Strategic Investments Yield Energy, Economic, and Environmental Benefits

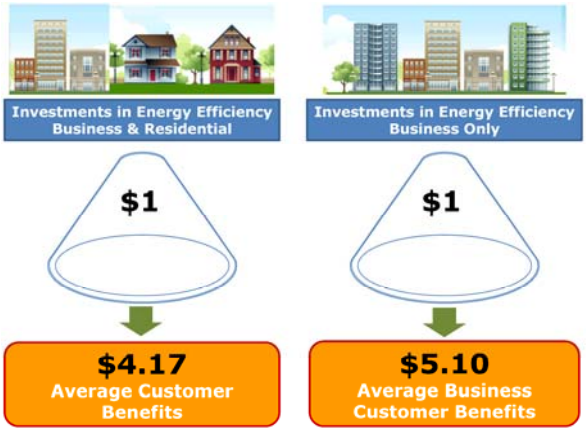
The 2011 Report of the Massachusetts Energy Efficiency Advisory Council

Prepared for the Massachusetts General Court,
the Joint Committee on Telecommunications, Utilities and Energy,
and the Department of Public Utilities
September 2012

A MESSAGE FROM THE CHAIR

In 2011, residents, businesses, and institutions across the Commonwealth continued to embrace energy efficiency as our state's "First Fuel." As they did, Massachusetts caught the eye of the nation, thanks to the ongoing commitment of the State Legislature and the Patrick-Murray Administration to implement the Green Communities Act and deliver all available cost effective energy efficiency. In October 2011, Massachusetts was named the #1 state for energy efficiency in the prominent American Council for an Energy Efficient Economy's (ACEEE) State Energy Efficiency Scorecard. This honor was due in large part to the state's energy policies and to the results delivered by the state's energy efficiency Program Administrators.

Massachusetts' energy efficiency programs, under the statewide Mass Save® brand, helped participants save 790 million kilowatt hours of electricity — enough to power 109,707 homes for a year. They saved more than 15 million therms of natural gas — enough to heat nearly 15,000 homes for a year. In addition, this drop in energy consumption reduced greenhouse gas emissions by more than 431,000 tons — the equivalent of taking 84,681 cars off our roads for a whole year.



The energy savings for residents and businesses and the benefits for our environment in 2011 are exciting. For every dollar invested in energy efficiency, the benefit to the average participant is $4.17. The results are even more impressive for business participants, who enjoy an average of $5.10 in benefits for that same invested dollar.

The Energy Efficiency Advisory Council guides the progress of the Three-Year Plans and continues to push for more energy savings for each participant, improved participant awareness and experience, and more technological and programmatic innovations. The Council advocates for long term solutions, such as long term energy plans with large energy users, high efficiency street light programs for cities and towns, and easy access for all residents and businesses.

We thank the Councilors, the Program Administrators, the Council consultants and the team at the Department of Energy Resources for their partnership, exemplary efforts, and dedication to providing nation leading opportunities to make energy efficiency our first fuel. We look forward to accomplishing the goals of the 2010-2012 Three-Year Plans and developing impressive plans for 2013-2015 to help Massachusetts residents and businesses further reduce their energy consumption and protect our environment.

Mark Sylvia
Commissioner, Massachusetts Department of Energy Resources
Chair, Massachusetts Energy Efficiency Advisory Council

Christina Halfpenny
Director, DOER Division of Energy Efficiency
Designated Chairperson, Massachusetts Energy Efficiency Advisory Council

EXECUTIVE SUMMARY
ENERGY EFFICIENCY ADVISORY COUNCIL
2011 REPORT TO THE MASSACHUSETTS LEGISLATURE

Governor Deval Patrick, in partnership with the Massachusetts Legislature, set the Commonwealth on a path to nation-leading investments—and return on investments—in energy efficiency in public and private buildings when he signed the Green Communities Act of 2008 (Act)[1].

The Act's mandate to capture all cost-effective energy efficiency opportunities drove the development of the first Massachusetts Joint Statewide Three-Year Energy Efficiency Plans (Three-Year Plans) for 2010-2012, approved by the Department of Public Utilities (DPU) in January 2010. These plans call for an investment of just over $2 billion with an anticipated return of nearly $6 billion in benefits. This report presents a summary of program activities and highlights from the second year of programs delivered pursuant to the Act and subsequent DPU orders.

GOALS FOR 2010-2012

The Program Administrators (PAs), Massachusetts' investor-owned electric and gas utilities and energy efficiency service providers, are implementing the Three-Year Plans. Developed jointly with the Energy Efficiency Advisory Council (EEAC), these plans are the most ambitious energy efficiency efforts anywhere in the United States.

Three-Year Plans Goals	2010	2011	2012	Total
Total Benefits (million $)	$1,355	$2,022	$2,520	$5,877
Annual Electric Savings (GWh)	600	908	1,107	2,615
Annual Gas Savings (million therms)	14.4	18.1	25.3	57.8
Annual GHG Reductions (metric tons)	343,000	500,000	627,000	1,470,000

The 2011 goals were modified from the original Three-Year Plans, as documented in the 2011 Mid-Term Modifications[2] (MTM) filed with the DPU by the PAs.

The Three-Year Plans are projected to produce the following results by the end of 2012.

- **Nearly $4 billion in net lifetime benefits to the citizens and businesses of Massachusetts**, based on $2.1 billion in total spending by programs and participants, generating nearly $6 billion in total lifetime benefits[3].
- **Electric savings of over 2,600 GWh over three years**, with 2012 savings representing 2.4 percent of annual retail energy sales. Lifetime electric savings from the Three-Year Plans are projected to exceed 30,000 GWh[4].

[1] An Act Relative to Green Communities, Chapter 169 of the Acts of 2008.

[2] These modifications account for changes in the operating environment (e.g., falling natural gas prices), results of evaluation studies, and subsequent program changes.

[3] The energy and non-energy benefits from investments in energy efficiency. Energy benefits include the value of avoided energy purchases, reductions in operations & maintenance costs, and other resource savings (e.g., water or raw materials). Non-energy benefits include reduced pollutant emissions and increased comfort or worker productivity.

[4] 'Annual' refers to the savings resulting from installed efficiency improvements operating for one year. Lifetime savings refer to the sum total of savings over the entire life of the efficiency measures. For example, a CFL that saves 50 kWh per year and lasts 5 years will have lifetime savings of 250 kWh.

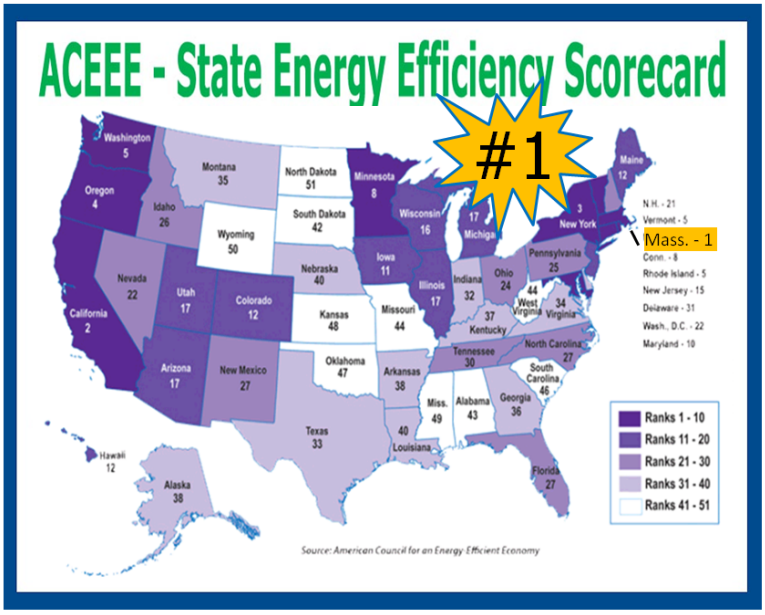
- **Natural gas savings of nearly 60 million therms over three years**, with 2012 savings representing 1.15 percent of annual retail gas sales. Lifetime gas savings from the Three-Year Plans are projected to reach nearly 900 million therms
- **Greenhouse gas (GHG) reductions of nearly 1.6 million metric tons over three years**. Lifetime greenhouse gas reductions from the Three-Year Plans are nearly 19 million metric tons.

2011 Highlights and Results

In 2011, the PAs delivered Mass Save programs with improvements driven by participant engagement and feedback, evaluation and measurement of the 2010 programs, and program pilots and enhancements that were tested the prior year. Collaborations were established with DOER's Green Communities Division, working to better serve cities and towns throughout the Commonwealth, and with the state's Leading by Example program and the Department of Capital Asset Management, to reduce energy consumption in state government operations.

American Council for an Energy Efficiency Economy (ACEEE)

THE 2011 STATE ENERGY EFFICIENCY SCORECARD



Highlights of the year's activity include the following.

- Massachusetts earned the #1 ranking in the American Council for an Energy Efficient Economy's annual State Energy Efficiency Scorecard.
- Mass Save, the single statewide energy efficiency brand, continued to build awareness of and participation in programs available to all residential, commercial, and industrial participants in investor-owned electric and natural gas service territories.
- The market model for Mass Save Home Energy Services (HES) was redesigned to include a diversity of home contractor business models, following an extensive program review process that included input from contractors and multiple stakeholders.
- The New Homes program received the U.S. Environmental Protection Agency's ENERGY STAR® Award for Sustained Excellence.
- The low income program served 26,000 participants in single-family and multi-family dwellings.
- Commercial and industrial programs achieved deeper savings from a broad range of participants by negotiating customized, multi-year agreements with large participants, and delivering advanced lighting improvements by working with manufacturers and distributors to make it cost-competitive for business participants to choose higher efficiency lighting products.
- Rigorous statewide investment in the Evaluation, Measurement & Verification (EM&V) program continued to yield data through third party assessments and recommendations to improve programs and processes through scientific and consistent review.

Commercial & Industrial (C&I) Lighting Program: Reducing Prices for New Technology

The C&I electric program partners, led by NSTAR, developed an "upstream" lighting program to work with electrical distributors and lighting manufacturers to offer discounted high efficiency lighting to Mass Save participants. The goal of the program is to shift the market away from less efficient standard lighting technology to more efficient technologies, such as reduced wattage linear fluorescent lamps and LEDs. This approach complements the traditional "downstream" approach in which PAs work directly with participants and installers to provide lower cost efficient lighting.

Through an agreement with participating electrical distributors, the PAs pay the higher cost of eligible lamps directly to the distributor, accelerating the use of new technologies by removing the initial cost hurdle for participants. As a result, participants receive premium replacement technology at a cost comparable to that of conventional products. The lamps have lower wattage and longer life, creating three ways to save: lower bills, fewer replacements, and reduced labor costs.

LED directional replacement lamps, for example, are an excellent substitute for conventional halogen lamps typically used in spot and track lighting applications. They provide up to 80 percent energy and cost savings, last at least ten times longer than traditional lamps, and produce less heat output for greater participant comfort and lower cooling costs. They're a good choice for retail stores, restaurants, hotels, museums and galleries. The incentives range from $10-$35 for each LED lamp.

The upstream lighting program has already had a number of successes. More than six leading lighting manufacturers have signed Memoranda of Understanding (MOUs) with the PAs to support the program. Over 30 electrical distributors have joined the effort, providing coverage across the state, and the PAs have provided incentives for hundreds of thousands of lamps.

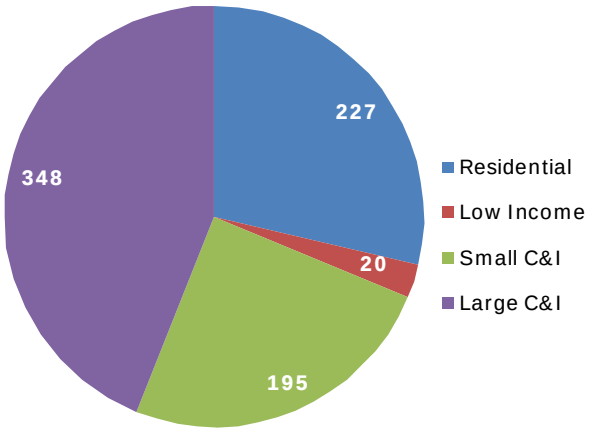
Table 1: 2011 Progress on Goals for All Programs

	Annual	% of goal	Lifetime	% of goal
Participants (thousands)	1,902	133%	*N/A*	N/A
Total Benefits (million $)	*N/A*	*N/A*	1,640	82%
Electricity Savings (GWh)	790	87%	10,503	100%
Gas Savings (million therms)	15	83%	208	75%
Oil Savings (million gallons)	2.4	*N/A*	*N/A*	*N/A*
GHG Reductions (metric tons)	431,875	86%	5,778,601	89%
NOx reductions (metric tons)	185	87%	2,459	101%
SO2 reductions (metric tons)	524	87%	6,967	101%
Program Spending (million $)	367	71%	*N/A*	*N/A*

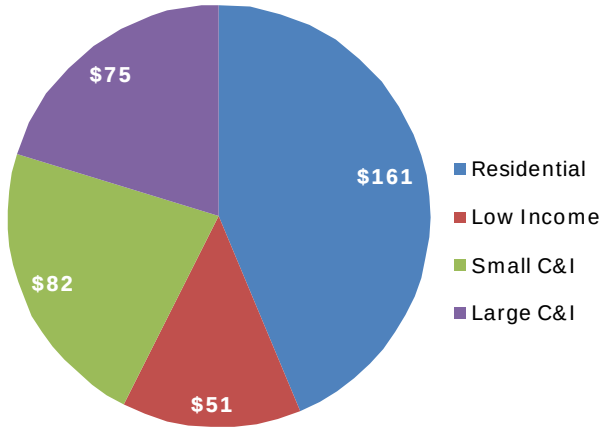
Another view of the annual energy savings is represented by these icons throughout the report		**2011**
Homes powered for a year		109,707
Homes heated for a year		14,883
Greenhouse gas emission reductions from cars per year		84,681

2011 Results by Sector

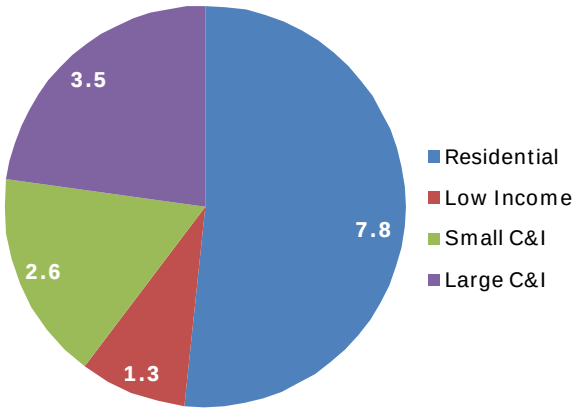
2011 Electric Savings by Program (GWh)



2011 Spending by Program (million $)



2011 Thermal Savings by Program (million therms)



Looking Forward

The final year of the Three-Year Plans implementation, 2012, will have a double focus: achieving the 2012 goals and developing the next set of Three-Year Plans to continue Massachusetts' pursuit of all cost-effective energy efficiency. The latter will require the EEAC and PAs to chart a course that responds to changing economic, technological, and regulatory conditions. It will also need to respond to participant, contractor, vendor, and other stakeholders feedback. Other topics the Council plans to address in 2012 include the following:

- Improving the cost efficiency of program delivery and pursue outside funding and financing options to leverage program funds and maximize benefits
- Refining the coordination and integration of gas and electric program administration to provide seamless program offerings and branding to residents and businesses
- Delivering consistent statewide programs in all PA service territories
- Exploring and developing a statewide data management and analytics system to enable better transparency of savings and benefits, and reduce administrative time spent on reporting
- Continuing to develop program strategies for deeper long term energy savings for all participants
- Integrating best practices reviews, including participant experience, into the planning and implementation efforts.

ENERGY EFFICIENCY ADVISORY COUNCIL
2011 REPORT TO THE MASSACHUSETTS LEGISLATURE

History

The current framework for energy efficiency delivery was developed in response to the mandates of the Green Communities Act. The Massachusetts Joint Statewide Three-Year Energy Electric and Natural Gas Efficiency Plans (2010-2012) stand on the foundation of 20 years of delivering well established, highly regarded energy efficiency programs, and are the result of several years of effort by the Commonwealth's gas and electric distribution companies and municipal aggregators (Program Administrators or PAs), the Department of Public Utilities (DPU), the Department of Energy Resources (DOER) and many interested stakeholders in the public, private, and non-profit sectors.

Three Acts signed into law in 2008 guide the continued evolution of efficiency programs in Massachusetts.

1. The **Green Communities Act** requires the PAs to develop energy efficiency plans that will "provide for the acquisition of all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply." In connection with these energy efficiency plans, the Act established the EEAC to oversee and advise the PAs on all aspects of efficiency planning and program execution.
2. The **Global Warming Solutions Act** (GWSA) mandates the reduction of greenhouse gas emissions in the Commonwealth, establishing a schedule of emissions reduction goals designed to spur innovation and promote research and development in the area of clean energy.
3. The **Green Jobs Act** provides a funding source for the green technology industry, facilitating economic development and job growth in the clean energy sector. This law established the Massachusetts Clean Energy Center.

These legislative efforts were driven by a number of factors, including concerns over Massachusetts' high energy costs, vulnerability to volatility in these markets, significant cost-saving options created by energy efficiency investments, and opportunities to develop a robust clean energy economy.

Massachusetts is at the end of the energy pipeline, figuratively and literally, importing all of its fossil-based energy sources — oil, natural gas, and coal — from other regions of the country or other parts of the world. Over $22 billion is spent each year on energy in Massachusetts, of which 80 percent leaves the state. This represents a huge opportunity to grow the Commonwealth's economy through local investments in energy efficiency, renewable energy, and other business and consumer needs.

In addition to this economic drain, energy consumers have experienced both dramatic price swings and long-term energy price increases over the last decade. By investing in energy use reduction, Massachusetts can keep energy dollars in the Commonwealth and reduce the impact of external price shocks on our citizens, thus sustaining more jobs and businesses.

Governance: the Energy Efficiency Advisory Council

The Massachusetts Energy Efficiency Advisory Council (EEAC) was created by the Green Communities Act to guide the development of comprehensive, integrated, statewide energy efficiency plans and monitor their implementation. Its primary role is to achieve and fulfill the efficiency requirements, goals, and obligations of the Act. Eleven[5] voting members represent a variety of energy efficiency

[5] See the list of members on page 21

stakeholders. Eleven non-voting members include the Program Administrators (PAs) from the investor-owned electric and gas utilities and energy efficiency service providers, and other stakeholder groups. The EEAC is chaired by the Commissioner of the Massachusetts Department of Energy Resources (DOER).

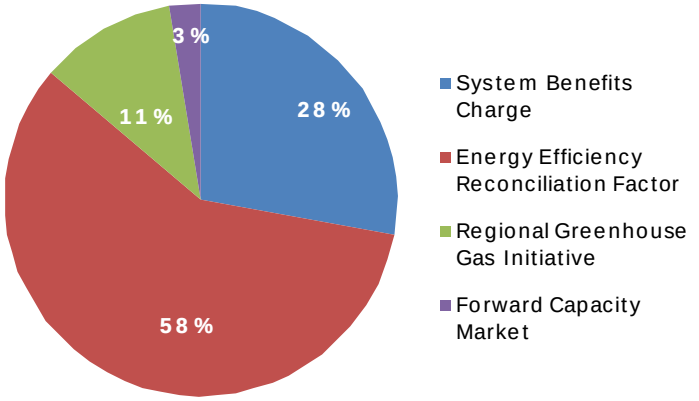
While the EEAC is responsible for guiding the PAs in carrying out the requirements of the Act, the PAs are responsible for delivering the programs and taking the actions that result in measurable, verifiable energy savings that meet the goals. As regulated entities, the PAs must receive approval from the Department of Public Utilities (DPU) for their efficiency program spending and related issues of cost recovery. The Three-Year Plans, covering the period from January 1, 2010 to December 31, 2012, were approved by the DPU on January 28, 2010.

Funding Sources

The electric energy efficiency programs are funded by a variety of sources, the largest of which are a historical Systems Benefit Charge (SBC) and the Energy Efficiency Reconciliation Factor (EERF) created by the Green Communities Act:

- The legislatively mandated SBC of 2.5 mills (0.25 cents) per kilowatt hour for all electric consumers, except those served by a municipal lighting plant (28 percent of funding for 2010-2012)
- The EERF, which recovers additional program costs from electric customers in proportion to the costs of programs directed at their sector (i.e., residential, commercial & industrial), with low-income programs receiving subsidies from other sectors (58 percent of funding for 2010-2012)
- Regional Greenhouse Gas Initiative (RGGI) auction proceeds (11 percent)
- Forward Capacity Market (FCM) payments from ISO-NE (3 percent).

Funding Mix: Electric Energy Efficiency Programs



The natural gas efficiency programs are funded by an Energy Efficiency Surcharge (EES) on gas customers' bills.

These designated funds were not the only energy efficiency dollars at work in the Massachusetts economy in 2011. Grants to cities and towns from DOER's Green Communities Designation and Grant Program (funded by RGGI proceeds) and the robust clean energy investments from the American

The Mass Save® Brand: Promoting Energy Efficiency Statewide

The Program Administrators continued to expand the awareness and reach of Mass Save, the single statewide energy efficiency brand, creating momentum with a multi-faceted approach on the Internet, including advertising and a key word search strategy to give Mass Save information a high profile for people searching for energy efficiency terms. As a result of 2011's marketing efforts, Massachusetts residents and participants continued to be educated on the value of the services, technical assistance, and incentives available to them across the state. Use of the Mass Save brand is being standardized across programs and PAs, while the PAs' logos are used as co-brands to enhance its recognition and validity.

Recovery and Reinvestment Act (ARRA) added investments in energy efficiency beyond the funding from the Three-Year Plans. The Mass Save programs were leveraged in city, town, and state buildings, as well as residential and business buildings, to achieve deeper energy savings and greater participant benefits than any would have produced on their own.

Ensuring Real Savings: Evaluation, Measurement and Verification (EM&V)

EM&V is the systematic collection and analysis of data to verify, document, and improve program performance and to enhance the program offers and services for all participants. EM&V analysis helps ensure that participants benefit from the energy efficiency investments, and that the reported savings and benefits are fully realized for residents and businesses.

For its energy efficiency initiatives, Massachusetts maintains a vigorous and far-reaching EM&V program in which virtually all studies are performed at a statewide level. While the studies are administered by individual PAs, decision-making authority ultimately rests with the EEAC. In 2011 PAs completed 45 EM&V studies ranging from impact and process evaluations on major programs to studies of special issues such as non-energy benefits[6], marketing, and community-based initiatives.

EM&V: Evaluating Results against Goals

There are three main types of EM&V: impact evaluation, process evaluation, and market assessments. Some key results from the 45 studies completed in 2011 are shown below.

Impact: How much energy and demand did the program save?

- Initial savings forecasts for C&I electric measures were generally found to be accurate, but savings for some C&I gas improvements were found to be overstated. Both the savings forecasting methods and the program designs for the affected gas improvements have since been updated to ensure that reported savings remain reliable.
- C&I lighting programs have had beneficial effects on the overall market leading to significant energy savings beyond those that have been directly tracked.
- Residential and low-income programs are producing significant non-energy benefits for participants and for society as a whole, but in some cases these are less than had been previously assumed.

Process: How can the program be improved?

- When health and safety issues are addressed, studies found that there is greater potential for energy efficiency improvements in the residential sector, and study recommendations to expand the financing program to help pay for removing barriers to participation — such as knob and tube wiring — resulted in development of a pilot program to test the effect.
- C&I process evaluation found significant economic benefits for commercial participants that invest in energy efficiency, including reduced operations and maintenance costs, and increased productivity to the business. These non-energy benefits will be communicated to participants.

Assessment: What are the specific characteristics of the markets being targeted?

- Studies recommended looking at code compliance to better determine the adoption of new building practices required in the IECC code for residential and commercial new construction. Results show that increased training and compliance efforts can support building closer to the established building codes.

[5] See footnote 2

Residential Programs: Portfolio Description

In this second year of the new Three Year Plans, the Program Administrators built on the success of 2010 and offered new services and incentives, enhanced participant education and outreach, and expanded the ability of homeowners and renters to work with independent contractors. The portfolio of residential programs continued to expand the breadth and depth of participant savings by taking a comprehensive approach to program delivery, capturing as much savings as possible from each participant through a single participant engagement process.

Home energy assessments by energy specialists are the starting point for a whole-house approach to savings. Rebates and incentives for heating and cooling, lighting and appliances, and improvements to building envelopes are generated by the assessment. The programs also offer incentives for up-stream stakeholders (retailers and manufacturers, contractors, design professionals, etc.) to offer information and services related to energy saving technologies for residential participants. This has increased the availability and visibility of high efficiency technologies in the residential participant marketplace and raised awareness of the benefits of those technologies.

2011 Residential Highlights

- The market model for Mass Save Home Energy Services (HES) was redesigned, following an extensive program development process and input from multiple stakeholders, to include two pathways for participants — through independent installation contractors or through home performance contractors.
- An HES Contractor Best Practices working group was created to provide participating contractors with a regular forum for introducing new program ideas and resolving issues in a timely manner.
- Zero interest HEAT Loans, totaling over $30 million, helped 3,620 participants install energy efficiency improvements in their homes.
- Compact fluorescent lights (CFLs) in hard-to-reach market segments (e.g., multi-family buildings), specialty CFLs, and LED lamps and fixtures received greater focus to achieve more cost-effective electric energy savings.
- Rebates for ENERGY STAR televisions and refrigerators significantly exceeded goals, each by over 50 percent.
- Electric and gas behavior-feedback programs continued to be implemented and significantly expanded, achieving cost-effective energy savings through social marketing and participant education.
- Innovative community-based outreach pilots (CBOs) were tested in communities with historically low program participation. The program model earned NSTAR an Outstanding Achievement award from the Association for Energy Service Professionals.
- A third U.S. EPA Sustained Excellence Award (the fifth EPA honor in five years) was given to the New Homes with ENERGY STAR Program, based on its leadership and achievements through superior energy efficiency program design.

Table 2: Residential Results  **31,517**  **7,675**  **27,943**

2011	Program Spending (million $)	Participants (thousands)	Annual GWh	Lifetime GWh	Annual Therms (million)	Lifetime Therms (million)	Annual GHG (metric tons)	Lifetime GHG (metric tons)
Actual	$161	1,861	227	1,676	7.8	92.2	142,512	1,234,759
Goal	$173	1,379	222	1,581	7.8	98.8	139,994	1,227,661

SAVINGS SUMMARY

THE NEED:

Improve efficiency and reduce utility costs

THE SOLUTION:

Install insulation and CFL light bulbs, and seal air leaks throughout the home.

- Project cost: $3,486.76
- Mass Save incentive: $2,550.00
- Estimated annual dollars savings: $228.36
- Simple payback: 4 years

Home Energy Services: The Shepherd Family, Westford
Mass Save Partner: National Grid

The Shepherds had a home energy assessment of their Gambrel style home in Westford. As part of the assessment, an Energy Specialist installed over a dozen CFL light bulbs at no cost. He also determined that the homeowners could benefit from sealing the air leaks and adding insulation to their home, built in 1964. The Shepherds had the energy efficiency improvements done and received over $2,500 in Mass Save incentives through National Grid.

"The Energy Specialist that performed the assessment was very thorough and made many good suggestions to help make our home more efficient and comfortable. He also directed us to other helpful resources."
The Shepard Family

Low-Income Programs: Portfolio Description

Low Income programs serve homeowners and renters of single and multi-family homes whose income qualifies them for comprehensive improvements at no cost to the individual. This approach makes it easier and more efficient to capture all available savings through a single participant engagement. The focus is on reaching as many low income residents with the greatest amount of cost effective services. Opportunities to target this market include new construction, existing single family buildings, and existing multi-family buildings.

The new construction program offers builders three tiers of incentives to construct homes up to 45 percent more efficient than code and achieve ENERGY STAR-qualified energy savings levels. The goal for the program is to build more homes to higher efficiency levels while increasing the number of participating builders each year. The existing buildings programs work to provide information on energy saving behaviors to low-income participants and landlords. They also install efficient weatherization, lighting, and heating and cooling improvements and appliances at no cost. This approach addresses the reluctance landlords may feel about making efficiency investments that yield lower bills for their tenants, but not direct benefits to landlords themselves. The program is coordinated with the state Department of Housing and Community Development's low-income energy efficiency programs.

2011 Low-Income Highlights

- More than 26,000 low-income housing units were upgraded in 2011 with nearly $90 million in funding from multiple sources: $50 million from Mass Save funds ($32 million of which was delivered by members of the Low-Income Weatherization and Fuel Assistance Program Network, representing 92% of their planned spending); $29 million in federal Weatherization Assistance Program (WAP)/ARRA funds; $8 million in federal funding for heating systems; and $0.5 million for innovative measures funded by the United States Department of Energy (DOE) and the Massachusetts Clean Energy Center.

- The Low Income Energy Affordability Network (LEAN), a central coordinating body for income-eligible weatherization and fuel assistance programs, developed a strong infrastructure of auditors, contractors, and quality control inspectors. While LEAN and its contractors were very busy using significant federal stimulus funding, they were still able to provide assistance to low income clients through the Mass Save programs and use 90 percent of the funds available through the PAs. Many more low-income residents received efficiency services as a result of the ARRA funding, but not all of those results are reflected in the statewide program performance data.
- The innovative low-income multi-family retrofit program is a new program in the Three-Year Plans and continued to evolve and expand in 2011, serving 8,000 units with weatherization and 12,000 with electric improvements such as efficient lighting and refrigeration.
- LEAN serves as a research and development lab for the Massachusetts Clean Energy Center and DOE, developing, for example, systems to make solar domestic hot water cost-effective and protocols to identify cost-effective installations of residential-scale combined heat and power (CHP) systems.

Table 3: Low-Income Results  **2,823**  **1,271**  **3,122**

2011	Program Spending (million $)	Participants (thousands)	Annual GWh	Lifetime GWh	Annual Therms (million)	Lifetime Therms (million)	Annual GHG (metric tons)	Lifetime GHG (metric tons)
Actual	$51	26	20	280	1.3	25.5	15,923	260,096
Goal	$64	29	30	370	1.1	22.6	19,317	284,216

Low Income Retrofit: Mr. Callahan, Mattapan
Mass Save Partners: Action for Boston Community Development, Inc (ABCD), National Grid

Mr. Callahan, a disabled Mattapan resident, was having problems staying warm during the winter. His single family home was using large amounts of natural gas for heat, so he reached out to ABCD to see if he could find help reducing his heating costs. A field technician conducted an energy assessment which revealed there was extensive opportunity for energy efficiency upgrades. The walls had no insulation and attic had very little. There were gaps in the basement overhead as well as the transition to the attic where air was leaking. The outdated heating system was running at 77 percent efficiency.

ABCD coordinated the installation of over 3,000sq/ft of cellulose insulation in the walls and attic, as well as hot water pipe insulation. The air leaks in the basement overhead and attic transition were sealed and weather-stripping was added to the exterior doors. These improvements have already reduced over 20 percent of the building's heating energy use.

The forced hot water heating system has been replaced with a new 90 percent efficient system, which will increase energy savings even greater.

Mr. Callahan said that his house has been more comfortable since the weatherization work was completed.

SAVINGS SUMMARY

THE NEED:

Cold house and high heating costs

THE SOLUTION:

Air sealing, insulation, and an efficient heating system.

- Project cost: $13,885
- Mass Save incentive: $8,349
- Funding from federal and state assistance programs: $5,536

Small Commercial & Industrial Programs: Portfolio Description

The Small Business Services program targets small and medium-sized commercial and industrial participants, providing turn-key energy efficiency solutions to businesses that generally have few technical or financial resources to devote to efficiency improvements. The program employs contractors who are responsible for outreach, audits, and installation. Equipment vendors and trade allies also inform participants of program services. Participants can select from a standard list of pre-determined improvements that cover multiple electric and gas efficiency opportunities. They can also install measures unique to their energy uses through a 'custom' approach.

2011 Small C&I Highlights

- The PAs partnered with local governments and EE2020, a non-profit initiative funded in part by the Barr Foundation, to test community-based marketing efforts to drive more and deeper savings in two communities, Pittsfield and Northampton. Deeper savings refers to achieving greater energy savings with each participant, in contrast to achieving greater savings by increasing the number of participants. The effectiveness of this approach is being evaluated.
- The PAs continually monitor the market for emerging gas and electric efficiency products that can be added to the menu of "direct install" measures – such as LED lighting applications – and are increasingly identifying older, less efficient boilers and furnaces that can be separately targeted for early retirement.

SAVINGS SUMMARY

THE NEED:

Reduce operating costs

THE SOLUTION:

Install LED lighting and an energy management system

- Project Cost: $1,229,638
- Mass Save incentive: $559,866
- F.L. Roberts contribution: $669,904
- Estimated annual kWh savings: 1,362,789
- Estimated annual savings: $239,284
- Participant payback: 2.8 years

Small C&I Direct Install: F.L. Roberts Corporation in Springfield
Mass Save Partner: Western Massachusetts Electric Co.

Cost has long been a hindrance for many small and mid-size businesses seeking to conserve energy and cut future operating costs. By partnering with Western Massachusetts Electric Company through the Mass Save® Small & Mid-sized Business Direct Install Program, F.L. Roberts Corporation overcame that funding obstacle and realized significant savings in energy and operating costs.

F.L. Roberts operates a chain of gas stations, convenience stores and car washes. In 2011, the company installed dozens of energy efficiency improvements in 33 western Massachusetts locations and its corporate headquarters in Springfield. Its efforts included retrofitting outdated lighting with new equipment that enhanced the comfort and safety of each facility, while lowering energy use.

Upgrades included the addition of LED lighting to exterior canopies and poles as well as to interior refrigerator cases. The company also installed a mini energy management system to control the fans and humidity levels in refrigerated cases and walk-in coolers at its convenience locations. The retrofits are estimated to save enough electricity to power 189 homes annually.

The company was able to complete over $700,000 in upgrades with no out-of-pocket expense, since the direct install program covers up to 70 percent of the costs and allows participants to pay off the balance over time, through their bills.

"The estimated energy savings will translate to over $230,000 annually and a projected payback of just over two years," said Richard Smith, Vice President of Operations for F.L. Roberts. "Everyone should take advantage of this program."

Table 4: Small C&I Results 27,076 2,513 19,676

2011	Program Spending (million $)	Participants (thousands)	Annual GWh	Lifetime GWh	Annual Therms (million)	Lifetime Therms (million)	Annual GHG (metric tons)	Lifetime GHG (metric tons)
Actual	$82	7	195	2,798	2.6	46.5	100,348	1,491,811
Goal	$120	12	225	3,226	3.5	65.6	118,850	1,783,271

Custom Retrofit and Install: Sea Crest Beach Hotel, Falmouth Mass Save Partners: Cape Light Compact and National Grid

The Sea Crest Beach Hotel, a 263-room family resort on Old Silver Beach in North Falmouth, opened almost 50 years ago and has undergone a $15 million dollar renovation since its 2010 acquisition by Scout Real Estate Capital, LLC. Scout's goal was to maximize energy efficiency of Sea Crest Beach Hotel during its complete renovation of the resort property.

The property's age and layout challenged Scout Construction to come up with a plan to create efficiencies in all of its mechanical systems. Working off of energy efficiency modeling from an energy consulting firm, the Cape Light Compact helped the renovation team take full advantage of Mass Save technical assistance and incentives. Improvements were made to the building envelope, including an extensive re-insulation project and ENERGY STAR rated windows. The hotel upgraded to high efficiency lighting (high efficiency T8 technology lighting, Compact Fluorescent Lights (CFL), and new Light Emitting Diode lighting (LED) as well as occupancy sensors) and HVAC systems. A high efficiency roof top unit systems was installed and treated with an anti-corrosion coating which protects the equipment from the salt air.

The company was named a MassSavers Award winner in 2011.

Scout has used Mass Save services and incentives at other properties in Massachusetts as a result of the Sea Crest project. "Mass Save's commitment to our success in meeting our objectives for Sea Crest Beach Hotel was truly phenomenal. We are very pleased with the results and honored to be among only 16 entrants to receive the MassSavers award." John Daley, Vice President of Construction, Scout Real Estate Capital, LLC.

SAVINGS SUMMARY

THE NEED:

Maximize energy efficiency in the process of a complete renovation

THE SOLUTION:

Upgrade insulation and install new windows, high efficiency lighting and occupancy sensors, and HVAC systems

- Estimated project cost: $413,405
- Mass Save incentive: $126,536
- Sea Crest contribution: $286,869
- Estimated annual kWh savings: 337,796
- Estimated annual therm savings: 15,400
- Estimated annual saved: $83,903
- Participant payback: 3.4 years

SAVINGS SUMMARY

THE NEED:

Increase the value and appeal of the condominium complex

THE SOLUTION:

Install efficient lighting, appliances, and controls, and seal air leaks

- Project cost: $69,300
- Mass Save incentive: $65,507
- Estimated annual kWh savings: 136,601
- Estimated annual savings: $19,124
- Participant payback: 2.4 years

Multi-family Renovation: Carlton Gardens Condominium, Westborough

Mass Save Partner: National Grid

Carlton Gardens Condominium complex in Westborough, built in the 1970s, contains six buildings. The property manager contacted National Grid to identify ways to make the buildings and the residences more efficient and comfortable. After an energy evaluation identified several opportunities, air leaks were sealed throughout the complex, programmable thermostats and energy efficient lighting were installed in the units and common areas, and rebates were provided for old, inefficient refrigerators. The work was affordable thanks to Mass Save incentives provided by National Grid.

"We were thrilled when we were approached for the Multifamily Retrofit Program," said Mary Hagspiel, Property Manager. "I thought it would involve a certain amount of disruption to our routines, but I can honestly say that that the work has fit in seamlessly. The feedback from residents has been outstanding. Not only have they been pleased with the new fixtures and thermostats, but they have also mentioned how great the installers were."

Large Commercial & Industrial Programs: Portfolio Description

The program portfolio that serves businesses and large institutions consists of two programs: New Construction and Retrofit. The New Construction program captures efficiency opportunities at the time of building design or during substantial renovations when basic building systems can be upgraded or replaced. The program offers rebates and financing, technical and commissioning services, and a comprehensive set of standard improvements representing cost-effective high efficiency technologies that have not yet become common practice. Customized measures, specific to a participant's needs, are also promoted. The program continually adjusts efficiency criteria as codes and standards advance.

The Large C&I Retrofit program focuses on opportunities to reduce energy consumption in working, but outdated and inefficient equipment and systems. Like the new construction program, the retrofit program provides an array of financial, technical, and project management services to overcome barriers to participant adoption of high efficiency equipment and systems, and offers both standardized and customized approaches.

Larger facilities benefit from the "Whole Building Assessment" (WBA) approach which helps them attain maximum savings through a comprehensive technical review of the entire facility, and a prioritized action plan that addresses identified opportunities, overcoming institutional barriers, and providing technical and financial assistance to support implementation of the plan. Also, certain facilities, such as large industrials, hospitals, and others with high year-round thermal use are eligible for combined heat and power (CHP) installations that efficiently produce both electricity and thermal energy for industrial process or other uses.

2011 Large C&I Highlights

- Program Administrators are expanding the successful model of customized, comprehensive, and multi-year agreements with their large participants. These agreements have primarily been with institutional facilities such as colleges and universities, but increasingly include commercial and industrial participants. Commitments involve significant, mutual capital investments over the term of the agreement. The multi-year aspect gives businesses long term planning and budgeting certainty and provides the PAs with a continuing stream of predictable savings over a longer time horizon. This model has been recognized and is replicated around the country. One large industrial facility has used the energy plan as a template for its facilities in other parts of the country.
- In late 2011, the PAs made a significant enhancement to the lighting programs, creating an "upstream" program approach to increase sales of a variety of high efficiency fluorescent and LED products. This approach significantly reduced the cost difference between standard efficiency products and their highly efficient counterparts at the product distributor level, so buyers face no price barrier and have an easy entry to choosing the high-efficiency option.
- PAs continue to promote project financing available through local banks throughout the state.
- Fifteen Massachusetts businesses won 2011 MassSavers Business Awards in recognition of their adoption of excellent energy efficiency practices and investments.

SAVINGS SUMMARY

THE NEED:

Reduce energy costs to retain Simonds competitive advantage

THE SOLUTION:

Install Combined Heat and Power (CHP) system

- Project cost: $5,490,000
- Mass Save incentive: $470,000
- Simonds contribution: $5,020,000
- Estimated annual therm savings: 50,765
- Estimated annual kWh savings: 13,500,000
- Estimated annual savings: $1,737,007
- Participant payback: 2.9 years

Combined Heat and Power (CHP): Simonds, Fitchburg
Mass Save Partner: Unitil

Simonds International is a worldwide manufacturer of quality cutting tools for wood and metal processing industries. Headquartered in Fitchburg, Simonds has always been a leader in innovation: designing trendsetting metal cutting blades and efficient wood cutting blade designs.

Simonds has partnered with Unitil over the past four years to incorporate a variety of energy efficiency improvements such as lighting, lighting controls in specific areas, new blade servers and high efficiency heating and cooling equipment, new variable speed driven air compressors, expanded storage tanks and high efficiency air dryers—combining to save approximately $66,264 per year and an estimated 552,198 kWh—or enough power for 77 homes each year.

Even after pursuing numerous opportunities to achieve efficiency savings through traditional projects, Simonds was not fully satisfied and sought to find even greater efficiencies for increased cost savings. This was ultimately fulfilled by building an on-site Combined Heat and Power (CHP) system that generates heat and produces electricity. The system is designed to provide building heat throughout the winter and, with the assistance of a 300 ton absorption chiller, provide building and process cooling throughout the plant. The ultimate benefit is that the engines that produce the heating and cooling are tied to generators that are rated at 1800 kW of electricity, capable of meeting 90 percent of the plant's electrical needs. The CHP project will ultimately save $1,737,007 per year through the 24-year life of the generation equipment.

The projected savings, and the $606,546 in Mass Save incentives provided by Unitil for all of Simonds' efficiency improvements, will allow the company to maintain its competitive advantage, retain experienced employees and hire additional personnel to meet the increased product demands, as well as maintain its position as an industry leader. Simonds was recognized as a Mass Saver in 2011.

Table 5: Large C&I Results 48,292 3,395 33,940

2011	Program Spending (million $)	Participants (thousands)	Annual GWh	Lifetime GWh	Annual Therms (million)	Lifetime Therms (million)	Annual GHG (metric tons)	Lifetime GHG (metric tons)
Actual	$75	2	348	5,750	3.5	43.8	173,093	2,790,836
Goal	$152	5	430	5,268	5.9	90.7	222,623	2,825,420

SAVINGS SUMMARY

THE NEED:

Transform a 100-year old mill into comfortable, efficient housing

THE SOLUTION:

High efficiency equipment improvements & weatherization

- Mass Save incentive: $95,000
- Estimated annual kWh savings: 200,000
- Estimated annual therm savings: 6,200
- Estimated annual savings: $50,000
- Participant payback: 4 years

C&I Equipment and Weatherization Improvements: Curtain Lofts, Fall River
Mass Save Partners: National Grid and New England Gas

An historic turn-of-the-century, five-story granite block Wampanoag textile factory was transformed into ENERGY STAR compliant senior housing property by its owner Winn Development, with help from New England Gas and National Grid Electric.

Located in Fall River, what is now known as Curtain Lofts was developed into a 97-unit, 55-and-older housing complex. The project's outstanding high technology and energy efficiency improvements include: high efficiency heating, ventilation, and air conditioning (HVAC) and water heating equipment; super insulation and air-sealing; and energy efficient windows and doors.

> *"This project preserves the unique architecture of the building and neighborhood while employing state-of-the-art building technologies. This makes it a showcase for future development in the area," said Dave Thunell, Construction Director. "I was very pleased with the collaboration employed by our architects and engineers, New England Gas Company, and National Grid in identifying the most cost-effective electric and gas technologies to maximize energy savings and comfort for our tenants."*

Winn Development's focus on insulation and efficiency will ensure the apartments are both comfortable for residents and affordable to operate. The project even incorporated solar photovoltaic panels on the roof capable of producing electricity for all of the common areas in the building.

Equipment Upgrades: West Springfield Middle School
Mass Save Partner: Columbia Gas of Massachusetts

In an effort to reduce their energy usage at the Middle School, the West Springfield School Department partnered with Columbia Gas of Massachusetts and TRANE to find ways to cut back on their costs. The team identified significant energy savings through an investment in a new high-efficiency natural gas boiler to replace the older, over-sized, inefficient model. The new boiler is projected to lower heating costs significantly while maintaining a comfortable educational environment for the students.

To further increase efficiency, WSMS re-commissioned and upgraded its existing Energy Management System (EMS), which will help eliminate overheating occupied sections of the school, regulate the amount of ventilation based on occupancy levels, and re-set room temperatures when spaces are unoccupied. Temperature and ventilation rate reductions can now be made as needed on a room-by-room basis to lower energy consumption further.

The savings from these and other energy efficiency projects the City has undertaken can fund more energy improvement projects or help the schools meet other budget needs. Both projects qualified for Mass Save incentives through Columbia Gas.

According to acting Assistant Superintendent Kevin McQuillan, "the high efficiency boiler and EMS re-commissioning project would not have been possible without the financial and technical assistance provided by Columbia Gas of Massachusetts".

SAVINGS SUMMARY

THE NEED:

Older, inefficient, oversized heating equipment and an outdated EMS

THE SOLUTION:

Installation of a new energy efficient boiler, and re-commissioning and upgrade of the EMS

- Estimated project cost: $180,550
- Mass Save incentive: $70,531
- WSMS contribution: $110,019
- Estimated annual therm savings: 19,000
- Estimated annual savings: $29,000
- Estimated annual savings: $1,737,007
- Participant payback: 4.8 years

Municipal Programs: Portfolio Description

Municipal participants are served as a small, but important, part of the C&I Retrofit Program, so this sector does not have specific electric and gas savings, spending, or participation goals. Cities and towns are served through targeted initiatives designed to address communities' unique set of barriers.

Municipalities are often capital and staff-constrained, and their procurement process is complex and lengthy. The Green Communities Act streamlined the contracting process by allowing municipalities to sole-source efficiency projects under $100,000 to a PA or the delivery contractor. By providing up-front, competitive bidding, PAs can provide turn-key solutions. Coupled with flexible financing options, including the on-bill financing offered by a few PAs, this program addresses many of the barriers faced by municipalities. The PAs, in collaboration with DOER's Green Communities Division, use direct, targeted outreach to ensure that municipalities are aware of all the services and customized assistance available to them, to better leverage municipal budgets, and enable deeper savings in participating facilities.

2011 Municipal Highlights

- Mass Save programs have been integrated with DOER's Green Communities Energy Audit Program and have provided energy assessments to more than 100 cities and towns. These assessments leverage the PAs technical knowledge to promote comprehensive and integrated projects that address the participants' electric and natural gas use.
- A roadmap for future collaboration with the DOER Green Communities Division was developed to promote and implement energy efficiency improvements in municipalities and other governmental entities.
- Drinking water and wastewater treatment plants, the second largest municipal energy use category (after schools), were targeted for efficiency improvements through collaborations with MassDEP, DOER and U.S. EPA.
- Future plans include a LED streetlight program for municipalities.

The Massachusetts Technical Advisory Committee – Bringing Innovation to Mass Save

If a business had a new product or program to propose for use in Massachusetts' energy efficiency programs prior to 2011, it had to approach each Program Administrator individually while also seeking support from the state and other stakeholders. This process was cumbersome; it required an enormous effort to secure buy-in from stakeholders and it discouraged standardization of adoption criteria. It also proved challenging for program designers who were often misinformed about conversations the business was having with other stakeholders; they were sometimes erroneously led to believe that DOER or another PA was already supporting the idea.

The Massachusetts Technical Advisory Committees (MTAC) were a bold solution to the confusion inherent in the existing technology adoption framework. The philosophy behind the residential and commercial MTACs was to

- Create a single entry point for businesses looking for Mass Save incentives for their products
- Develop statewide baseline adoption standards
- Ensure that all relevant stakeholders were aware of potential new measures
- Create a regular discussion about research and development activity.

Although the two MTACs have been operating separately up to this point, discussions are underway to create a single MTAC to streamline points of entry and PA communication further.

Businesses that gain approval to move forward from the MTAC are subsequently routed to the appropriate program working groups or evaluators to determine how their products will fit in to the energy efficiency portfolio. Businesses with either unproven or ill-fitting technologies are sent a letter explaining the process and decision. The process also allows the PAs to request more information from vendors before making a decision.

The commercial MTAC has reviewed numerous proposals and has facilitated incentive offerings for technologies including prescriptive refrigerated case covers and custom gas flue draft controls. The residential MTAC has reviewed technologies that have been presented to it and has investigated others it finds itself, some of which have been referred to program working groups, including demand circulation pumps to the multi-family program.

Assessing Green Jobs

Program Administrators and the Green Justice Coalition (a multi-stakeholder group) worked together for a second year to ensure that local residents receive energy retrofit training and the opportunity to access good jobs paying living wages. In this spirit, the Community Mobilization Initiatives - innovative outreach pilots in ethnically-diverse communities - have included a jobs component. This effort is part of the overall strategy to ensure that all participants receive the highest quality service from the energy efficiency programs.

Looking Forward

Looking ahead to 2012, Massachusetts will continue to lead the way in energy efficiency and strive to maintain its #1 ranking. The programs will continue to meet increased annual energy savings goals and achieve the planned three-year goals that represent an unprecedented level of sustained energy efficiency. Successfully meeting these aggressive goals and continuing to provide energy savings for residents and businesses throughout Massachusetts provides fertile ground for the development of the next Three-Year Plans. Aggressive, yet sustainable, savings targets, innovation, and new approaches to a variety of market segments will continue Massachusetts' leadership in energy efficiency policies and programs. Investment in energy efficiency continues to create and maintain local jobs, improve local economies, cut our dependence on imported fossil fuels, improve the quality of the environment, and reduce pollution that causes climate change .

The 2012 energy efficiency programs will achieve the higher energy savings goals and secure the benefits of energy efficiency by increasing efforts to

- Improve the cost efficiency of program delivery and pursue outside funding and financing options to leverage program funds and maximize benefits
- Refine the coordination and integration of gas and electric program administration to provide seamless program offerings and branding to participants
- Deliver consistent statewide programs in all PA service territories
- Explore and develop a statewide data management and analytics system to enable transparency of savings and benefits and reduce administrative time spent on reporting
- Continue to develop program strategies for deeper, long term energy savings for all markets
- Integrate best practice review, including participant experience into the planning and implementation efforts.

Accomplishing the higher energy savings goals in 2012 will also keep the Commonwealth on the path to achieve its energy, economic, and environmental goals in the Massachusetts Clean Energy and Climate Plan for 2020, adopted in December 2010. The energy savings delivered through the energy efficiency programs are the strongest single contributor to the strategies outlined in the Clean Energy and Climate Plan.

Resources

2011 Budget Summaries

Demand-Side Management Programs	Actual Electric	Plan Electric	Actual Natural Gas	Plan Natural Gas
RESIDENTIAL				
ENERGY STAR Lighting	19,308,184	19,843,698	-	-
ENERGY STAR Appliances	6,804,198	5,841,650	-	-
Residential Cooling & Heating Equipment	5,423,231	5,740,791	22,932,347	14,315,370
Subtotal - Consumer Products	**$ 31,535,613**	**$ 31,426,139**	**$ 22,932,347**	**$ 14,315,370**
Residential New Construction & Major Renovation	3,641,432	3,935,777	5,302,202	5,793,809
Multi-Family Retrofit	11,897,996	15,630,512	3,961,731	3,843,455
MassSAVE	41,514,926	47,299,472	5,451,388	5,038,973
O Power	3,243,158	2,808,894	3,076,185	2,867,638
Heat Loan Program	6,526,069	9,509,985	-	-
Weatherization Program	-	-	13,410,767	18,483,042
Deep Energy Retrofit	747,119	1,528,678	593,972	1,017,403
Subtotal - Residential	**$ 67,570,700**	**$ 80,713,318**	**$ 31,796,246**	**$ 37,044,319**
LOW INCOME				
Low-Income Residential New Construction	1,051,062	1,360,294	-	-
Low-Income 1 to 4 Family Retrofit	19,266,961	22,486,936	11,517,414	14,521,829
Low-Income MultiFamily Retrofit	9,466,819	14,201,679	7,906,211	9,677,776
Subtotal - Low Income	**$ 29,784,843**	**$ 38,048,908**	**$ 19,423,625**	**$ 24,199,605**
COMMERCIAL & INDUSTRIAL				
C&I New Construction and Major Renovation	30,530,271	57,112,789	11,038,546	11,032,275
C&I Large Retrofit	64,535,249	137,750,037	12,449,059	14,885,053
C&I Small Retrofit	40,805,986	54,392,326	736,301	702,729
Subtotal - Commercial & Industrial	**$ 135,871,506**	**$ 249,255,152**	**$ 24,223,906**	**$ 26,620,057**
OTHER - PILOT PROGRAMS				
Power Monitor Pilot	-	-	-	-
Residential New Construction & Major Renovation - Major Renovation statewide pilot	128,710	712,484	-	-
Residential New Construction Multi Family (4-8 story) statewide pilot	485,492	614,800	-	-
Residential New Construction Lighting Design statewide pilot	47,954	124,499	-	-
Residential New Construction V3 Energy Star Homes statewide pilot	0	-	-	-
Heat Pump Water Heater Pilot	10,898	11,111	-	-
Hot Roofs	-	9,000	-	-
Home Automation	-	25,000	-	-
Community based Pilot	485,374	1,258,558	159,816	207,418
Subtotal - Pilot Programs	**$ 1,158,428**	**$ 2,755,452**	**$ 159,816**	**$ 207,418**
OTHER - EDUCATION AND OUTREACH				
Residential Education Program	1,040,040	2,223,880	55,054	258,868
Workforce Development	85,682	356,861	36,270	238,057
Energy Analysis: Internet Audit Program	-	-	203,081	316,876
Business Energy Analyzer	-	-	86,678	-
Statewide Marketing & Education	2,358,930	2,481,715	778,748	821,594
Subtotal - Education and Outreach	**$ 3,484,651**	**$ 5,062,456**	**$ 1,159,832**	**$ 1,635,395**
TOTAL ALL PROGRAMS	**$269,405,741**	**$407,261,425**	**$99,695,772**	**$104,022,164**

Glossary

Term	Description
Benefits	The economic and non-economic effects from investments in energy efficiency. Economic benefits include the value of avoided energy purchases, reductions in operations & maintenance costs, and other resource savings (e.g., water or raw materials). Non-economic benefits include reduced pollutant emissions and increased comfort or worker productivity.
Cost-Effective	In general terms this is a measure of whether an investment's benefits exceed its costs. When applying this term to investments in energy efficiency, it is important to consider the following parameters. • The stakeholder perspective of the test, whether program participant, utility, ratepayer, or society in general • The key elements included in the costs and benefits, including avoided energy use, incentives, avoided need for new generation sources and new transmission and distribution, and avoided environmental impacts • The baseline against which the costs and benefits are measured; what costs and benefits would have been realized without investment in energy efficiency?
Free Rider	A customer who participates in an energy efficiency program, but would have installed some or all of the same improvement(s) on their own, with no change in timing of the installation, if the program had not been available.
Lifetime Savings	Lifetime savings refer to the sum total of savings over the entire life of an efficiency measure. For example, a CFL that saves 50 kWh per year and lasts 5 years will have lifetime savings of 250 kWh.
Lost Opportunity	Refers to a measure being installed at the time of planned investment in new equipment or systems. Often this reflects new construction, renovation, remodeling, planned expansion or replacement, or replacement on failure.
Measure	A product (piece of equipment), combination of products, or process designed to provide energy and/or demand savings. Measure can also refer to a service or a practice that provides savings. It can also refer to a specific combination of technology and market/customer/ practice/strategy (e.g., direct install low-income CFL).
Measure Life	The number of years that an efficiency measure is expected to garner savings. These are generally based on engineering lives, but sometimes adjusted based on observations of market conditions.
Participant	A customer who installs a measure through regular program channels and receives any benefit (i.e. incentive) that is available through the program because of their participation.
Prescriptive Measure	A prescriptive measure is generally offered by use of a prescriptive form with a prescribed incentive based on the parameters of the efficient equipment or practice.
Program Administrator (PA)	Those entities that oversee public benefit funds in the implementation of energy efficiency programs. This generally includes regulated utilities, other organizations chosen to implement such programs, and state energy offices. The Massachusetts electric PAs include Cape Light Compact, National Grid, NSTAR, Western Massachusetts Electric Company (WMECO), and Unitil. The Massachusetts natural gas PAs include Berkshire Gas, Blackstone Gas Company, Columbia Gas of Massachusetts, National Grid, New England Gas Company, NSTAR, & Unitil.
Retrofit	The replacement of a piece of equipment or device before the end of its useful or planned life for the purpose of achieving energy savings. Retrofit measures are sometimes referred to as "early retirement" when the removal of the old equipment is aggressively pursued. May also refer to improvements made to an existing building's shell, such as insulation and air sealing.
Sector	A system for grouping customers with similar characteristics. For the purpose of this manual, the sectors are Commercial and Industrial (C&I), Small Business, Municipal, Residential, and Low-income.
Watt	A unit of electrical power. Equal to 1/1000 of a kilowatt.

Massachusetts Energy Efficiency Advisory Council 2011

VOTING MEMBERS

REPRESENTING	APPOINTMENT	ORGANIZATION
Residential Consumers	**Penn Loh**	Tufts University
Low-Income Weatherization & Fuel Assistance Network	**Elliot Jacobson**	Low-Income Energy Affordability Network
Environmental Community	**Jeremy McDiarmid**	Environment Northeast
Businesses (including large C&I end users)	**Rick Mattila**	Genzyme
Manufacturing Industry	**Robert Rio**	Associated Industries of Massachusetts
Energy Efficiency Experts	**Deirdre Manning**	Smith College
Organized Labor	**Charlie Harak**	Local 369 of the Utility Workers Union of America
Environmental Protection	**Nancy Seidman**	Department of Environmental Protection (MassDEP)
Attorney General	**Martha Coakley**	The Office of the Attorney General
Housing & Economic Development	**Debra Hall**	Dept. of Housing and Community Development (DHCD)
Energy Resources	**Mark Sylvia**	Department of Energy Resources

NON-VOTING MEMBERS

REPRESENTING	APPOINTMENT	ORGANIZATION
Energy Efficiency Businesses	**Paul Gromer**	Peregrine Energy
Heating Oil Industry	**Alisha Frazee**	
Municipal Aggregators	**John Ghiloni**	Town of Marlborough
Cape Light Compact	**Kevin Galligan**	
NSTAR	**Penelope Conner**	
National Grid	**Carol White**	
Western Mass Electric	**Richard Oswald**	
Unitil	**George Gantz**	
Columbia Gas of Massachusetts	**Derek Buchler**	
Blackstone Gas	**Andrew Newman**	
Berkshire Gas	**Michael Sommer**	
New England Gas Company	**James Carey**	

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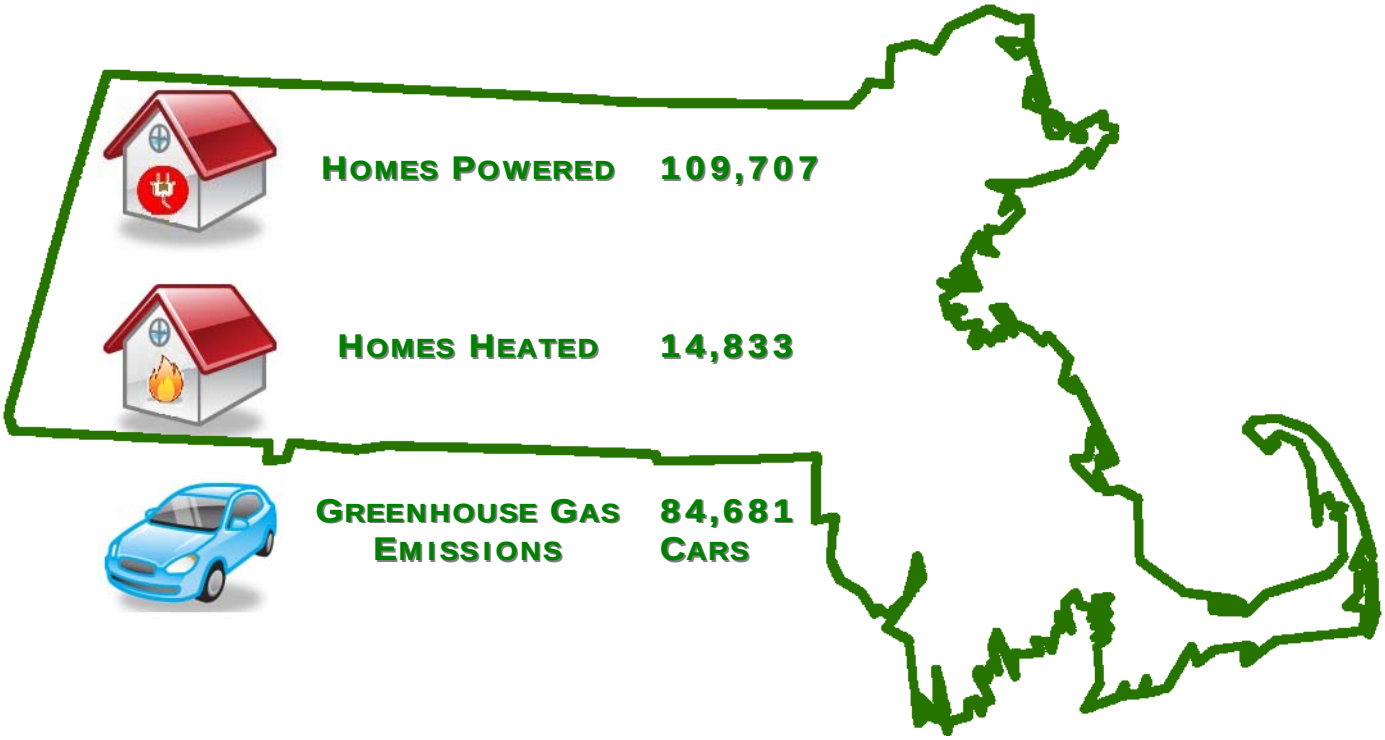
Understanding the Impact of the 2011 Energy Savings in Massachusetts

The 2011 electric and gas savings achieved through energy efficiency investments in homes, businesses, and government buildings can be understood in everyday terms. In this report, savings are compared to the number of homes that could be powered and heated annually, and to the number of cars' greenhouse gas emissions that could be avoided.



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