical assistance provided has shown its positive effects. Unfortunately, the industrial program cannot attach a number to the dozens of instances where it has provided technical support to industrial end-users and their resource providers.

WSU can quantify results of the capital energy improvement projects that have or will receive incentive funds through the natural gas settlement grant. Since 2006 as mentioned above, WSU has obligated nearly $1.5 million dollars towards capital projects with energy savings totaling approximately 35,000 MMBtu and over 22 million kWh annually from implemented projects, with another 142.6 MW coming from CHP projects being partially financed with incentive funds.

By partnering with electric utilities, WSU leverages its incentive funds with utility incentive funds to move projects forward that otherwise would have stalled due to lack of financing. In one case, WSU helped a local food processor apply for incentive funding through its utility, even going so far as completing the utility paperwork and technical analysis for the company, which resulted in a $500,000 utility incentive for the plant's $1.5 million project. The plant was previously unaware that utility incentives were even available.

WSU is on the planning committee for the 3rd Annual Industrial Energy Efficiency Summit, which was initiated with DOE funding in 2008 but has now become self-supporting with Northwest Food Processors Association, Northwest Energy Efficiency Alliance, Bonneville Power Administration, Energy Trust of Oregon, utilities, and other sponsors.

Lessons Learned

In the spirit of cooperation and coordination, WSU chose to not heavily brand their Industrial Services program and add to the myriad of competing program and organization identities, but rather worked hard to support and integrate existing programs to create a more coordinated and understandable approach for industrial end-users. Stakeholders appreciate this altruistic approach as well as the resulting support and referrals to their programs.

Contract and grant funding that are limited in time and specific in scope rarely include energy savings monitoring, and verification. A simplified approach to metrics gathering should be considered for inclusion in project negotiations.

Industries face technology and business challenges in their efforts to implement efficiency projects. A program approach that offers support at many levels in the company will be more effective than one focused exclusively on identifying plant energy improvements.

Program at a Glance

Program Name: WSU Energy Services Industrial Program

Targeted Customer Segment: Industrial energy users and stakeholders

Program Start Date: 2000 (Start of formal Industrial Program)

Program Participants: Approximately 2,200 participants in training, incentives, assessments, technical assistance, conference attendees, and *Newsbrief* subscribers.

Annual Energy Savings: Approximately 22 million kWh/year; 35,000 MMBtu; 142.6 installed MW from implemented or soon-to-be implemented projects.

Other Measures of Program Results to Date:
1,026 students trained in industrial efficiency; 4.5 million kWh/year, ~2 million MMBtu; 124 installed MW recommended through assessments conducted in 2008 and 2009.

Budget: Annual budget varies. Currently working with two DOE grant-funded projects: A three-year multi state project with the Oregon energy office as a sub-contractor totals approximately $800,000; and a two-year multi-state project with the Montana and Idaho energy offices as sub-contractors totals approximately $500,000. Also funded by the Washington State Attorney General's Office (natural gas overcharge settlement funds). Final year of a five-year project—total approximately $3.3 million.

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Program Web Site:
www.energy.wsu.edu/apps/Projects/IndustrialServices.aspx

CALIFORNIA HYBRID TRUCK AND BUS VOUCHER INCENTIVE PROJECT (HVIP)

California Air Resources Board and CALSTART

Program Description

The Hybrid Voucher Incentive Project (HVIP) is an innovative, streamlined incentive program that can become a national model for spurring low-carbon technology. The California Air Resources Board (ARB) created the HVIP in 2009 to speed the market introduction of low-emitting hybrid trucks and buses by reducing their cost for fleets that purchase and operate these vehicles in the state of California. The HVIP voucher is intended to reduce about half the incremental costs of purchasing hybrid heavy-duty trucks and buses and thereby change fleet purchase decisions. Voucher amounts range from $10,000 to $45,000 per vehicle and fleets are limited to 100 vouchers apiece. Recommendations for the voucher structure were strongly supported by fleet users and manufacturers, and validated by data developed by the national Hybrid Truck Users Forum (HTUF) program.

Hybrid trucks and buses are fairly new technology and are therefore more expensive than traditional vehicles, especially in the early market when production volumes are low. ARB recognizes that hybrids have the proven ability to reduce criteria and greenhouse gas (GHG) pollutants in California and aims to accelerate the penetration of these cleaner vehicles to meet state clean air regulations and climate change goals. HVIP will help fleets purchase hybrids immediately and will meaningfully increase the production of these vehicles.

HVIP is a highly “leveraged” project, with fleet purchasers providing more than 3.5 times the investment of the state as their share of the truck purchase (truck cost plus their share of the incremental cost). Market research indicates that the biggest impediment to widespread commercialization of hybrid technology is the high upfront purchasing cost. By targeting only half the incremental cost—the amount identified by research of HTUF and its Incentives Working Group to be the primary barrier to purchase—HVIP can spread funds across far more vehicle purchases.

HVIP is a first-of-its-kind incentive program that speeds, targets, and streamlines the process of helping fleets transition to low-emitting trucks. Typical incentive programs involve laborious and costly proposal efforts with no certainty of result. Contract negotiations required for previous programs would delay purchases until all agreements were in place. In contrast, the HVIP program provides customers a simple list of eligible vehicles and voucher amounts. Customers request vouchers at the time of the truck order so fleets know if they qualify and HVIP delivers funding at the time of purchase to reduce fleet out-of-pocket capital costs. HVIP directs incentives to dealers as well, who can then pass on reduced cost vehicles directly to purchasers without requiring purchasers to cover the full cost of the vehicle and wait for a rebate. This model eliminates several key barriers: cost, lack of certainty, and capital constraints.

In addition to the uniqueness of the program itself, its implementation is also innovative. Dealers are trained and qualified on a rolling basis to apply for vouchers online. The funding amounts are shown in real time on the Web site, and as the program is implemented, a digital archive of truck and bus details will be available to ARB for analysis, including vehicle usage data.

The HVIP project offers an automated, easy-to-understand Web portal that allows participants to request, track, and fulfill their vouchers through an online process. Augmenting this, a toll-free number is operating for real-time questions and assistance, and online and face-to-face recruitment and training is provided. HVIP has a number of different “customers,” all of who have reported satisfaction with the project thus far. Almost half the voucher funds were been requested during the first quarter of the program. Dealers trained in person and online report that the site training and voucher application process is easy to use.

HVIP is a California Air Resources Board (ARB) funded project; it is being led and implemented by the 501(c)3 nonprofit CALSTART. CALSTART is a national organization focused on developing and growing a clean, advanced transportation technologies industry. ARB developed the rules, structure, and implementation manual for the project. CALSTART implements the project and established the voucher request and tracking Web site; fleet and dealer training and registration process; voucher approval, validation, tracking, payment, and compliance; and design fleet reporting protocol.

Program Performance and Potential

Approximately 675 trucks and buses will be purchased using the HVIP voucher buydowns in its first year, and as many as 3,000 to 5,500 over its proposed 3 to 5 year lifetime, if funded. In its first year HVIP alone could almost double the number of hybrid vehicles on the road nationwide (now estimated at 2,000 units), which represents a highly meaningful market spur. By helping truck and system makers sell their higher-cost early production units, the HVIP effort builds the volume needed to reach lower price points and greater market penetration faster. Additionally, qualified truck and bus makers will benefit by increasing production and building demand for cleaner vehicles in the future.

Hybrid trucks and buses have been shown in testing to reduce both greenhouse gases and fuel use by 20–50%, depending on the vehicle and its application. Some hybrids are showing even greater reductions, especially when combining reductions from turning off the engine at work sites and at stops, incorporating advanced designs, and including low-carbon fuels. Hybrids also further reduce criteria (smog-causing) emissions beyond the level of the certified engine in the vehicle (on a gram/mile basis). ARB estimates this reduction at 25%.

Hybrid technology is also an important strategic advantage for the United States: U.S. and North American manufacturers are currently the world's leaders in developing and producing these vehicles, which retain jobs today and create new green tech jobs in the years ahead. Employment studies now being performed by CALSTART and Union of Concerned Scientists (UCS) will show the potential for thousands of jobs to be retained and created through the development and production of hybrid truck technologies in the United States.

One of the most exciting elements of the California HVIP project is its ability to be exported to other states or federally, or to be used as a model for additional incentive programs targeting other cutting-edge, energy efficiency technologies. CALSTART is in discussions with other states to model their incentive programs on HVIP, and has proposed the model to EPA and DOE as a structure for federal incentive distribution. ARB also granted other government entities access to the Web and database architecture created for the program, lowering the risk for other agencies to "piggy-back" on the program design.

HVIP is also ideally designed to become a performance-based system, potentially providing vouchers for vehicles based on their performance in reducing energy, climate change and criteria impacts. The ARB created a system for truck and bus makers to qualify their vehicles, proving their energy savings, and providing generous discounts to "bridge the gap" between existing high-efficiency technologies and fleets' ability to pay for them. From easy-to-duplicate online training modules to fraud deterrent policies to determine viability of voucher applications, the ARB has created an innovative and replicable program that can have far-reaching impacts nationally and across technologies, reducing dependence on fossil fuels, cleaning the air, and ramping up nascent clean technologies.

Program at a Glance

Program Name: California Hybrid Truck and Bus Voucher Incentive Project (HVIP)

Targeted Customer Segments: Transportation fleets utilizing medium- and heavy-duty trucks and buses.

Program Start Date: February 2010

Program Participants: 87 dealers registered (many more trained); over 100 fleets reached though outreach and training

Other Measures of Program Results: As many as 800 trucks and buses will be purchased this year through the HVIP program, which would have an annual estimated energy savings of 1,600,000 gallons of diesel fuel, reducing yearly nearly 18,000 tons of carbon emissions.

Budget: For State FY 10/11, HVIP's budget is roughly $20,000,000

Funding Sources: Voucher fund is a 100% state-funded project through the California Air Resources Board.

Best Person to Contact for Information about the Program:
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Program Web Site:
http://www.californiahvip.org

CHAPTER 40R / SMART GROWTH ZONING OVERLAY DISTRICTS

Massachusetts Department of Housing & Community Development

Program Description

Chapter 40R, otherwise known as the Smart Growth Zoning and Housing Production Act, was enacted in 2004 to encourage higher-density, mixed-income housing production in smart growth locations by providing financial incentives to municipalities that establish zoning overlay districts satisfying certain minimum thresholds pertaining to location, allowable residential density, and affordability.

The financial incentives under 40R consist of two different types of payments. The first payment, the Zoning Incentive Payment, is a one-time-per-district payment ranging from as low as $10,000 for districts allowing 20 or fewer additional residential units to as high as $600,000 for districts allowing in excess of 500 units, relative to what the existing zoning already allowed. Communities become eligible for the Incentive Payment upon adoption of the 40R District and Smart Growth Zoning regulations. A community does not have to return the Incentive Payment so long as construction commences on at least one 40R Project within 3 years of receiving the Incentive Payment.

The second type of 40R payment, referred to as Density Bonus Payments, consists of $3,000 per additional unit that receives a building permit under 40R. Depending upon the number, size, phasing, etc., of projects developed within the District, this may involve a single lump sum payment or periodic payments as building permits are issued for new housing units within the District.

In addition to the Incentive and Density Bonus Payments available under 40R, participating municipalities may also be eligible for associated school-cost reimbursement through a companion piece of legislation, Chapter 40S. Chapter 40S is intended to cover any net increases in education costs resulting directly from new students living in 40R units and enrolling in the local school system. The Division of Local Services within the Massachusetts Department of Revenue administers Chapter 40S and issued accompanying 40S regulations (830 CMR 40S.1.1).

The Eligible Locations

The first step in establishing a 40R district is the identification of a qualifying area containing one or more developable parcels. Chapter 40R and the accompanying regulations (760 CMR 59.00) outline three types of eligible locations: areas within a half mile of a transit station (e.g., subway, commuter/inter-city rail, bus. or ferry terminal), Areas of Concentrated Development (existing city or town centers, existing rural villages, or other existing commercial districts), and Highly Suitable Locations that meet various minimum criteria for smart growth. While this third category is less easily defined, necessary characteristics include existing or planned infrastructure, designation as an area suitable for high-density or mixed-use development in a local or regional plan, or complimentary designation under other state programs. Depending upon the characteristics of the proposed district, other required existing features may include significant pedestrian accessible destinations of frequent use such as relevant/complimentary retail services, public, institutional, and recreational uses within half mile of the proposed District as well as overall consistency with smart growth as defined by the statute.

The Process

Once a suitable area has been identified, a community can begin preparing the application for a formal determination of 40R eligibility by DHCD. The application includes a number of components such as the proposed Smart Growth Zoning Bylaw and any accompanying Design Standards, maps showing the location of the proposed district that support the designation as an Eligible Location, calculations demonstrating the number of new units that the Smart Growth overlay zoning regulations will allow, documentation of a local comprehensive housing plan, and local certifications in regard to existing zoning and infrastructure capacity. Prior to submitting the application to DHCD, the Chief

Executive Official for the municipality must hold a public hearing on the proposed District in order to ensure at least a threshold level of public outreach and opportunity for comment.

Once the application has been submitted to DHCD, it reviews the proposed Smart Growth zoning regulations and accompanying materials for consistency with Chapter 40R and its corresponding regulations. If the application is complete and the proposed District meets the criteria for an Eligible Location, DHCD issues a Letter of Eligibility, which is a prerequisite for municipal adoption of the Smart Growth Zoning. After receiving the Letter of Eligibility, the municipality can proceed with local adoption of the proposed Smart Growth Zoning map and regulations via the usual applicable local process for the enactment of zoning amendments.

If the Smart Growth Zoning map and regulations are adopted and, in the case of towns, approved by the Attorney General, the community can then submit the zoning and proof of adoption to DHCD for final approval. If DHCD finds that the Smart Growth Zoning regulations and any amendments thereto remain consistent with the statute and regulations, it will then issue a Letter of Approval, which constitutes final approval of the District. Any amendment to the Smart Growth Zoning made after final approval also requires the approval of DHCD.

While municipalities may begin reviewing 40R Project applications before final approval by DHCD, the local Smart Growth Zoning review board cannot approve any 40R Project until DHCD issues the Letter of Approval. It should be noted that DHCD does not approve specific 40R Projects proposed under the Smart Growth Zoning Act. 40R Projects are approved locally in accordance with the provisions of the Smart Growth Zoning regulations. However, DHCD does approve the project-specific Affirmative Fair Housing Marketing Plans (AFHMP) and the Affordable Housing Restriction. .

The 40R statute passed in 2004, regulations were issued at the beginning of 2006, and the first applications were received in February of 2006. The school cost reimbursement component appeared in the original legislation but was stripped from the bill and passed separately a year later as Chapter 40S.

The basic concept behind Chapters 40R and 40S was put forward by the Commonwealth Housing Task Force, an independent organization made up of a diverse group of interests representing individuals and organizations involved in housing, planning, and economic development.

Program Performance

Chapter 40R has two basic financial incentive components—the zoning incentive payment and the density bonus payment. The Zoning Incentive Payment rewards Massachusetts cities and towns that adopt smart growth overlay zones that encourage higher density housing and mixed use development. Because, among perhaps other factors, these overlay zones only encourage/allow, rather than compel, landowners to take advantage of the new zoning, it is difficult to estimate the likely energy and emissions impact of this aspect of the program. The program is relatively young and to a large extent, its initial implementation has coincided with a historic collapse of the economy and, in particular, the real estate market. That said, to the extent that the additional 10,000+ smart growth units that are now zoned under 40R are able to relieve growth pressure that might otherwise result in less compact, more land/energy consumptive development, corresponding energy and emissions savings will be realized.

The second financial incentive component, the Density Bonus Payment, is more directly tied to the actual construction of housing via the issuance of corresponding building permits. To date, there are a minimum of 1,224 residential units that have received building permits under Chapter 40R and are either completed or in construction. All of these units are multifamily and in locations with smart growth/compact development characteristics. Approximately 37% of the districts are in locations where the *existing* conditions score a “very walkable” or better rating from the Web site Walkscore.com. Of those with lower scores, virtually all are within a half mile of a transit station, a redevelopment site, or both. Ninety-two percent of the 40R Districts that have received eligibility or

approval to date either allow mixed-use or are within walking distance of retail/services. By some estimates, the total energy use (transportation + home) of the average urban household is 41% less than that of the average suburban household.[6]

In a report on California's Zero Energy New Homes (ZENH) Program, which in turn cites a 1990 Department of Energy report on Household Energy Consumption and Expenditures, "multi-family housing has less than half the energy use per household as compared to a single-family home because of smaller spaces, shared walls and the potential for central systems."[7]

The authors of "Growing Cooler: The Evidence on Urban Development and Climate Change" from the Urban Land Institute calculate:

> Shifting 60 percent of new growth to compact patterns would save 79 million metric tons of CO_2 annually by 2030. The savings over that period equate to a 28 percent increase in federal vehicle emissions standards, generating one-half of the cumulative savings of the new 35 mpg CAFÉ standards. Every resident of a compact neighborhood would provide the environmental benefit expected from, say, driving one of today's efficient hybrid cars… As a rule of thumb, it is realistic to assume a 30 percent cut in VMT with compact development… Making reasonable assumptions about growth rates, the market share of compact development, and the relationship between VMT and CO_2, smart growth could, by itself, reduce total transportation-related CO_2 emissions from current trends by 7 to 10 percent in 2050. [8]

Lessons Learned

- A voluntary smart growth zoning program that relies exclusively on financial incentives can by itself attract participation from larger urban communities interested in revitalizing their downtowns but may require accompanying mandates to attract a similar degree of participation from suburban and rural communities that may be more conflicted about housing development/densities.
- The availability of a dedicated source of upfront planning funds can help make a program such as 40R accessible to more municipalities and enable additional public outreach and participation at the local level.
- For many communities, 40R provides a welcome alternative zoning mechanism for making progress towards local and regional affordable housing goals.
- Smart growth is not only about where you build but also how and what you build, and the more the design of a program such as 40R acknowledges this, the greater the smart growth and energy efficiency benefits.
- To date, actual development under 40R has been exclusively multifamily construction even though 40R explicitly allows zoning for single-family at 8+ units/acre. To the extent higher-density single-family on small lots is also a priority in terms of greater diversification of the new-construction, mixed-income housing stock, program modifications may be necessary in order to make this option more attractive to both developers and municipalities.

[6] http://www.cities21.org/HomeEnergyUseJonathanRoseLLC.xls
[7] http://www.bira.ws/files/ACEEEPowerlightGobalGreenUSAPaper516.pdf
[8] Reid Ewing et al. 2007. *Growing Cooler: The Evidence on Urban Development and Climate Change.* Washington, DC.: The Urban Land Institute.

Program at a Glance

Program Name: Chapter 40R / Smart Growth Overlay Districts

Targeted Customer Segments: Massachusetts cities and towns; public and private sector planning communities; residential and commercial development sector

Program Start Date: February 2006

Program Participants: 38 Eligible or Approved districts in 36 communities

Other Measures of Program Results: 10,000+ smart growth units that are now zoned under 40R.

Budget: Funded by Smart Growth Housing Trust Fund (SGHTF). Due to the state budget challenges and emergency funding priorities, $18M was taken out of the SGHTF. Of the balance ($4M), approximately $1,341,190 in recent 40R payments to municipalities have been made, leaving the current balance at $2,658,810. It is not certain at this time what if any proceeds will be received in the coming fiscal year from the closed-out housing finance program or other sources. Legislation has been filed to establish a more predictable and reliable funding source.

Funding Sources: The Smart Growth Housing Trust Fund (SGHTF) was initially funded through revenues from the sale of state surplus land over the course of several years. The trust fund has also received funds periodically based on a formula/percentage of revenues from a closed housing finance program.

Best Person to Contact for Information about the Program:
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Useful Web Sites:

Chapter 40R Program Web site:

http://www.mass.gov/?pageID=ehedterminal&L=3&L0=Home&L1=Community+Development&L2=Community+Planning&sid=Ehed&b=terminalcontent&f=dhcd_cd_ch40r_ch40r&csid=Ehed

NEW JERSEY PAY FOR PERFORMANCE

New Jersey's Clean Energy Program

Program Description

The Pay for Performance Program takes a comprehensive, whole-building approach to energy efficiency in existing commercial and industrial buildings. Similar to performance contracting programs offered in other states, this program links incentives directly to energy savings and includes a measurement and verification component to ensure that the estimated savings levels are achieved. This market-based program relies on a network of program Partners that provide technical services to participants, acting as their "energy expert." Partners are required to develop an Energy Reduction Plan (ERP) for each project. The ERP includes the whole-building technical analysis component of a traditional energy audit, along with a financial plan for funding the energy efficiency improvements and a construction schedule for installation. A set minimum source energy reduction of 15% is required of all projects, which is based on an approved whole-building energy simulation. The achievement of the energy reduction goal is verified using post-retrofit billing data and EPA's Portfolio Manager, an energy performance benchmarking tool. For building types that are not addressed by Portfolio Manager, buildings follow an alternative approach based on the LEED Existing Building method.

Pay for Performance is available to existing commercial, industrial, and institutional facilities in the state of New Jersey with an annual peak electric demand over 200 kW. The facilities that are eligible for this program include hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls, restaurants, etc. Buildings that fall into five specific customer classes are not required to meet the 200 kW demand in order to participate in the program: hospitals, public colleges and universities, nonprofit organizations, affordable multifamily housing, and local governmental entities. The program also accommodates new construction projects. Commercial, industrial, and institutional buildings with 50,000 square feet or more of planned conditioned space are eligible to participate.

Network of Partners

The network of approved Pay for Performance Partners provides technical, financial, and construction-related services. One of the goals of this program is to expand the network of energy efficiency firms that can provide these services in order to make the incentives more accessible to commercial and industrial customers. This market-based approach helps develop the workforce capacity necessary to achieve ambitious energy savings targets.

Program Incentives

Program incentives are performance-based and not specifically tied to the project cost or the recommended energy efficiency measures. Disassociating incentives from project cost is a key program design feature that streamlines program administration by eliminating the collection of bid documents, construction contracts, and change orders. This incentive structure also provides the benefit of allowing Partners to estimate and explain incentives to prospective participants as part of the program sales process. Participants are more inclined to invest in multiple improvements because the program incentives increase with higher savings levels. Program incentives may not exceed 50% of the total project cost. Incentives are released in three phases, upon completion of specific milestones:

1. Completion of the Energy Reduction Plan (ERP)
    a. Intended to offset cost of services required for completion of ERP
    b. Incentive based on square footage of facility
    c. Incentive not to exceed 50% of facility annual energy cost
2. Installation of all recommended measures per the Energy Reduction Plan
    a. Incentive based on a projected energy savings
    b. Intended to serve as 60% of the total performance incentive

3. Completion of Final Benchmarking Report, including M&V
    a. The report includes verified post-construction energy use
    b. Actual source energy savings are calculated using the EPA's Portfolio Manager
    c. Remaining 40% of the performance incentive, tied to actual source energy reduction achieved

There are additional incentives available for combined heat and power (CHP) projects. The facility's approved ERP must include a projected minimum savings of 15% in order to access the CHP advanced measure incentives.

Program Performance

March 19, 2010 closed out the first year of the Pay for Performance Program's Existing Buildings component, which included substantial Partner and building owner participation. In the first year the program received nearly 100 project applications. Twenty-three projects are well into their design and analysis phases, and eight more projects are nearing the end of their construction phases. Pay for Performance—New Construction was launched in November 2009 and currently has eight applications. Between both components, nearly $5 million in incentives has been committed toward these projects.

Pay for Performance requires that existing buildings save 15% in source energy in order to qualify for incentives, which is an ambitious but attainable goal. Similarly the new construction component of the program requires any new buildings or major renovations to be constructed in a manner that saves 15% in energy costs below the state energy code.

Pay for Performance created a large network of program Partners and utilized this talented pool of energy companies to co-market and deliver the program. There are currently 102 Partner companies participating in the existing buildings component and 46 offering their services on new construction projects. The additional work created by the program serves to stimulate job growth for the engineering community and benefits the state's economy. Existing EPA tools, such as Portfolio Manager and Target Finder, are integrated into the program to tie in federal resources and expand the skill level of the Partners and participants. The use of national standards, such as LEED and ASHRAE 90.1-2004, in both the Existing and New Construction components of the program, is another effective way to integrate existing resources into the New Jersey market.

Lessons Learned

While Pay for Performance experienced much success in its first year, there were obstacles to address. Some of the challenges involved responding to the market's impression of this new program. Although many contractors and building owners found the program exciting, others found it cumbersome or confusing. A strong marketing and outreach effort, along with comprehensive Partner training, helped overcome these hurdles.

Because Pay for Performance offers incentives based on savings rather than project cost, the application process requires Partners to model the proposed buildings' current energy use and potential savings from efficiency improvements using advanced building modeling software. The savings estimates provided by the modeling tools are then used as a basis for funding. However, program administrators quickly learned that many Partners do not have experience with advanced building modeling tools. As a result, applications often contained incorrect or incomplete building models, requiring administrators to carefully verify potential savings claims. To assist Partners that are new to modeling software, Pay for Performance holds day-long orientation classes and offers access to eQUEST experts who hold periodic conference calls to help Partners troubleshoot their projects. Additionally, for all new construction projects, Pay for Performance offers a subsidized rate for modeling software training.

Adapting the program to the many types of unexpected or unconventional proposed projects created another major barrier to wide-scale acceptance. Pay for Performance was originally designed to serve one building at a time, but projects began pouring in that contained multiple buildings on master-meters, or that were served by a central plant. Other projects involved high energy use process equipment or waste-water equipment. There were some buildings that were mega energy users, such as Atlantic City's hotels and casinos, which needed extra help participating in the program. Over the first few months, TRC responded to the market demand by adopting additional guidelines to instruct program Partners on how to handle these types of facilities. Program administrators found that they often needed to tailor the program to individual project's needs.

Multifamily building owners and managers in New Jersey also began to show a great deal of interest in participating, which brought additional challenges due to some overlap with existing programs. The C&I and Residential Market Managers were able to develop a sound approach to guide prospective participants into the appropriate component of New Jersey's Clean Energy Program.

Representatives continue to receive inquiries about projects that require investigation and program adaptation. The goal of Pay for Performance is to be as inclusive as possible without losing the integrity of the program, which requires a continuous and dedicated response to market demands.

Program at a Glance

Program Name: New Jersey's Clean Energy Program—Pay for Performance	**Budget:** $52,395,112 for 2010
Targeted Customer Segments: Commercial, Industrial, Multifamily	**Funding Sources:** Societal Benefit Charge. Additional funding is expected from the American Recovery and Reinvestment Act.
Program Start Date: March 2009	**Best Person to Contact for Information about the Program:**
Program Participants: 66 entities participating, which equates to 98 separate projects and 252 buildings to date.	Valentina Rozanova 732-855-2882 vrozanova@trcsolutions.com
Direct Energy Savings: Based on current data, an average project is expected to save approximately 800,000 kWh annually and around 2,000 MMBtu annually through participation in the Program.	**Program Web Site:** http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance