

INTRODUCTION

This briefing presents a high-level overview of the Residential Sector and is intended to provide context for the following Residential workshops: Products workshop on January 29, and Whole House (including multi-family) workshop on February 26th. Note that this briefing does not address the Low Income Sector, which will be separately briefed for the February 26 afternoon workshop. Massachusetts’ residential efficiency programs have consistently generated some of the highest savings in the country. At the statewide level, the Massachusetts Program Administrators (PAs) have been exceeding their Residential Sector gas and electric goals under the 2013-15 Plan.¹ Residential savings, along with Low Income Sector savings, have been instrumental in making up the achievement shortfall of C&I Sector electric goals under the PAs’ portfolio.

PROGRAM PLANNING CONSIDERATIONS

The PAs take several considerations into account when they are planning their programs. Table 1 shows several major considerations that it will be helpful for the Council to understand in support of discussions during the workshops and beyond.

Table 1. Program Planning Considerations

Consideration	Questions to be addressed
Cost effectiveness ²	Are costs/savings known? Do any 3rd party evaluations exist to substantiate savings?
Customer experience	How will the customer experience be impacted? What is expected customer demand—now and in the future?
Policy/regulatory barriers	Will removing a policy/regulatory barrier be required in order to implement?
Market availability	Does the market/product exist? If so, is there a distribution network for it?
Contractor engagement	How will a very extensive contractor network be impacted?

MASSACHUSETTS RESIDENTIAL EFFICIENCY SAVINGS AND BENEFITS

In 2013, the electric PAs achieved a statewide annual reduction of 414 GWh (26 percent above goal) and a

¹ Several individual PAs did not achieve 2013 goals.

² Cost effectiveness is an important and complex issue. The National Action Plan for Energy Efficiency produced a good information resource on this subject in 2008: “Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods and Emerging Issues for Policy-Makers.”
<http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf>

lifetime reduction of 2,804 GWh from their Residential Sector programs. The gas PAs achieved a statewide annual reduction of 14 million therms (36 percent above goal) and 162 million lifetime therms. This represents 2.7% of annual electric load, and 1.3% of gas savings. 2014 is expected to further grow these savings levels, with some PAs recording up to 200 percent of plan goals for the year.

There are two main Residential Sector Programs for which savings are tracked: Whole House and Products. Table 2 shows these programs and the initiatives within them, with a breakdown of 2013 savings by initiative.

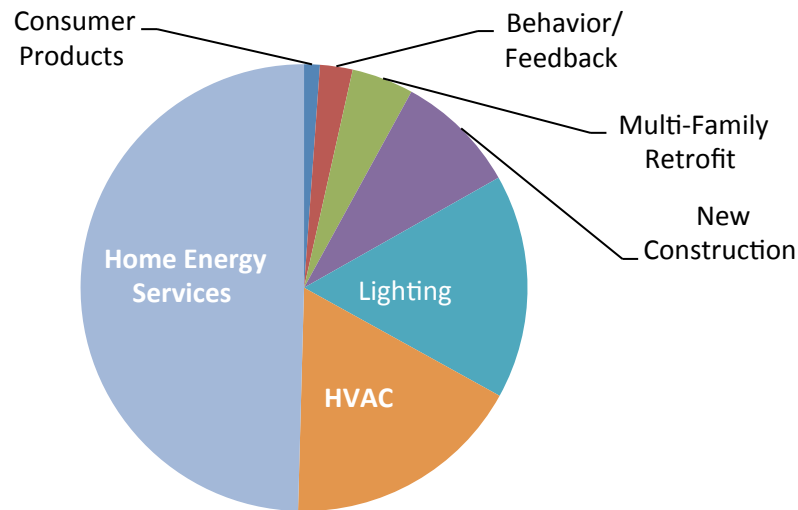
Table 2. 2013 Savings by Initiative

Initiative	Electric		Gas		Oil and Propane	
	Lifetime Savings (GWh)	% of Sector Savings	Lifetime Savings (million therms)	% of Sector Savings	Lifetime Savings (million therms)	% of Sector Savings
Whole House Program						
Behavior/Feedback	91	3%	5.3	3%	0	0%
Home Energy Services	440	16%	67.8	42%	86.6	95%
Multifamily Retrofit	201	7%	9.0	6%	0	0%
New Construction	94	3%	22.6	14%	4.6	5%
Products Program						
Consumer Products	119	4%	0	0%	0	0%
Cooling & Heating Equipment	161	6%	57.1	35%	0	0%
Lighting	1,699	61%	0	0%	0	0%
Res Totals	2,804	100%	161.8	100%	91.2	100%

Table 2 and Figure 1 below illustrate the relative contribution of the various residential initiatives to the PAs' savings for all fuels. For the electric PAs, 61 percent of lifetime Residential Sector savings in 2013 came from the Lighting Initiative. Much of the savings for the electric Home Energy Services (HES) (71 percent lifetime), Multifamily Retrofit (92 percent lifetime), and New Construction Initiatives (42 percent lifetime) are also from lighting through the PAs' direct installation/instant savings measures efforts.

For the gas PAs, HES is the largest contributor to lifetime gas savings at 42 percent. In the all-fuels (including oil and propane) perspective on lifetime savings presented in Figure 1, the HES Initiative is also the largest contributor to savings for the Residential Sector.

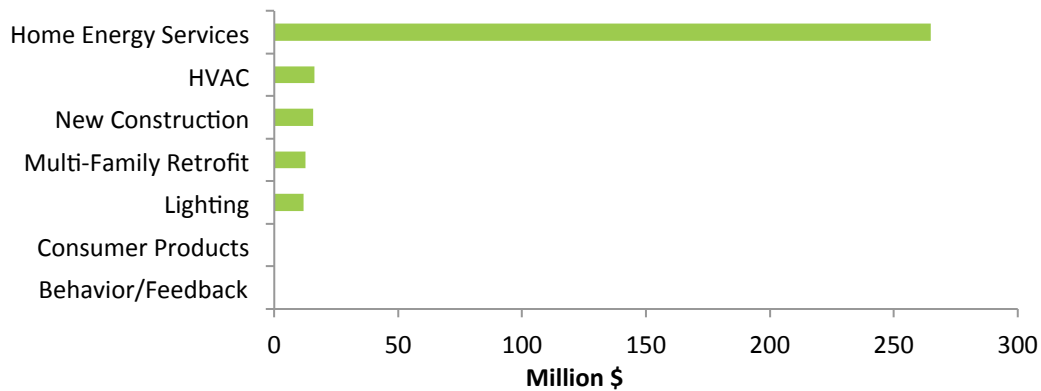
Figure 1. 2013 Residential Lifetime Savings by Initiative (all fuels, site MMBtus)



Note: Shown as percent of total sector savings. Electric and gas initiatives are combined.

In Massachusetts, both resource and non-resource benefits measurements are tracked and provide a more complete picture of the true impact of the Massachusetts energy efficiency programs. Figure 2 shows that the HES Initiative is by far the largest contributor of non-resource benefits (\$265 million in 2013), contributing more than 16 times the benefits of the next highest contributors. The primary sources of HES non-resource benefits are increased property value and expected ease of selling the home (applied as a one-time benefit), improved home durability, increased thermal comfort, and reduced equipment maintenance.

Figure 2. 2013 Residential Non-Resource Benefits by Initiative (Electric and Gas Initiatives Combined)



The Residential Sector also includes a Hard-To-Measure Program for which savings are not tracked. The largest line item in this Program is for HEAT Loans. In 2013 more than 9,000 HEAT Loans were made with an average loan value of \$9,700, and a cost of almost \$14 million in interest buydown payments. In 2013, this resulted in over \$88,000,000 in outside capital being financed by consumers for energy efficiency upgrades. 2014 loans grew to over 11,000 loans and close to \$110,000,000 financed. This Program also includes workforce development and statewide marketing.

The PAs also have goals for program budgets and participation. Participants are separately defined for each initiative and current methods of counting participants present challenges in identifying cross-initiative participation and participation by renters versus owners. The workshop presentation deck includes slides addressing budgets and participation.

COUNCIL PRIORITIES

For the past several years, the Council has annually prioritized improving customer access to and use of the Massachusetts energy efficiency programs, including through encouraging deeper savings. The PAs developed and completed a number of enhancements in the 2013-15 Plan related to customer access and use and deeper savings, including (but not limited to):

- The Efficient Neighborhoods+® initiative
- Early replacement initiatives for boilers, furnaces, and central air conditioning
- Pre-weatherization barrier incentives
- Execution of a bulk procurement for direct install lighting
- Online rebate processing
- Rollout of an online audit tool
- Introduction of new insulation measures

PA efforts related to these Council priorities are reported by the PAs in their quarterly and plan-year reports and in periodic presentations to the Council. In presentations and reports to the Council during the 2013-15 Plan period, the Consultant Team has noted strong progress by the PAs in addressing Council priorities as well as room for continuous improvements and implementation of new opportunities, especially for Home Energy Services/deeper savings and multi-family retrofit. These will be noted more specifically in the topic-specific briefings for the residentially related workshops. The completion of the statewide database—another consistent Council priority—will also assist with assessing achievement of Council priorities.

At the Council's December 9 kick-off workshop for 2016-18 planning, the Council prioritized several residential planning topics that were incorporated into the planning of these workshops.

CHANGES IN EFFICIENCY ENVIRONMENT

The policy and technological landscape related to residential efficiency continues to evolve, necessitating ongoing review and revision of program offerings by the PAs. Changes in three main areas in this environment should be considered for the 2016-18 Plan:

- **Residential Conservation Services (RCS) revisions.** The Department of Energy Resources (DOER) has proposed revisions to the implementing regulations and guidelines for the RCS statute, which created the framework for residential in-home energy efficiency services around which the Massachusetts programs were built. This has the potential to increase savings available to residential homes—particularly multi-family units—and homes interested in fuel switching for HVAC or water heating.
- **Changes in codes and standards.** Federal appliance efficiency standards play a large role in establishing baselines for PA savings calculations. Over the past two years and through 2015, new efficiency standards were effective or will be by year end for multiple key technologies. Similarly, updated building energy codes may affect baselines and resulting savings opportunities in the PAs' Residential New Construction (RNC) Initiative.
- **Dynamic markets and technologies.** The technologies and practices that the PAs support also evolve and the PAs' programs must respond accordingly. These market changes include both improved savings and cost performance for existing technologies and the introduction of new technologies. LEDs are probably the best example of both of these effects. Moving forward into the 2016-18 Plan, there may be new or increased savings opportunities from technology innovation and market growth, including home energy management systems, heat pump water heaters, wireless enabled thermostats, and cold climate heat pumps and other thermal renewable technologies. Note that the PAs already support several of these technologies.

EVALUATION IMPACTS

Evaluation, measurement and verification (EM&V) studies play a key role in identifying successes and improvement opportunities for the Massachusetts energy efficiency programs. These EM&V efforts also provide market research and estimates of both gross and net measure and program savings. Over the last several years a large number of Residential EM&V studies have been completed. In the next several months, significant evaluation results are also expected to provide important insights on lighting, HES, multi-family retrofit, residential customers, and HEAT Loans, among other matters. Completed evaluation reports and a list and schedule of studies in progress may be found on the Council's website at <http://ma-eeac.org/studies/>.