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## WORKSHOP TOPIC OVERVIEW

Mass Save is a major driver of energy efficiency investments in the Commonwealth and creates a significant source of work for people employed in the building trades, construction, engineering, and service sectors. Mass Save PAs spend a portion of their budgets on workforce development to further support the skills and expertise needed to deliver the programs. Although the PAs generally do not claim savings from their workforce development efforts, these efforts are critical to the success of the Mass Save programs.<sup>1</sup> A better trained, more diverse and more robust workforce will be necessary to equitably deliver quality energy savings measures into the future.

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## OVERVIEW OF CONSULTANT RECOMMENDATIONS FOR COUNCIL CONSIDERATION

1. **Deliver targeted training for emerging and/or critically important technologies including building automation systems and heat pumps.**
  - Expand investment in targeted trainings for field assessment, installation, and commissioning of various heat pump technologies for both residential and commercial sectors.
  - Fund efforts that grow the field of qualified building automation system technicians and commissioning specialists in the commercial and multifamily sectors.
  - Expand building operator training for large, complex facilities to ensure that investments made in new technologies deliver on their full savings potential.
2. **Complete an independent Mass Save workforce study with a first report to be completed by September 2022. Report on jobs resulting from Mass Save Program investments, statistics on workforce demographics prioritized by the Equity Working Group, and ongoing identification of areas for strategic workforce investments that drive future program success.**
  - Assess the overall quality and quantity of the workforce that directly and indirectly deliver the Mass Save program (PA staff, PA contracted vendors, and firms that operate through the PAs open market programs).
  - Include demographic information on workforce outlined in the recommendations from the Equity Working Group.
  - Continually identify deficiencies and needs for greater investment for various programs and technologies.
3. **Expand investments in workforce development including but be not limited to funding apprenticeships and internships, training and upskilling for incumbent workers, and outreach to draw new and diverse workers into the Mass Save ecosystem. Target an increase in workforce development spending to 2% of total annual budget by the end of 2022-2024 plan period.**
  - Encourage steady and sustained ramp-up of spending incrementally throughout the 2022-2024 plan (for example, 0.8% in 2022, 1.6% in 2023, 2% in 2024).

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<sup>1</sup> PAs claim some savings for C&I Building Operator Certification (BOC), but most other trainings do not lead to claimable savings

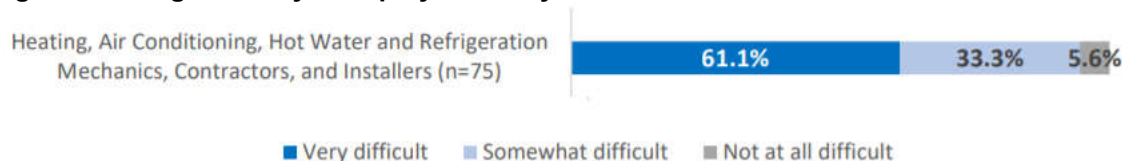
## DELIVER TARGETED TRAINING FOR EMERGING AND CRITICAL TECHNOLOGIES

### Background/Current Status

Many of the technologies needed to deliver on the promise of a low-carbon built environment exist today, however, the ability of our workforce to fully leverage the benefits of these technologies still lags. Electrifying and decarbonizing the built environment is contingent on our ability to efficiently heat and cool buildings, and to optimize controls for these systems. With a trained workforce to design and install the necessary technology, we cannot meet our goals for carbon reduction.

The PAs surveyed employers as part of the Workforce Development Needs Assessment and found an acute need in to expand the quality and quantity of eligible workers in the HVAC mechanic, contractor, and installer labor pool. Ninety-four percent of HVAC employers reported hiring to be “very difficult” (61%) or “somewhat difficult” (33%) showing that the HVAC market is extremely short on qualified workers.

**Figure 1. Hiring Difficulty – Employer Survey from Mass Save Workforce Needs Assessment**

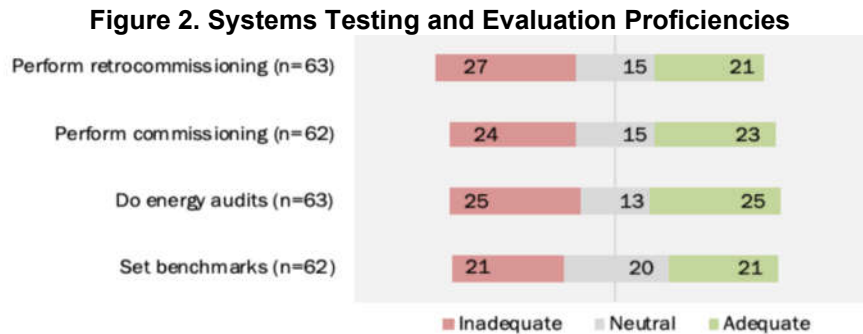


Heating systems have historically been installed by plumbing contractors because traditional heating systems are often hydronic, meaning they distribute steam or hot water from a central boiler. As we shift toward more all-electric heating systems like heat pumps that rely on refrigeration cycles to transfer heat in and out of space, a different set of licensure and skills are required. More workers who have Refrigeration Technician Licensure will be necessary.<sup>2</sup> In addition to the changing licensure requirements for qualified workers, modern heating and cooling systems require more complex controls and integration with various home systems. A heat pump installed in a building with an existing fossil fuel heating system requires controls that leverage the heat pump’s capacity up to the point where the primary fossil fuel system takes over. Many heat pumps installed to-date have been set up strictly for cooling purposes and do not include integrated controls, reducing the benefits of low carbon heating technologies. The workforce needs significant upskilling to be able to competently install these technologies and have them deliver on their low-carbon heating potential.

A report issued by ACEEE in September of 2020 on “Training the Workforce for High-Performance Buildings” identified the skills that education and training programs should prioritize to ensure that the workforce can meet current and future demands.<sup>3</sup> This report reviewed 60 published reports and articles from the United States and Canada and conducted 20 expert interviews with building managers, workforce training program administrators, and experts from trade. They found that if the workforce lacks the requisite skills, high performance buildings will not deliver on promised energy savings, improved indoor air quality, climate protection, and cost reduction. These failures not only hinder performance of those systems but also dissuade customers from future investments, thereby slowing adoption of new technologies. The study identified several areas of high-performance building technologies and capabilities where current workforce deficiencies hinder achieving savings potential, including retro-commissioning and commissioning, as well as use of modeling and simulation software in the design and performance modeling steps of building system design.

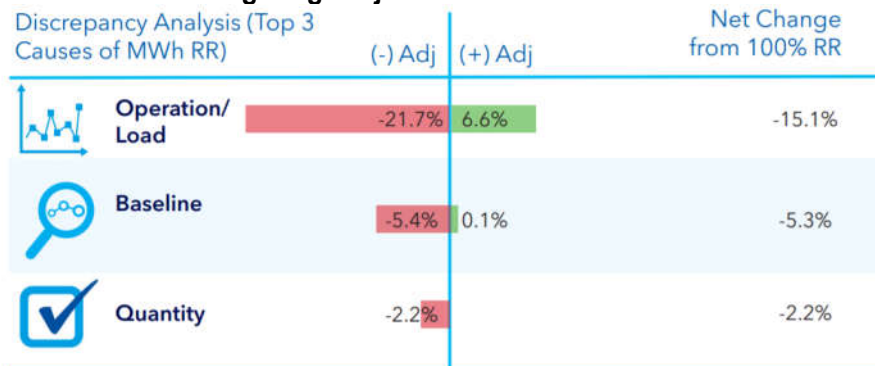
<sup>2</sup> <https://www.mass.gov/service-details/refrigeration-technician-license>

<sup>3</sup> <https://www.aceee.org/blog-post/2020/09/workforce-ready-high-performance-buildings-report-finds-major-skills-gaps>



In evaluations of efficiency programs, realization rates are estimated to determine how much of the projected savings was actually achieved. Evaluation reports of custom non-lighting electric savings measures in Massachusetts C&I buildings show a realization rate of 71.5 percent. These reports analyze the reasons for differences between estimated and realized savings. In many cases, especially for more complex measures, the most often cited factor is operations, as shown in Figure 3.

**Figure 3. Sources of Discrepancy Between Estimated and Evaluated Savings of C&I Custom Non-Lighting Projects 2016-2018 Results<sup>4</sup>**



Operations factors account for more than 21.7 percent of the net 28.5 percent shortfall between estimated and evaluated savings in non-lighting measures. This category of discrepancy is described as differences between proposed and actual operating parameters used to estimate savings. This equates to roughly 36 million kWh in unrealized savings over 3 years and presents a substantial opportunity to increase savings. A study of small business non-lighting measures found better overall realization rates for refrigeration and HVAC measures, however, a more targeted study looking at EMS/controls projects in a coffee franchise consistently performed less than estimated in tracking with many sites delivering zero evaluated savings.<sup>5</sup>

To realize the full savings opportunities of new efficiency technologies, building operators must be fully familiar with the latest and greatest building management systems and understand all the nuances of their new equipment. One could argue over the precise impact of a better trained workforce, but we can say with surety that higher levels of training for our building professionals would have a positive impact on savings realization.

<sup>4</sup> [https://ma-eeac.org/wp-content/uploads/MA\\_CIEC\\_Stage5\\_Report\\_C07\\_Custom\\_Electric\\_Impact\\_Evaluation\\_PY2017\\_18\\_FINAL-2020-06-01.pdf](https://ma-eeac.org/wp-content/uploads/MA_CIEC_Stage5_Report_C07_Custom_Electric_Impact_Evaluation_PY2017_18_FINAL-2020-06-01.pdf)

<sup>5</sup> <https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf>

## Recommendations

- 1. Deliver targeted training for emerging and/or critically important technologies including building automation systems and heat pumps.**
  - Expand investment in targeted trainings for field assessment, installation, and commissioning of various heat pump technologies for both residential and commercial sectors.
  - Fund efforts that grow the field of qualified building automation system technicians and commissioning specialists in the commercial and multifamily sectors.
  - Expand building operator training for large, complex facilities to ensure that investments made in new technologies actually deliver on their full savings potential.

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## ENERGY EFFICIENCY WORKFORCE JOBS STUDY

### Background/Current Status

The needs assessment completed by the PAs provided one piece of a complex puzzle that needs to be more completely understood for effective workforce program development and implementation. A comprehensive and continual understanding of current workforce statistics and trends that MA efficiency programs is needed to identify where additional resources should be deployed. We need to understand who is going into those jobs, who is progressing along career paths, and who the industry may lose, through both ineffective recruitment and retention. Other states, like Rhode Island,<sup>6</sup> complete an annual jobs study that provides detailed, independent analysis of the job creation from their PA implemented energy efficiency programs. Studies like this, done on a regular basis, with the ability to compare results over time and with other jurisdictions, would help to identify needs, establish reasonable targets, and develop more sound and targeted workforce development strategies. It would help with planning and forecasting not only workforce development program needs but also the results that a highly trained workforce could achieve. An annual jobs study could also collect data on metrics being considered by the Equity Working Group (see Equity Working Group recommendations).

### Recommendations

- 2. Complete an independent Mass Save workforce study with a first report to be completed by September 2022. Report on jobs resulting from Mass Save Program investments, statistics on workforce demographics prioritized by the Equity Working Group, and ongoing identification of areas for strategic workforce investments that drive future program success.**
  - Assess the overall quality and quantity of the workforce that directly and indirectly deliver the Mass Save program (PA staff, PA contracted vendors, and firms that operate through the PAs open market programs).
  - Include demographic information on workforce outlined in the recommendations from the Equity Working Group.
  - Continually identify deficiencies and needs for greater investment for various programs and technologies.

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<sup>6</sup> <http://rieermc.ri.gov/wp-content/uploads/2020/09/2019-ee-workforce-in-rhode-island-final-report-07.05.2020.pdf>

## INCREASE BUDGET FOR WORKFORCE DEVELOPMENT

### Background/Current Status

Table 1 shows planned and actual spending on workforce development initiatives over the last two three-year plan cycles (2013-2015 and 2016-2018) and the first year of the current plan cycle (2019). While overall spending is important, spending as a percentage of budget is useful in assessing whether investments in the workforce have kept up with the overall scale of program budgets.

**Table 1 – Mass Save Spending on Workforce Development, by Sector and Fuel, 2013-2019<sup>7</sup>**

Year	Total Planned Workforce Spending	Total Actual Workforce Spending	Actual Spending as % of Planned	Total Mass Save Actual Spending	Workforce Development Spending as % of Total Mass Save Actual Spending
2013	\$692,757	\$168,429	24%	\$574,433,324	0.029%
2014	\$749,771	\$116,977	16%	\$592,858,403	0.020%
2015	\$754,446	\$263,448	35%	\$743,501,415	0.035%
2016	\$1,000,842	\$224,502	22%	\$740,729,451	0.030%
2017	\$940,217	\$385,401	41%	\$739,379,853	0.052%
2018	\$907,051	\$404,462	45%	\$826,373,036	0.049%
2019	\$1,166,276	\$1,220,934	105%	\$900,953,574	0.136%

PA workforce development efforts include initiatives across sectors as outlined below.

**Table 2. Example Trainings Supported by All PAs<sup>8</sup>**

Training Topic/Course Title	Sector
Wx Crew Chief Training	All Resi
Wx Installer Training	All Resi
BPI Certification	All Resi
New technology/ heat pump training	All Resi
Passive House Certification	All Resi
Passive House Building Science Best Practices, Quality Assurance	All Resi
Project Expeditors Training	All Sectors
Building Operators Certification	C&I
Commercial Energy Auditor training	C&I
Chiller Optimization Training	C&I
Pump System Assessment	C&I
Process Heat Optimization	C&I
Steam System Awareness	C&I
Code Enforcement Training	All Sectors

There have been increases in the percentage of budget spent on workforce over time, however, overall spending still lags significantly behind peers in other leading states. **California PAs have consistently spent approximately 2 percent of program budget** on Workforce Education and Training (WE&T) programs over

<sup>7</sup> <https://www.masssavedata.com/Public/PerformanceDetails>.

<sup>8</sup> From PA presentation to MA EEAC Equity Working Group 10/13/20

the same time-period.<sup>9</sup> **NYSERDA recently committed to invest \$100 million on workforce development efforts through 2025** including already announced funding opportunities for entry-level training for HVAC and heat pump installers, internships, building operator training and apprenticeships with a combined budgets of \$43.5 million.<sup>10</sup> **National Grid Rhode Island's 2021-2023 outlines a proposal to “increasing its workforce development budget to roughly 1 percent of total portfolio expenditures to expand the size and skillset of the efficiency workforce over the next three years”.**<sup>11</sup>

Recognizing the need to assess and develop the workforce, the PAs funded a Workforce Development Needs Assessment report in 2020. The purpose of this report was to identify gaps and needs in the energy efficiency workforce development and training network in order to inform the PAs on where to direct future investments that will prepare the present and future labor pool to reach the state's energy efficiency goals.<sup>12</sup> The PAs have recently engaged in more holistic workforce development initiatives. For example, In January of 2020, the Roxbury Community College Center for Smart Building Technology held its ribbon cutting.<sup>13</sup> Both Eversource and National Grid contributed financial and technical support to the development of program curriculum and continue to serve on the Center's advisory committee. At the October 13<sup>th</sup> Equity Working Group meeting, the PAs presented on an initial effort, which includes the development of a Clean Energy Pathway (CEP) internship program. This program intends to “train diverse candidates, engage stakeholders, retain and grow the pool of diverse participants, and support small trade allies” with a focus on HVAC and weatherization workers.

Spending on workforce development is generally trending upward, however, workforce development is not a simple on / off switch. It takes years to develop a prospective energy efficiency worker from high school, to post-secondary trades licensure, to apprenticeship, to eventually being licensed and qualified to begin work. The lag-time between investment in workforce development and the outcome of a more robust, diverse and qualified labor pool means the PAs need to immediately ramp up these efforts. Mass Save PAs need to increase spending on workforce today and make up for historic under-investment in the workforce required to deliver high-quality energy efficiency services to residential and commercial ratepayers of the Commonwealth.

## Recommendations

3. **Expand investments in workforce development including but be not limited to funding apprenticeships and internships, training and upskilling for incumbent workers, and outreach to draw new and diverse workers into the Mass Save ecosystem. Target an increase in workforce development spending to 2% of total annual budget by the end of 2022-2024 plan period.**
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<sup>9</sup> [https://www.pge.com/pge\\_global/common/pdfs/for-our-business-partners/energy-efficiency-solicitations/PGE-Energy-Efficiency-Business-Plan.pdf](https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-efficiency-solicitations/PGE-Energy-Efficiency-Business-Plan.pdf)

<sup>10</sup> <https://www.nyseda.ny.gov/all-programs/programs/clean-energy-workforce-development>

<sup>11</sup> <http://rieermc.ri.gov/wp-content/uploads/2020/10/3yp-only-2021-ap-and-2021-2023-3yp-combined-filing.pdf>

<sup>12</sup> <https://ma-eeac.org/wp-content/uploads/Massachusetts-Energy-Efficiency-Workforce-Development-FINAL-REPORT-CAREER-PROFILES.pdf>

<sup>13</sup> <https://rcc.mass.edu/about-us/news/1181-rcc-holds-ribbon-cutting-ceremony-for-its-center-for-smart-building-technology>