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Year-to-Date Performance – Q4 2017

At the end of the fourth quarter of 2017, **electric PAs achieved 106% of lifetime savings** for 2017, 115% of annual savings, and 102% of total benefits, and have spent 85% of the budget. **Gas PAs have achieved 97% of lifetime savings** for 2017, 93% of annual savings, and 105% of total benefits, and have spent 92% of the budget.

On a three-year basis, electric PAs have already achieved 70% of lifetime savings from Q1 2016 through Q4 2017. Similarly, gas PAs have achieved 66% of lifetime savings through Q4 2017.

Figure 1. Electric YTD Lifetime Savings

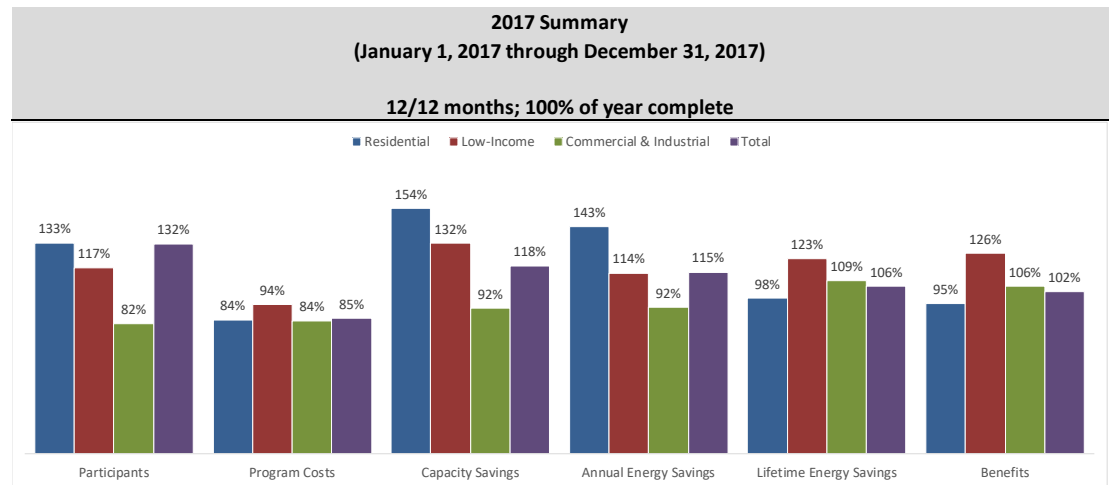
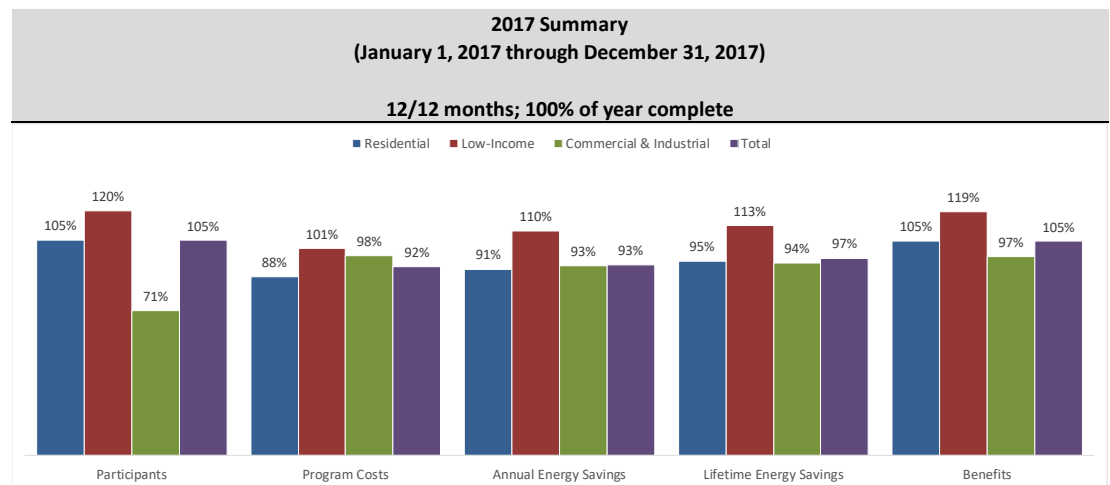


Figure 2. Gas YTD Lifetime Savings





Energy Efficiency Quarterly Report of the Program Administrators

Fourth Quarter 2017
February 21, 2018

Important Links:

[2016-2018 Plan](#)

[Oct. 26, 2015 Council
Resolution](#)

[Mass Save Data](#)

[Mass Save](#)

2017 Council Priorities

Priority 1: 2016-2018 Plan: Monitor progress and provide input into priority commitments and new program initiatives included in the October 26, 2015 Council Resolution and the 2016-2018 Three-Year Plan.

- C&I Programs continued to focus on incorporating lighting controls within the multiple program channels by [training](#) engineers, consultants, and energy managers on their intricacies and potential.
- The Massachusetts Technology Assessment Committee (“[MTAC](#)”) reviewed six new technologies in Q4 and recommended a new duct sealant for program consideration that can achieve 75%+ reductions in duct leakage.
- On December 7, 2017 Eversource and National Grid hosted a Combined Heat and Power Industry Summit where DOER shared information for vendors, manufacturers, developers, contractors, and engineers conducting business in the CHP Industry.

Priority 2: 2019-2021 planning: Identify key factors affecting the programs’ ability to maintain high goals and cost-efficient program delivery and explore possible impacts on the 2019-2021 Three Year Plan.

- The PAs continue to explore new avenues for program improvements including increasing uptake in communicating thermostats, streamlining rebate processing with contractor collaboration, adding Variable Refrigerant Flow (“VRF”) equipment to C&I HVAC offerings, and launching the online C&I Massachusetts Application Portal. See the C&I Program Highlights section below for more details.
- Several planning events occurred in Q4, including a two-day Residential Offsite Planning Meeting with PA evaluators and implementers, the RMC, and vendors. See Residential Program Highlights for more details.

Priority 3: Equitable customer participation: Ensure equal access to energy efficiency programs through enhanced delivery models.

- In Q4 the PAs’ worked on a Moderate-Income Demonstration with LEAN. See the Residential Updates below for more information.
- The PAs presented to the EEAC on the [Moderate Income Demonstration](#) in November.
- PAs continued to serve a diverse range of customers. Learn about how small business offerings met the needs of a Pioneer Valley nonprofit, Dakin Humane Society, in the Case Study section.

Priority 4: Data transparency: Advance transparency, availability and effectiveness of data and information to assess and improve energy efficiency programs.

- PAs held a three-day Evaluation Summit in December, bringing together stakeholders, evaluation vendors, PA implementers and evaluation analysts. Read more about it in the EM&V Highlights section.
- PAs continued to add data to Mass Save Data and keep the site up to date.

Priority 5: Identify opportunities for advancing an integrated approach to demand side management for the 2019-2021 Plan, including peak load reduction, integration of distributed resources and planning in a manner that decreases costs, increases resilience and reliability, supports innovation, and improves both the environment and the economy.

- The November EEAC Meeting focused on Demand Response, inclusive of a [statewide overview update](#), [Eversource-specific active demand management update](#), [active demand reduction cost-effectiveness considerations](#), and [demand response considerations in PA Potential studies](#).
- On October 30, 2017, the Department issued Orders addressing the proposed Eversource and Unitil Demonstration Offerings, which the Council supported in its October 2016 Resolution. View the [PA presentation here](#).
- Evaluation of National Grid's C&I and Residential DR programs is underway with expectations of completion in the first quarter of 2018.

Gas & Electric Program Highlights

Residential & Low-Income Sectors

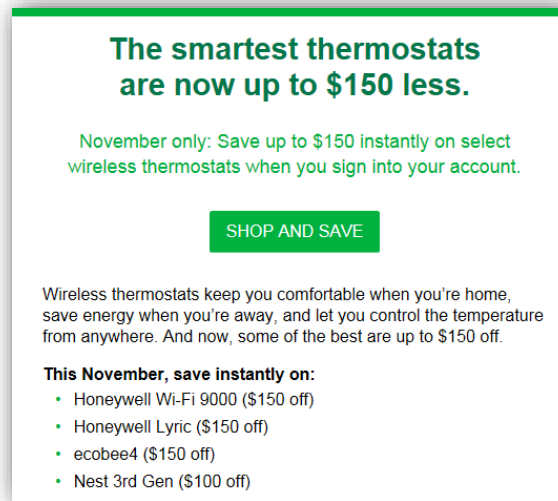
◆ Topic: Promotion of Communicating Thermostats

Summary: The Program Administrators leveraged planned manufacturer thermostat promotions in November **to increase communicating thermostat production for 2017 and drive participation through the Mass Save® [online store](#).**

Context: For the month of November 2017, the Program Administrators increased the incentive for communicating thermostats by an additional \$50 for customer purchases made through the Mass Save® unified marketplace. Customers of a sponsoring PA that heat with natural gas, electricity, oil and propane were eligible. During the week of Black Friday, Nest and Ecobee offered an additional \$50 off the MSRP, making the offer even more attractive for customers.

Decision: The PAs deployed email marketing to promote the offer throughout the month of November.

Figure 3. Email advisement for communicating thermostat increased rebate



During the promotional period, the **PAs sold roughly 11,000 communicating thermostats** statewide through the Mass Save® online store, a **200+% increase** over a similar promotion the PAs held in July. Additionally, the conversion rate on the Mass Save® unified marketplace was over 10% during this time, which is three times typical ecommerce conversion rates.

Next Steps: The Program Administrators will review the results, successes, and lessons of the promotion for future considerations as part of 2018 marketing plans.

◆ Topic: Streamlining Rebate Processing with Contractor Collaboration

Summary: In an effort to streamline the rebate process and expedite customers' rebates, the Program Administrators proactively reviewed 2017 rebate applications and worked directly with HVAC contractors who had submission issues tied to their invoices.

Context: The HVAC rebate application requires customers to submit a copy of their contractor invoice to verify installation and "paid in full" status. The submitted invoice must contain specific information including, but not limited to:

- The contractor's company information
- Make and model of the equipment
- Install address

If an invoice is missing required information, it moves the application to a 'flawed' status, resulting in a delay in payment to the customer. To facilitate processing, most invoice issues

need be corrected by the contractor and resubmitted, which requires additional steps by both the contractor and the customer, and can slow the customer's application process considerably.

Decision: The PAs identified those applications with missing information and contacted the applicable contractors directly via email and/or phone to advise them on how to correct the issues going forward. Over 50 contractors were notified, and feedback has been positive. Some contractors were unaware of the outstanding issues and will work to resolve any potential problems before the applications are submitted.

Next Steps: The PAs will continue to monitor applications submitted to the rebate processor monthly to examine areas where the program can make improvements. **The PAs will also continue to work directly with contractors to improve and minimize invoice issues.**

◆ Topic: 2019-2021 Three-Year Planning Milestones

Summary: The Program Administrators have begun an earlier and more intensive planning period to initiate the strategic development of the Massachusetts Statewide 2019-2021 Energy Efficiency Plan, which efforts continued in Q4.

Context: **The PAs have undertaken early planning for the 2019-2021 Statewide Energy Efficiency Plan** in recognition that this plan cycle will require significant innovation and creativity to maintain the PAs' leadership in securing energy efficiency benefits for Massachusetts' energy consumers. The early planning can also be attributed to addressing Council concern for diminished claimable lighting savings as LED lighting options increasingly become the standard customer choice, in large part due to the PAs' success in supporting lighting market transformation.

Discussion: The PAs are well into the planning stages of the 2019-2021 Energy Efficiency Plan. Beginning in the spring of 2017, residential implementation teams began to identify opportunities for 2019-2021 plan improvements and held a full day planning session in July 2017 to synthesize and prioritize these opportunities. To complement these efforts, starting in August 2017, the PAs invited DOER representatives and EEAC consultants to participate in bi-weekly RMC meetings to encourage collaborative work. The following chart lays out the residential planning milestones achieved in the 2017 calendar year:

Table 1. 2017 Residential Planning Milestones.

Milestone	Date	Attendees	Purpose
Residential Planning Kickoff Meeting	July 31, 2017	RMC and PA Implementation Teams	Develop a high-level residential vision statement and identify potential program design improvements.
Best Practices Working Group Session	September 28, 2017	Lead Vendors, HPCs, IICs and PAs	Explore contractor pain points and opportunities under the current program design using The Value Proposition Canvas.

Residential Offsite Planning Meeting Day 1	October 30, 2017	PA Implementation Teams and PA Evaluation Teams	Develop high level strategies to move the residential vision statement generated at July 31 forward.
Residential Offsite Planning Meeting Day 2	October 31, 2017	RMC, PA Implementation Teams and Lead Vendors	Share PA planning and vision for 2019-2021 to gain delivery partners' insights and understand partners' potential to help shape and move this vision forward.
Formation of Residential Planning Groups	October 31, 2017	Residential PAs	Small group work to identify and brainstorm ongoing exploration of program design options.
TVA Presentation	November 22, 2017	TVA, CLEAResult, EEAC consultants and RMC	Webinar arranged by ERAC and TVA to present the newly adopted eScore utility platform.

Next Steps: Program Administrators will continue to work with DOER representatives and EEAC consultants on residential planning efforts for the 2019-2021 Energy Efficiency Plan, with particular attention to understanding EEAC recommendations identified through the workshop process.

◆ Topic: Moderate-Income Demonstration with LEAN

Summary: The Program Administrators are building on their partnership with the Massachusetts Low-Income Energy Affordability Network (“LEAN”) to explore additional opportunities to serve moderate income customers with LEAN’s network, which primarily includes Community Action Program Agencies (“CAPs”).

Context: Program Administrators and stakeholders across Massachusetts acknowledge the importance of ensuring that moderate income households (customers whose household income **is between 60%+\$1 up to 80% of State Median Income (“SIM”)**) are aware of, have access to, and can benefit from the Commonwealth’s energy efficiency programs.

Eversource and National Grid have been planning for a 2018 trial that leverages the expertise of LEAN and CAP agencies in order to serve moderate-income customers through existing income-eligible program channels. The primary objective of the trial is to inform improvements in the design and delivery of services to moderate-income customers as a part of the PAs’ larger efforts to comprehensively offer energy efficiency measures to customers of all income ranges. For this reason, the trial design focuses on producing actionable and replicable insights to a mass market.

Decision:

- The target timeframe for this trial is six months, approximately March 2018 through August 2018. This timeframe will allow results/insights from the trial to inform three-year planning decisions.
- LEAN, along with Eversource and National Grid’s lead CAPs, respectively Action for Boston Community Development, Inc. (“ABCD”) and Action, Inc., will provide overall



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project management, including the management of participating CAP agencies within eligible towns.

- Up to 150 qualified moderate income households in the designated Eversource and National Grid territories will be included. See the **Table 2** below for a list of selected towns.
- To be eligible for the trial, households will need to verify their income is between 60%+\$1 to 80% of SMI and each customer should own and live in the 1-4 unit building receiving the services.

Table 2. Towns and organizations included in Moderate Income Outreach Trial.

Program Administrator	Lead CAP	Selected Towns
Eversource	ABCD	Boston Plymouth Dalton Hinsdale Peru Windsor
National Grid	Action Inc.	Boston Gloucester Lowell Chelmsford

Customers will be income verified as 60%+\$1 – 80% of SMI following the current HES moderate income verification process or the current low-income verification process, prior to being served a Home Energy Assessment (“HEA”). Once customers are identified, CAP agencies will provide customers with a comprehensive HEA, addressing both gas and electric opportunities. The HEA includes the installation of instant savings products including efficient lighting, water savings devices, smart strips, and programmable thermostats (subject to participant discretion). Additionally, the Energy Specialist will provide a full weatherization scope of work (including all needed insulation and air sealing), an evaluation of hot water/heating and cooling equipment replacement potential (including health and safety assessment), an evaluation of other appliance efficiency potential including refrigerators and clothes washers, and provide HEAT Loan information.

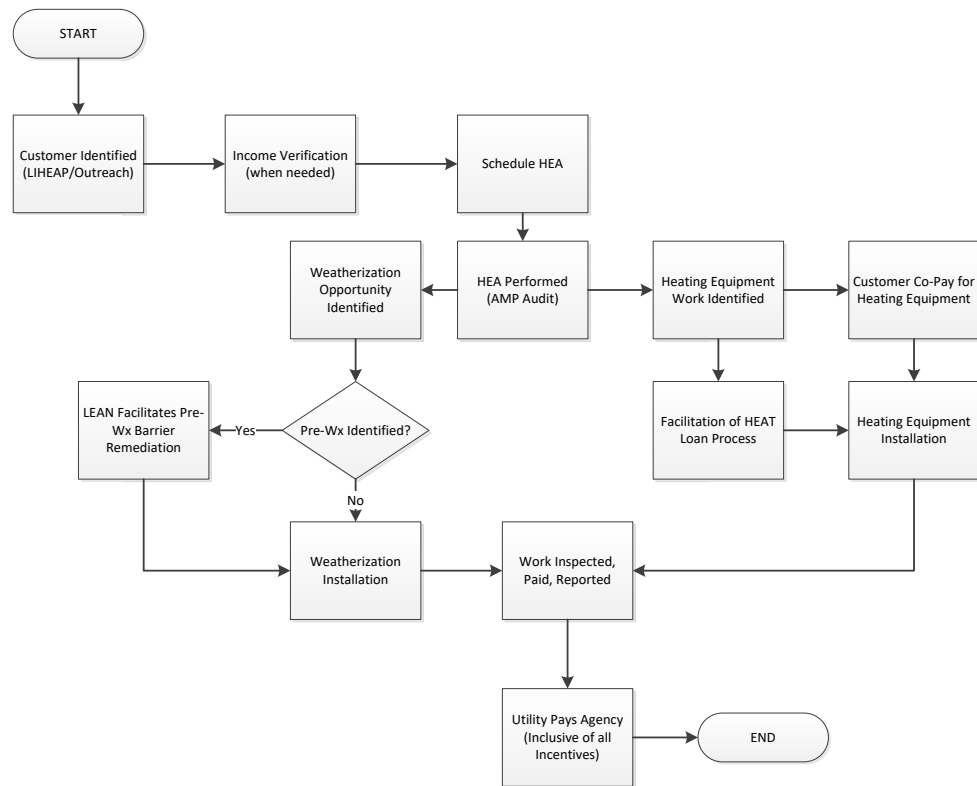
At the end of the assessment, the Energy Specialist will provide the customer with documentation that provides an overview of services received, additional eligible efficiency improvements and incentives available, Early Retirement Rebate forms for Refrigerators and/or Clothes Washers when applicable, and next steps.

CAP agencies will identify any pre-weatherization barriers during the HEA. Building on their expertise, CAP agencies will facilitate all pre-weatherization remediation and repairs for the customers using the same protocols used in the income-eligible program, including the procurement of bids, if necessary.

Current Home Energy Services (“HES”) Moderate-Income incentives will apply to participants in the trial. Eversource and National Grid will be monitoring the effectiveness of the trial in increasing participation for moderate-income customers.

LEAN project management includes management of all phases of weatherization and heating system measure procurement and installation, as shown in **Figure 4** below.

Figure 4. LEAN project management within the moderate income trial.



Next Steps: The moderate-income demonstration with LEAN will begin in early 2018. Eversource and National Grid will be testing the following items to inform Three-Year Planning:

- LEAN/CAP capacity to serve the Moderate-Income segment statewide.
- The LEAN/CAP “project manager” model. Identifying the challenges and opportunities from guiding a customer through the entire energy efficiency project, from intake through measure installation, including the mitigation of pre-weatherization barriers.
- Overall customer satisfaction with the model.
- The overall impact of these fully facilitated services to the cost of participation for customers, and how this compares to HES.
- Cost-effectiveness of this trial.

Pending trial results lessons learned and successes will be considered for broader statewide application.

Commercial & Industrial Sector:

◆Topic: C&I Training & Outreach

Table 3. 2017 Fourth Quarter C&I Trainings and Outreach Events.

DATE	TOPICS OF INTEREST
Oct 12	Benchmarking Commercial Buildings, Webinar in conjunction with the New Buildings Institute (NBI)
Oct 18	New TLED Integrated Lighting Fixture Technology. Presentation at Westwood by Lunera
Oct 27	Lunch & Learn (York YMC Centrifugal Chillers)
Oct 30	Lunch & Learn (Cree)
Nov 1	Cannabis: Explosive Market Growth, Extreme Energy Intensity. Presentation at AEE New England Meeting (Waltham MA)
Nov 7	“Transforming Existing Buildings into a High – Performing Facility” Presentation at ASHRAE Boston Chapter meeting (Waltham, MA)
Nov 10	Leveraging Partnerships to Drive Energy Savings on Campus. Presentation at ABX 2017 – Greenbuild International Conference 7 Expo (Boston MA)
Nov 15	Advanced Lighting Control Systems. Training / Presentation at Massachusetts Energy Efficiency Partnership (MAEEP) (Norwood, MA)
Dec 7	Innovation in Electric HVAC and Gas-fired Air Heaters (Webinar)
Dec 12	Vibration Isolation and Noise Control with MEP Systems. Presentation at ASHRAE Boston Chapter meeting (Waltham MA)
Dec 13-14	Advanced Management of Compresses Air Systems – CAC Level 2. Training / Presentation at Massachusetts Energy Efficiency Partnership (MAEEP) (Norwood MA)
Dec 15	Phase Change Material Characteristics and Applications for Improvement of Energy Efficiency. Full day meeting at Fraunhofer Institute in (Boston MA)
Dec 18	Benefits of Modern HVAC Technology (Webinar)
DATE	Early Q1 2018 Trainings & Outreach
Jan 1	Lunch & Learn (Gustavo Preston Company)

Jan 4	Lunch & Learn (Save Energy Systems)
Jan 10	Discussion of Eversource Massachusetts's Demand Reduction Program & Opportunities. Presentation at AEE New England Meeting (Waltham MA)
Feb 6	Lunch & Learn (Apex Lighting "Controls")

◆Topic: VRF added to Upstream HVAC Initiative

Summary: The Program Administrators introduced Variable Refrigerant Flow ("VRF") equipment to the C&I Upstream HVAC Initiative as of September 1, 2017.

Context: VRF technology can allow for simultaneous heating and cooling in many different building zones and, in part because it uses refrigerant lines instead of ductwork, VRF is an attractive option for many use cases, including retrofits in older buildings that are space-constrained and do not have pre-existing ductwork. The large extent of market overlap with the existing Commercial and Industrial HVAC Initiative presented an opportunity to further engage the market and better serve customers.

Decision: In an effort to provide customers with increased choice in high efficiency equipment, the PAs worked to establish minimum efficiency requirements and savings calculations for VRF systems for introduction to the initiative on September 1, 2017. The incorporation of VRF technology allows for the PAs to offer an exciting new program offering to commercial and industrial customers that provides significant electricity savings. **Within their first four months in the initiative, VRF measures represented almost 1 GWh in first year annual savings across more than 40 installation sites.**

Next Steps: The PAs are currently continuing market engagement around this product offering and using the high-savings potential to entice increased participation.

◆Topic: PAs Host Lighting Controls Training

Summary: The Program Administrators hosted an Advanced Lighting Control Systems [training](#) on November 15, 2017 at the Four Points Sheraton Norwood Conference Center.

Context: Advanced Lighting Controls continue to be an area of great potential and impact for customers. As a result, the PAs continue to focus on new lighting control technologies in the marketplace and on incorporating lighting controls within the multiple program channels. As PAs look to create a new offering to increase the penetration and successful use of advanced lighting controls, the PAs are developing targeted training programs that will educate multiple channels within the entire market chain: manufacturer, distributor, engineer, designer, vendor, contractor, and installer.

The Advanced Lighting Control Systems training allowed for initial insights into one aspect of the overall proposed training strategy. The session was fully attended and the audience

represented a mix of market chain participants. The curriculum was based upon the upcoming Design Lights Consortium's ("DLC") lighting controls training program. The training also included a detailed information session in the morning followed by a hands-on session in the afternoon lead by DLC instructors.

Decision: Course evaluations and reviews were very positive. The feedback and comments were very helpful in highlighting adjustments for future offerings. As a result, the PAs decided to continue to support similar training sessions with more frequency throughout the year. In addition, since this particular session only represented one aspect of a much larger training strategy, the PAs approved additional training components for further evaluation and testing.

Next Steps: The PAs will continue to develop a multi-tiered training approach. In addition, the PAs will also continue their collaboration on the DLC Committees in order to expand the list of products on the published Qualifying Products List as new product groups come into the market. Additional aspects of the multi-tiered training will be explored and tested in 2018. The PA will continue to assess and consider full deployment of the complete training structure over the next several months. If successful, this multi-tiered training and outreach model may be viable for other technologies and measures within the energy efficiency programs.

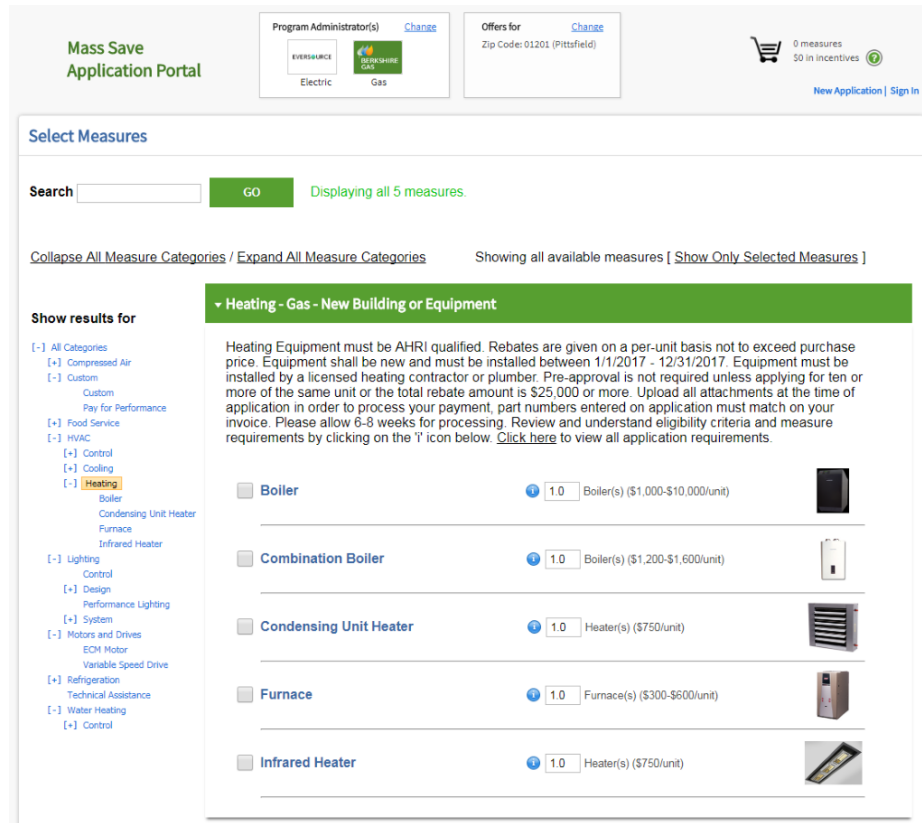
◆Topic: Launch of C&I Massachusetts Application Portal

Summary: The Mass Save® Application Portal ("MAP") entered the initial "go-live" phase of a coordinated launch schedule to transition from a paper application process to an online application process for Massachusetts C&I customers.

Context: As described in the 2016-2018 Three-Year Plan, this **online platform provides customers with a fully digital means to search for offers and apply for incentives**, replacing the former paper-based system. The intuitive design allows customers to browse through offers and guides them through the application process while connecting them to additional recommended energy efficiency measures. Features such as real-time error detection and intelligent routing of applications to the appropriate Program Administrator(s) decrease end-to-end processing time and provide better data quality and consistency. Auto-population of known information is expected to streamline repeat participation for both customers and business partners. The back-end data platform delivers new visibility into customer behavior and with feedback loops that enable continuous process improvements. Overall, MAP is anticipated to improve customer experience and participation rates.

The controlled roll-out of the portal provides PAs a low-risk way to become fluent in the use of the system and introduce customers to the new online application process. Feedback is captured from all users to make system adjustments, as necessary, before transitioning to an exclusively online system of applying for C&I incentives

Figure 5: Image from the new Mass Save® Application Portal



Decision: In the fall of 2017, MAP was made available to a limited group of C&I customers across the state in anticipation of the full launch of the portal in 2018. PAs captured feedback from this group to make system adjustments, while also training internal staff and adapting internal business processes. During this time, PAs successfully processed a dual-fuel custom application and a handful of prescriptive rebates.

Next Steps: On January 1, 2018 MAP was made available to all C&I Customers across the state. The MassSave.com site was updated to include an “Apply Online” button that links to the MAP landing page, introducing applicants to the new process for participation. Marketing and outreach is beginning in Q1 2018, and training will be offered to business partners. PDF applications will continue to be accepted through the end of Q1 2018. During this time, PAs anticipate a significant shift from the current paper process to applications processed through MAP. Monitoring of the system’s success and customer needs will determine if PDF paper applications are accepted after Q1, with the desired outcome being a full transition to MAP in Q2.

Innovation

Massachusetts Technical Assessment Committee:

The Massachusetts Technical Assessment Committee (“MTAC”) provides a statewide coordinated process for the PAs to assess the energy saving merits of new technologies, both residential and commercial. Eligible technologies are referred from MTAC to the Innovation and Technology Subcommittee for individual consideration and may be included in Massachusetts energy efficiency programs, as appropriate.

For each technology that MTAC recommends, a “Technology Scorecard” is developed and made available on www.MassSave.com/MTAC. These scorecards provide a description and photo of the technology, an overview of the energy savings opportunities associated with the technology, a summary of its strengths and weaknesses, and market development issues, as well as a list of known suppliers.

In the fourth quarter of 2017, MTAC received eight new technologies to review. Two of the technologies found to already be eligible in the PA programs as custom measures and therefore did not require a full MTAC review. The remaining six technologies are currently under review.

Table 4. Updated list of eligible technology reviewed by MTAC in 2017.

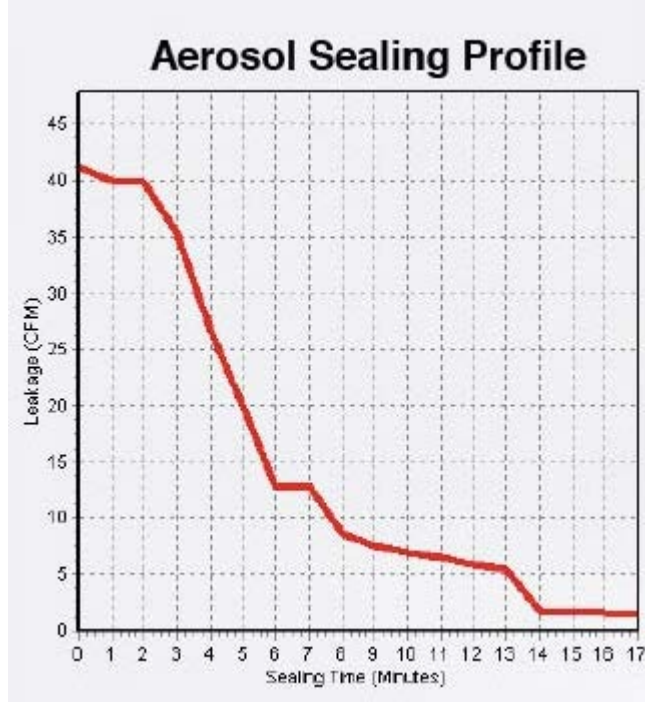
Technology Name	Status
A/C Draft Shields	Eligible for Custom Measure
Ice Rink Vortex Water Treatment System	Eligible for Custom Measure for ice arenas
Fire Smoke Dampers for Elevator Shaft Vents	Eligible for Custom Measure for Retrofits
Advanced Oxidation Secondary Pool-Water Disinfection	Eligible for Custom Measure for Commercial Pools and Spas that require secondary UV disinfection

Spotlight on Technology:

MTAC has referred a **new duct sealing technology** for program consideration. This new product reduces energy usage associated with heating and cooling by using the HVAC fan to spray a fine mist made up of mostly vinyl acetate copolymer through the duct system. This mist begins to adhere where there are leaks, sealing the ductwork from inside. When applied

correctly, these duct sealants are excellent at sealing ductwork and can achieve 75%+ reductions in duct leakage.

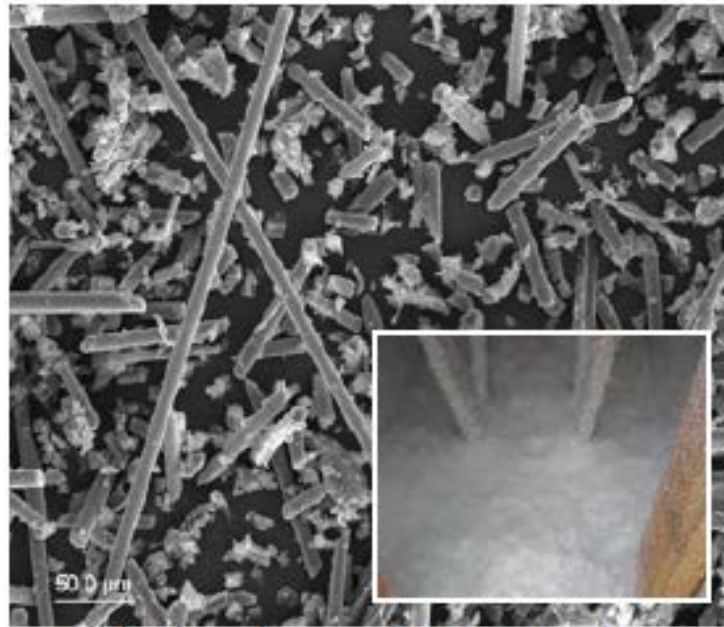
Figure 6. Reduction of duct leakage after duct sealant is applied



Strategy Research:

Phase Change Material (“PCM”) can shift heating and cooling loads. Manufacturers are starting to target commercial refrigeration and building envelope applications. Characterizing the load shifting behavior of PCMs and quantifying additional efficiency benefits remains complex and indeterminant. To improve stakeholder understanding of PCM applications and performance, MTAC and representatives from the DOER and MassCEC attended a strategic overview session on PCMs led by industry expert Dr. Jan Kosny at Fraunhofer CSE in Boston. Going forward, new applications for PCMs will be evaluated for future program consideration; however, new or improved performance modeling methods will be required for wider program adoption.

Figure 7. PCM material mixed with fiberglass attic insulation.



EM&V Highlights

Overview

For an overview of the evaluation activities currently being undertaken by the Evaluation Management Committee (“EMC”), please refer to the list of studies and corresponding Gantt chart on the EEAC website’s [Studies](#) section. Details on each study, including the study name, research area, study type, overall evaluation goal (project summary/purpose), expected outcomes and the current stage of the evaluation are available on the website. The list of evaluation studies is organized according to the current stage of study (planning, implementation, ready to file, etc.). A Gantt chart that illustrates each study’s schedule from the start of the study to its expected completion date is also available on the EEAC Website.

Planning Activities Conducted in Q4

In early December, the PAs hosted a three-day evaluation planning summit in Boston. The planning meeting brought together various evaluation stakeholders to begin discussing areas of research for the 2019-2021 period. While no decisions were made as to what specifically needs to be investigated in the next planning cycle, various subcommittees were formed to address issues which require stakeholder consensus prior to scoping targeted research later in 2018.

Studies Completed in Q4 and their Application

2016 Sales Data Analysis and Sales Data LED NTG Modeling

This report describes the results of two studies that analyzed sales data from a dataset compiled by the Consortium for Residential Energy Efficiency Data (CREED). One study describes market share of screw-base light bulbs, and the other estimates net-to-gross ratios (NTGR) for light emitting diodes (LEDs). The studies show that energy-efficient lighting programs in Massachusetts and beyond have had a profound impact on the market. Compared to non-program states, Massachusetts and other program states have higher market shares of LEDs and compact fluorescent lamps (CFLs). In addition, the data suggest that greater adoption of energy-efficient bulbs (in terms of socket saturation and sales) leads to lower bulb sales overall due to the longer measure life of CFLs and LEDs.

Key findings included:

- Massachusetts had the highest combined market share of energy-efficient bulbs in 2016 (42%)
- In the US, market shares for LEDs and halogens are increasing, whereas market shares for incandescents and CFLs are contracting
- The proportion of confirmed ENERGY STAR qualified bulbs sold in Massachusetts is higher than New York but lower than the US, program, and non-program states
- Incandescent and halogen bulbs account for nearly all A-line bulb sales in current and future EISA (2020) exempt lumen bins
- Socket saturation and market share of energy-efficient bulbs (LEDs and CFLs) likely influence bulb sales per household across the US
- LED and CFL prices—which include program incentives—generally remained higher than incandescent and halogen prices in 2016
- ENERGY STAR LEDs cost more than non-ENERGY STAR models in non-program states and across the nation. However, this was not the case in Massachusetts
- LED shares increase as program spending increases
- Statistical modeling results confirm the importance of program spending for boosting LED sales; program age, income, concentration of certain retail stores, and political leanings also influence LED sales
- The NTGRs suggested by the recommended model are 55% when assuming the Massachusetts program never existed (i.e., there was no program activity in 2016 or any years prior), and 39% when assuming the program existed through 2015 but not in 2016

HEHE Wi-Fi Tstat Tech & Lit Review

The goal of the study was to understand the current and future state of thermostat technology and other connected devices, and their impacts on energy use. This study consisted of a review of existing literature on smart thermostats and other connected devices. The literature review revealed these products are gaining traction in the consumer market, with thermostat market share increasing most rapidly. The research team recommends performing a primary research study of smart thermostat energy savings specific to Massachusetts. Energy savings have been identified for smart thermostats in different utility programs across North America,

but reports from recent studies are not consistent in their findings across multiple years, climate zones, or thermostat types. However, due to the lack of consistent data regarding other connected devices and the relatively sparse market for these products, the research team recommends not performing a primary research study for such devices at this time.

Upstream HVAC Initiative Process Evaluation

The goal of this study was to investigate the initiative's current impact on the market, whether greater uptake should be occurring, differences in participation levels, and programmatic changes which could increase participation and alleviate any inefficiencies identified.

Key findings included:

- Update the incentivized technologies to include variable refrigerant flow, per consensus feedback of all parties interviewed
- Current rebate processing times pose a barrier to broader implementation and program administrators should work to remedy these and alleviate distributor high "carrying costs"
- A focused marketing campaign should be developed leveraging national best practices in order to increase awareness and educate market actors on the value of the initiative

Combined Heat & Power Process Evaluation

The goal of this study was to investigate CHP best practices and areas/strategies which have worked well in CHP execution while also investigating market barriers facing implementation in Massachusetts and ways in which these can be mitigated.

Key findings included:

- Customers are generally happy with the incentives available in Massachusetts and place a high priority on kWh and cost reductions, which suggests a continued focus on existing processes and cost effective screening
- Program administrators and the DOER should continue to work together to identify and alleviate differences in approaches which could lead to confusion on the customer's and/or stakeholder's part, and could consequently lead to execution inefficiencies
- Smaller customers could represent an area of opportunity and program administrators should investigate cost effective projects in this segment
- Related to the previous finding, more aggressive marketing to mid-sized and smaller customers should be pursued if opportunity exists

Upstream Lighting Impact Evaluation

The goal of this study was to investigate gross savings parameters of lighting products running through the upstream delivery model. All products evaluated as part of this study were light emitting diode (LED) technology of different applications. The study produced evaluated realization rates for kWh, kW, and interactive effects of electric/non-electric impacts. In addition, the study parsed out gross factor adjustments for 2018+ application.

Key findings included:

- Installation rates tended to be low for many product categories (e.g., a lamps, decorative lamps, reflector lamps, etc.) with the exception of TLEDs
- Reasons for low installation rates generally included: on-site storage for installation at a later time, shipment to other, unverified sites, and product exchanges/returns with no corresponding repurchase and installation of high efficiency technology
- Linear LED lamp technology showed favorable evaluation results mainly due to higher delta watts between baseline and high efficiency technology than predicted by initial program administrator forecasts

Community Based Program Design Effectiveness Study

This study had three overarching goals: (1) to identify and document the breadth of CBP designs and attributes nationally, (2) to explore the relative effectiveness of various community engagement strategies, and (3) to explore what factors help to explain why community engagement strategies are variably effective across contexts. Phase 1 addresses the first of these goals, comments on the second and third, and lays the groundwork for the potential development of a Phase 2 study to answer an additional question about the long-term effectiveness of CBPs if warranted.

This study represents a comprehensive synthesis of 25 CBPs, and offers a comprehensive look at the entire program process, from origins to evaluation results. It also fills important gaps in the PAs' knowledge related to benefits that CBPs can offer that go beyond energy-reduction goals. This report brings together multiple interim documents to present a synopsis of all methods, findings, and recommendations.

Studies Started in Q4

2019 to 2021 Planning and 2017 Annual Report Residential Lighting Market Adoption Models

The main study goal is to update or create three models that will inform the 2017 Annual Report and 2019 to 2021 Program Planning. The three models are as follows:

- Standard (A-line) model – update
- Reflector model – update
- Other Specialty model – create

Additional study goals include updating wattage bins using the most current market information available. The study will also explore the feasibility of incorporating wattage bins into the specialty model that coincide with very low lumen (below 310) and very high lumen (above 3,300) bulbs that will remain exempt in the second phase of the Energy Independence and Security Act (EISA) per the Department of Energy's (DOE's) recent General Service Lamp (GSL) rulemaking, if it is implemented. The model will predict gross and net delta watts through 2025.

The team will include predictions of direct-install (DI) delta watts for all versions of the Market Adoption Model.

Shelf-stocking

The goals of the shelf-stocking research are to assess the following:

- The amount of shelf area dedicated to LEDs, CFLs, halogens, and incandescent lamps in Massachusetts
- The pricing, number of bulb packages, and shelf locations of LED, CFL, halogen, and incandescent lamps in Massachusetts
- Differences in pricing and availability for LED ENERGY STAR® vs. Non-ENERGY STAR products in Massachusetts

Low Income Process and Market Evaluation

The process evaluation of the single-family and multi-family Income Eligible Program will address the following objectives:

- Describe, and to the extent possible quantify, progress in serving target segments (e.g., 1-unit single-family, 2-4-unit single-family, 5+ unit multi-family, owner, renter)
- Identify stakeholder perceptions of market saturation (available future weatherization potential) of the target segments
- Document current outreach and marketing efforts and uncover challenges with these efforts as well as opportunities for successful outreach strategies that could be used in the future
- Identify barriers and opportunities for addressing harder-to-engage target populations such as renters and smaller multi-family buildings
- Describe uniformity and variance by region and agency in customer experience, agency practices, and program implementation
- Explore current and future concerns for achieving savings in a cost-effective way with consideration of changing cost-effective measures (e.g., strategies to replace lost lighting savings) and administrative costs

Upstream Lighting Process Evaluation

This study follows the recently completed Upstream Lighting Impact Evaluation, which has suggested that changes are currently being implemented to the upstream delivery model and quality controls protocols which could alleviate some of the issues discovered as part of the impact evaluation. This study is geared at examining whether this is the case and whether changes address the issues in program delivery. In addition, it has also been established to gain additional insight into the rapidly changing LED market and, more specifically, barriers and further opportunities in the linear LED market, assessing the impact of programmatic changes to data accuracy, and measuring participating customer and trade-ally satisfaction with the initiative.

Massachusetts Statewide Residential and Commercial Statewide Awareness Survey

Over the past five years, the PAs have implemented the Mass Save campaign, serving as a statewide umbrella marketing campaign for the PA energy efficiency programs. To date, the

state's evaluation efforts have focused on tracking Mass Save brand awareness over time, capturing increases in residential awareness from 39% in 2012 to 64% in late 2016 and C&I awareness from 33% in 2012 to 73% in 2016. Given this steady increase in awareness, the PAs and EEAC noted interest in both conducting the ongoing awareness survey research, as well as digging into deeper questions around PA and statewide brand associations. While there is high awareness of the Mass Save brand across Massachusetts, PAs are not sure whether residential and commercial customers tie the Mass Save brand back to the utilities that fund it.

The Statewide Residential and Commercial Awareness Survey will provide insight into the following research questions:

- What is the level of residential and commercial customer awareness of the Mass Save brand?
- What is residential and commercial customer awareness of the new website?
- What feedback do residential and commercial customers have regarding the new website?
- What is the level of residential and commercial customer satisfaction with the new Mass Save website?
- What is the level of residential and commercial customer awareness of the link between their utility and Mass Save?
- What are the longitudinal changes in awareness over time?
- What are the awareness differences across key sub-populations, including the low-income and Spanish-speaking populations?
- What are the awareness differences by geographic region?

Regulatory Updates

On October 3, 2017, the Department of Public Utilities (“Department”) opened an investigation in D.P.U. 17-146 into the eligibility of energy storage systems (batteries) to net meter under current regulations. The PAs are monitoring the Department’s decisions in this docket for potential impacts on battery storage demonstration projects.

The Department issued Orders on October 30, 2017 approving, in part, the proposed Unitil and Eversource demand reduction demonstration projects.

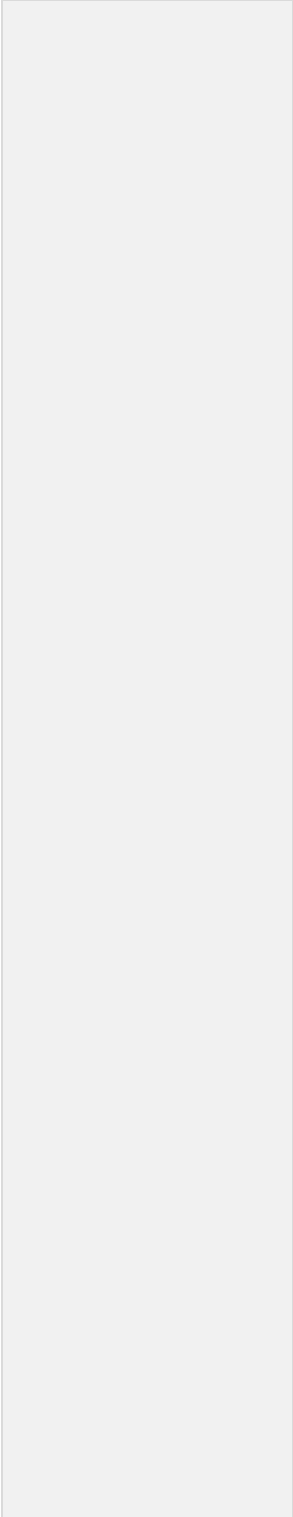
In Q4, Unitil requested EEAC approval of a [mid-term modification](#) of its electric Residential Products program. Unitil sought approval to spend additional funds in this program to meet increased demand and achieve additional savings. On November 15, 2017 the EEAC voted to approve an additional \$590,000 for spending by Unitil in this program.



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Case Studies

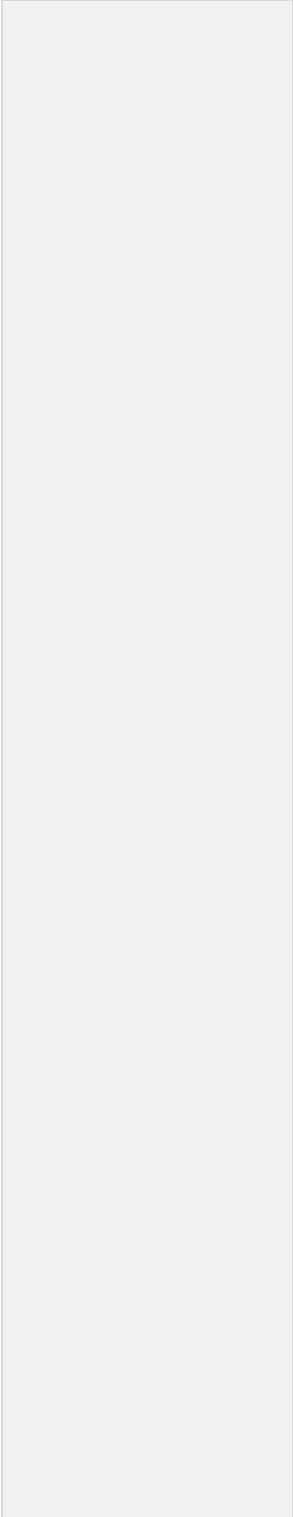




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Data Tables



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