

DEFINITION AND BACKGROUND

The Massachusetts Program Administrators' (PAs') electric and gas Residential Products Programs promote a large and diverse range of measures. In 2013 the programs contributed 71 percent of the PAs' lifetime Residential Sector electric savings and 35 percent of lifetime gas savings. They include three electric initiatives and one gas initiative described in the table below.

Initiatives in the Residential Products Programs	Measures and Practices Encompassed by Initiative	% of Sector Savings Annual/Lifetime (for respective fuel type)
Residential Lighting (electric)	Efficient compact fluorescent lamps (CFLs) and light emitting diode (LED) lamps and fixtures. Delivered primarily through upstream incentives to retail lighting outlets, as opposed to HES lighting installs	50/61
Residential Cooling & Heating Equipment (electric)	Efficient cooling (central air conditioning), heating (heat pumps), and hot water equipment (heat pump water heaters (HPWHs)); programmable and Wireless enabled thermostats; efficient boiler circulator pumps, and proper installation practices for central cooling, heat recovery and heating equipment.	3/6
Residential Consumer Products (electric)	Efficient appliances (refrigerators, room air cleaners, clothes dryers, and dehumidifiers), consumer electronics (TVs, computers, and monitors), advanced power strips, and variable speed pool pumps, as well as the removal and environmentally responsible recycling of inefficient second refrigerators and freezers	4/4
Residential Heating & Water Heating (gas)	Efficient gas-fired heating and hot water equipment, wireless enabled and programmable thermostats, and the installation of controls on older boilers	24/35

Note: Currently oil and propane heating and hot water equipment and controls are incentivized through the broader Home Energy Service (HES) Initiative.

Efficient lighting and consumer products are promoted at retail through a combination of upstream incentives to retailers and manufacturers, and with mail-in rebates. A majority of PA lighting incentives are upstream. Whenever possible the PAs require ENERGY STAR[®] lighting qualification as a minimum criterion for incentive eligibility.

Increasingly, the PAs' retail lighting efforts focus on LEDs. The rapid growth of LEDs as a percentage of all lighting sales in the 2013-15 Plan has been the most significant change in the electric Products Program. In 2014 LEDs represented approximately 23 percent of PA supported retail lighting units—up from 6 percent in 2012—yielding an estimated 56 percent of the initiative's lifetime savings. Developing projections of expected LED pricing, market adoption and claimable savings for the next Plan will be challenging given the rapid evolution and growth of this technology.¹

¹ An important planning consideration for the 2016-2018 Plan will be the assumed net-to-gross (NTG) ratio for LEDs, which is currently 100% absent any empirical data.

The electric Cooling & Heating Equipment Initiative focuses on customer/contractor incentives for efficient HVAC and domestic hot water (DHW) equipment, wireless enabled thermostat incentives at retail, and proper installation practices for central air conditioners and heat pumps. The most noteworthy measure additions in the 2013-15 Plan have been wireless enabled thermostats and heat pump water heaters.

The gas Heating and Water Heating Initiative focuses on efficient equipment and controls, which include Wi-Fi thermostats and boiler reset controls. Nearly all of the electric and gas incentives are directed to contractors and customers.² While most incentives are structured to address replacement at failure opportunities, the PAs also encourage early equipment retirement and replacement through other initiatives, notably through successful early boiler and early furnace replacement measures in the Home Energy Services (HES). Note that recent evaluation results determined that as much as half of efficient gas heating equipment installations supported by the gas Heating and Water Heating Initiative are associated with an oil-to-gas fuel conversion.³

Recent or impending federal equipment efficiency standards have or will potentially reduce savings opportunities for many of the Products Programs' key measures including lighting, refrigerators, freezers, room air conditioners, boilers, and heat pumps. For some products, most notably room air conditioners and freezers, federal standards have sufficiently diminished savings opportunities to the point that PA support in 2015 was discontinued. Additionally, large market and technology driven improvements in TV efficiency have significantly reduced savings from this once key Consumer Products Initiative measure.

The Consultant Team's report, "Residential Products: Savings Opportunities and Innovative Strategies for the 2015 and the 2016-2018 Plan," provides more detailed discussion of the Products Programs and savings opportunities.

POTENTIAL OPPORTUNITIES FOR 2016-18 PLAN

New savings opportunities from the Products Programs can potentially come from four main areas of program enhancements:

- **Increased promotion of LEDs.** The efficient lighting industry has shifted its focus from CFLs to LEDs as LED products have become more available and prices have continued to decline. LEDs provide greater lifetime savings than CFLs primarily due to their longer lifespan. Currently, LED incentive costs are higher than those for similar CFLs. LEDs perform better than CFLs in a number of key performance parameters including longer lifetimes, warm-up time to full brightness, dimmability, cold temperature performance, and use in directional applications like reflector lamps. They are also mercury free.
- **Pursuing a fuel-blind approach to space heating and hot water.** Currently, consumers seeking alternatives to their existing heating and hot water fuel choices receive a limited range of options through the Massachusetts energy efficiency programs. This program limitation is due to the historical interpretation of the DOER Residential Conservation Services (RCS) regulations. In addition, PA incentives and savings claims for measures such as efficient heat pumps and heat pump water heaters are based on a comparison against a baseline of less efficient electric equipment. This approach does not credit the full range of opportunities for existing fossil fuel-fired equipment to be replaced or supplemented by thermal renewable technologies, which include heat pumps, heat pump water heaters, and pellet stoves. The state's Clean Energy Center currently supports these thermal renewable technologies to help Massachusetts meet its Alternative Portfolio Standard. Currently, biomass and some heat pump applications are not claimed savings opportunities for the PAs, whereas efficient gas or

² The PAs have previously considered upstream gas HVAC programs, but have concerns around its potential effectiveness in MA.

³ 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing. Volume 1. June 2013. Cadmus Group.

replacement oil equipment do provide significant claimed savings. The pending revisions to the RCS regulations present an opportunity to change and expand the equipment programs.

- **Promoting new technologies, practices and implementation strategies.** The PAs routinely identify and support new technologies and practices. Most recently these have included wireless enabled thermostats, heat pump water heaters, Tier 2 advanced power strips, efficient clothes dryers, and LED lighting.

In the 2016-2018 Plan, new technologies to promote may include home energy management systems, duct sealing of gas heating systems outside of HES, and incorporating savings from fossil fuel heating and hot water alternatives including cold-climate air source heat pumps.

In regards to enhanced implementation strategies, upstream incentives to distributors for HVAC and DHW equipment may hold significant promise and preliminary evaluation results indicate that boiler installation practices may merit closer attention. Finally, there may be opportunities for the PAs to expand, coordinate, and leverage their efficiency efforts both internally and with utility smart grid efforts to address seasonal peak demand issues.

KEY QUESTIONS

Some key questions that the Council may want to explore during the workshop include:

- **LED strategy:** How quickly should the PAs transition to a retail lighting initiative that only supports LEDs?
 - What should that trajectory look like, and what market information should be collected to inform any decision to phase out PA support for CFLs?
 - How should the many important non-savings attributes of LEDs be balanced against the current, higher costs of savings for general service LED lamps?
- **Specialty CFLs:** Many specialty CFLs, (i.e., reflector, dimmable, globe and candelabra CFLs), already have a higher incentive \$/lifetime kWh cost than their LED counterparts. Should these lighting products be discontinued in favor of LEDs in the 2016-2018 Plan?
- **Switching fuels:** What should be the role of efficiency programs to identify, promote and support a fuel-blind approach to space and water heating, including gas conversions and renewable thermal energy options such as cold climate air-source heat pumps, geothermal heat pumps, biomass boilers and wood pellet stoves?
- **New technologies and strategies:** What additional new technologies, practices, and program implementation strategies could be qualified to be included in the 2016-2018 Plan?
 - Could expanded and new wireless enabled thermostat and home energy management system efforts be used to increase customer engagement (including behavior) and support demand response activities to address peak load issues?
 - Are there adjustments to existing program delivery models (e.g. upstream HVAC for appropriate measures) that should be considered?
- **Coordination and deeper savings:** How can Whole House and Products Programs efforts be better coordinated to promote efficient products and encourage their proper installation in existing homes, including expanding early replacement opportunities, and support a more complete accounting for achievement of deeper savings?