Massachusetts Energy Efficiency Workforce Development Needs Assessment

PRODUCED FOR THE MASSACHUSETTS PROGRAM ADMINISTRATORS

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Table of Contents

Introduction

The Massachusetts Program Administrators (PAs) commissioned BW Research Partnership to conduct a Workforce Development Needs Assessment in order to meet the goals outlined in the Massachusetts 2019 to 2021 Three-Year Energy Efficiency Plan. The Massachusetts Program Administrators (PAs) are Berkshire Gas, Blackstone Gas Company, Cape Light Compact, Columbia Gas, Eversource, Liberty Utilities, National Grid, and Unitil. These local electric and natural gas utilities and energy efficiency service providers share the common goal of helping residents and businesses across Massachusetts save money and energy and work together to market energy efficiency rebates, incentives, and programs under the joint Mass Save® brand.

The purpose of the following report is 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.

The research objectives for the Workforce Development Needs Assessment are as follows:

- Identify energy efficiency employer needs, including occupational demand; skill, education, certification, and experience requirements; hiring difficulties; and preferred hiring sources.
- Identify certification requirements for different energy efficiency markets, such as low-income residential housing, market-rate residential housing, and commercial and industrial buildings.
- Develop an inventory of energy efficiency training programs across the state from universities, community colleges, vocational technical high schools, manufacturers, and energy efficiency associations, and identify gaps in the training network.
- Survey nine energy efficiency occupations, highlighting typical education, certifications, and work experience; career satisfaction and advancement; possible barriers to advancement; typical feeder and promotion occupations; and, compensation and employment benefits.[1]
- Understand the preferences and priorities for the pipeline of potential workers, including workplace preferences and perceptions of the energy efficiency industry.
- Examine diversity in the energy efficiency workforce and how to expand diversity across energy efficiency occupations.

The data, key findings, and recommendations in this report are based on a combination of data from surveys of energy efficiency employers, the current energy efficiency workforce, and the potential energy efficiency talent pipeline, as well as public data from the Bureau of Labor Statistics and the U.S. Census

[1] While the survey and report body include data for nine occupations, the research team in conjunction with the PAs selected six final occupations to be included as a deep dive of "Career Profiles" in Chapter 4 of this report. The decision was based on projected near-term demand and the need for focused workforce development support in these fields.

Bureau, a comprehensive training inventory, and executive interviews with training providers and independent installation and home performance contractors.

Key findings highlight the combined trends observed across each of the research elements. It should be noted that the employer survey is based entirely on firms that conduct work in Massachusetts. As such, any demand or hiring needs data may be considered representative of Massachusetts energy efficiency businesses. While the current and potential worker data is regional to the Northeast, there are no statistically significant differences in responses by geography. As the talent pipeline often extends beyond state borders, these regional results may be generalized and considered indicative of the needs across Massachusetts energy efficiency businesses.[2]

Executive Summary

Key Findings

EMPLOYER NEEDS

A small applicant pool and low public awareness, among other issues, contribute to hiring difficulties for energy efficiency employers. Ninety-two percent of employers reported hiring difficulty over the last 12 months, with 45 percent indicating that hiring had been very difficult. Employers' top reported reasons include lack of experience or industry-specific knowledge, a small applicant pool, and competition with other industries.[3] The hiring problem is compounded by limited public awareness of the benefits and opportunities associated with energy efficiency jobs. Between 48 to 56 percent of potential workers indicated that they are either unaware or have no opinion on the benefits of an energy efficiency career and if these jobs provide adequate compensation, benefits and perks, career advancement opportunities, or flexible work schedules.[4] The sentiments of limited public awareness were also largely echoed in executive interviews with training organizations and employers. High school graduates rarely consider these trades an option as parents and guidance counselors typically advocate for a college education or the career benefits of professional service occupations.

Hiring difficulty is greatest across the vocational technical trades. The most difficult occupations to fill include plumbers, HVAC workers, and insulation and weatherization workers. Over half of employers reported that hiring has been "very difficult" for these occupations. By contrast, professions that require advanced degrees, such as architects, had the lowest reported rate of hiring difficulty; zero percent of employers reported that hiring architects has been "very difficult."[5]

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[2] The worker surveys covered New York, Massachusetts, Connecticut, Maine, New Hampshire, Rhode Island, and Vermont. For more information on the surveys, sample sizes, and research methodology, please refer to Appendix B of this report.

[3] These data refer to Q5 and Q6 in the Employer Survey, with cross-tab analysis by occupation to identify occupations with the greatest hiring difficulty.

[4] These data refer to Q24 and Q24 in the Potential Worker Survey.

[5] This data refers to Q5 in the Employer Survey.

Work experience is vital for successful employment and career navigation in the energy efficiency sector. Employers and current workers alike highlighted the importance of hands-on job training and work experience. During executive interviews, employers indicated that classroom learning may provide a basis of understanding but is less valuable in the workplace than experiential learning. The most significant reported reason for hiring difficulty was lack of experience or industry-specific knowledge, and 85 percent of employers require some amount of previous work experience. Forty-nine percent specify up to three years of experience in a comparable position. These same sentiments are echoed by the current energy efficiency workforce; 53 percent indicated that on-the-job training was the most important factor in their successful career navigation, followed by previous work experience (42 percent).

Employers rely largely on word of mouth and online job sites to recruit new workers. Over half, or 58 percent, of energy efficiency employers reported using word of mouth, including asking current employees, to recruit new workers. Fifty-four percent also use general online job sites such as Indeed, Monster, or CareerBuilder. Surveyed potential workers also typically use job sites. About six in ten (62 percent) potential workers reported using job sites when searching for a new job, followed by family and friends (38 percent). Interestingly, 21 percent of potential workers also use Facebook when job hunting, while only 17 percent of employers reported using Facebook to find potential job candidates.

There is increasing demand for building operators and facilities management technicians with interdisciplinary knowledge across technical and industry-specific skills, such as electrical and HVAC, computer science, and energy management software. The rapidly changing nature of building technologies has created a gap in employer demand and workforce supply. As this occupation does not have singular title or role, it is difficult to design a comprehensive and cohesive training program for building operators. Additionally, the void in these occupations is preventing many buildings from operating at maximum efficiency.[6]

MARKET DIFFERENCES & PROGRAM AWARENESS

The focus on residential or commercial market applications varies by occupation. The survey asked employers to select if their workers spend any amount of time working across different buildings types. Overall, 80 percent of employers reported that their employees spend time on commercial and industrial buildings such as offices, hospitals, retail spaces, or manufacturing plants, and 47 percent of employers reported their employees also spend time on market-rate multi-family residential units. Auditors, engineers, sales representatives, architects, and mechanical or electrical contractors are most likely to spend time working with commercial buildings, while plumbers, HVAC workers, and insulation and weatherization workers are more likely than average to spend their labor hours working on single-family homes.[7]

Few employers require market-specific certifications, but it is beneficial for at least one crewmember to have knowledge across different markets. Most employers indicated they do not require special certifications for employees to work on specific markets such as commercial or industrial buildings or

[6] In response to this demand, the Massachusetts Clean Energy Center is conducting a separate study similar to this that focuses solely on building operators and facilities management occupations.
[7] These data refer to Screener E in the Employer Survey.

market-rate and low-income residential housing. Overall, only nine percent of employers require a certificate for working on market-rate multi-family housing, and 14 percent of employers require a certificate for low-income multi-family housing workers. Additionally, a respective 17 and 25 percent of employers reported requiring specific certifications to work on commercial buildings or single-family homes.[8] In discussions with independent contractors, employers noted that while required skills are mostly similar across markets, at least the supervisor or crew chief must be aware of the different regulations across these markets. As such, it is valuable to have one or two certified crew chiefs on staff that are aware of different market regulations, but for most workers, it is not necessary.

Employers tend to be more aware of commercial and industrial Mass Save® programs. Seventy-one percent of employers indicated they are aware of commercial and industrial programs, and another 53 percent are aware of residential market-rate programs. Only 38 percent of employers indicated they are aware of residential low-income or income-eligible Mass Save® programs. At the same time, 67 percent of employers participate in commercial and industrial programs, 42 percent participate in residential market-rate programs and 21 percent reported participation in residential low-income or income-eligible programs.[9]

Employers report that Mass Save® programs contribute to their business revenues. A quarter of employers reported that at least half of their business revenue is a result of participation in Mass Save® programs, and another 22 percent indicated that about a quarter to half of their business revenue can be attributed to such programs.[10]

WORKPLACE DEMOGRAPHICS

In general, workplace diversity is low, and few employers have formal diversity initiatives. Forty-five percent of employers reported that they have no formal diversity and inclusion or affirmative action programs. Most energy efficiency workers are Caucasian men who primarily speak English. About 79 percent of energy efficiency workers are Caucasian, compared to 81 percent of the population overall. Only 13 percent of energy efficiency workers are women, compared to 52 percent across the state. However, energy efficiency engineers or project designers are more likely to be women than men.[11]

The proportion of Hispanic and Latinx individuals in energy efficiency jobs is higher than in the overall statewide population, while the proportion of Black or African American energy efficiency workers is lower compared to the overall state. In general, about 12 percent of the population in Massachusetts identifies as Hispanic or Latinx.[12] Across all nine surveyed occupations, employers reported that roughly 16 percent of their energy efficiency workforce are Hispanic or Latinx, with occupations like insulation and weatherization workers (48 percent), engineers (17 percent), and electrical contractors (17 percent)

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[8] This data refers to Q18 in the Employer Survey. While most employers reported requiring no market-specific certifications, those that did reported the following: PE (Professional Engineer) for commercial or industrial engineers, electrical license for commercial and industrial electricians, lead safety for low-income multi-family residential weatherization workers, oil burner license for HVAC employees that work on single-family homes. It should be noted that these are qualitative responses from a small sample size of employers.

[9] These data refer to Q1 and Q2 in the Employer Survey.

[10] This data refers to Q31 in the Employer Survey.

[11] These data refer to Q22 through Q30 of the Employer Survey.

[12] U.S. Census Bureau QuickFacts, July 2019. https://www.census.gov/quickfacts/MA. Retrieved 28 January 2020.

reporting the highest proportion of Latinx workers compared to the rest of surveyed jobs.[13] At the same time, 3.6 percent of energy efficiency workers are Black or African American, compared to 8.9 percent of the statewide population.

Individuals who identified as Hispanic or Latinx still have less access to career resources and higher rates of unemployment. These individuals are more likely to feel that they cannot afford the training and education needed to advance their careers, that language barriers prevent them from accessing this training, that they do not have the time to pursue additional training, or that training and education providers are too far away from their homes.[14] While the overall unemployment rate for Massachusetts sits at 2.9 percent, Hispanic and Latinx communities have a reported unemployment rate of 4.2 percent.[15]

Mentorship is especially important for ethnic and racial minorities. Seventy-one percent of employers report no formal mentorship program at their business.[16] Respectively, 22 and 17 percent of current workers report that formal or informal mentorship have been important to their career success and 87 percent of potential workers indicated that mentorship was important during career navigation.[17] Individuals who identified as Hispanic or Latinx are more likely to indicate that informal mentorship has contributed to their career advancement opportunities, and those who primarily speak Spanish were more likely to report that they have participated in a mentorship program. African Americans were also more likely to indicate that lack of mentorship or career guidance would be an obstacle to promotion in the energy efficiency sector.

CAREER BENEFITS

Career satisfaction is high among energy efficiency workers. Eighty-nine percent of workers are satisfied with their careers. In fact, just over six in ten, or 62 percent, indicated that they are "very satisfied" with their energy efficiency career. Overall, more than 80 percent of individuals for each of the nine occupations indicated that they are satisfied with their energy efficiency career. Energy auditors tend to be the most satisfied, followed by HVAC workers, engineers, and electrical contractors.[18] Caucasians and African Americans were also more likely to report that they are "very satisfied" with their energy efficiency careers compared to Asians.

The energy efficiency sector provides numerous employment benefits and career advancement opportunities that are in line with what potential workers are seeking. Ninety percent of energy efficiency workers are optimistic, predicting they will advance in their careers. In fact, 73 percent reported that they expect to advance within their own company. In general, the energy efficiency sector also provides robust employment benefits such as healthcare, retirement, and paid vacation, among others. Seventy-seven percent of workers receive some type of health insurance benefit, 70 percent receive retirement benefits, and 75 percent receive paid vacation from work. Energy auditors, mechanical

[13] This data refers to Q29 in the Employer Survey.
[14] These data refer to Q13 of the Potential Worker Survey. It should be noted that only 23 percent of Current Workers identified as Hispanic or Latinx and 12 percent identified as Hispanic or Latinx in the Potential Worker Survey.
[15] Economic Policy Institute (EPI) analysis of Bureau of Labor Statistics Local Area Unemployment Statistics (BLS LAUS) and Current Population Survey (CPS), 2019 Q3. https://www.epi.org/indicators/state-unemployment-race-ethnicity/.
[16] This data refers to Q21 of the Employer Survey.
[17] These data refer to Q15 in the Current Worker Survey and Q20 in the Potential Worker Survey.
[18] This data refers to Q22 in the Current Worker Survey.

contractors, engineers, and electrical contractors are more likely to get total health insurance coverage from their company. These occupations, as well as plumbers and pipefitters, are also more likely to receive retirement benefits or paid vacation from work. In general, insulation and weatherization workers are less likely to receive healthcare, retirement, and paid vacation benefits compared to other occupations. Additional benefits received by energy efficiency workers include flexible work schedules, company vehicles, tuition support, and transportation stipends. Reported energy efficiency career benefits are largely similar to what potential workers focus on when looking for a job, such as compensation, fair treatment, meaningful work, healthcare and paid vacation benefits, career growth opportunities, and flexible work hours.[19]

TRAINING LANDSCAPE

The Program Administrators currently fund training across a variety of building trades. These include weatherization installer and crew chief trainings, HVAC, energy auditing, building operator, passive house, LEED, heat pump, and lighting.[20] Funding for vocational trade programs is particularly important given the consensus across employers and training providers regarding the high near-term demand of trade occupations.[21] Between 2013 and 2018, workforce development expenditures by the Massachusetts Program Administrators totaled just over $1.56 million for both residential and commercial industrial gas and electric programs.[22]

In addition to PA-funded programs, there is a network of energy efficiency training offered in Massachusetts. The research team identified 316 additional energy efficiency-related training programs across the Commonwealth from universities, community colleges, manufacturers, energy efficiency associations, technical schools, and vocational high schools.[23] Various training providers often partner to create a talent pipeline for students. Such combined efforts are exemplified in the geographic proximity of Madison Park Vocational High School, Roxbury Community College, and Wentworth Institute of Technology, which creates a pathway for high school graduates to gain technical skills, on-the-job training, and eventually higher education to move up the career ladder.[24]

The most common in-demand certifications are shared across each occupation. Employers indicated high demand for the following certifications: OSHA 10 Hour, Certified Energy Manager, OSHA Confined Spaces Training, Weatherization Crew Chief, the HVAC Manuals, and BPI Energy Auditing. OSHA trainings were the top required certifications for most occupations, including energy auditors, electrical and mechanical contractors, weatherization workers, HVAC workers, and plumbers; the OSHA training is typically a general requirement to begin work in the industry, with additional certifications required for working specific tracks or technologies. Few employers reported requiring certifications for Zero Net Energy or Passive House Buildings. In fact, 81 percent of employers reported that they do not require these certifications.[25]

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[19] These data refer to Q18 through Q21 of the Current Worker Survey.
[20] See the table in Chapter 3 for a full list of PA-funded training programs.
[21] This finding is from the executive interviews that were conducted for this report.
[22] Source: https://www.masssavedata.com/Public/PerformanceDetails.
[23] For a full list of this training inventory, please refer to Appendix A.
[24] This finding is from the executive interviews that were conducted for this report.
[25] These data refer to Q16 and Q17 in the Employer Survey.

Conclusions & Recommendations

BW Research offers the following conclusions and recommendations based on the research and key findings in this report. Examples from other cities and states across the country are included in the recommendations to highlight successful methods of implementation. In general, from both the research findings and nationwide examples, a streamlined and connected workforce development network will most expediently and efficiently prepare the future labor market to meet the state's energy efficiency goals. This would include comprehensive partnerships and programs that can simultaneously incorporate on-the-job training, access to credentials and certifications, and job placement. There are numerous examples in which key players— cities, utilities and program administrators, non-profits, training providers, and employers—are working together to design successful programs that incorporate all these elements into a single channel or curriculum. More specifically, the Massachusetts Program Administrators might consider the following:

1. **Fund and promote internships and apprenticeships or other modes of hands-on training, particularly for vocational technical trades.** Vocational technical trades tend to benefit most from apprenticeships; these include carpenters, construction workers, electricians, plumbers, insulation workers, or boilermakers. Many of the technical and hands-on aspects of this type of work are not achievable in a classroom setting.[26] Apprenticeships, internships, or machine shop courses built into a curriculum are key given the importance of work experience and on-the-job training for these trades. Such programs would be particularly important for high school graduates or those who are unemployed or underemployed and seeking to enter a new field of work; it is especially important for low-income communities with less access to university education. Apprenticeships would additionally minimize the time between training and job placement, an efficient and cost-effective method to filling gaps in employment demand. In San Jose, California, Work2Future has a program that provides energy efficiency training to young adults from disadvantaged communities and places them in pre-apprenticeship programs. Since 2014, the program has successfully trained 276 young adults and has an 82 percent job placement rate.[27] Additionally, as part of the Clean Energy Fund Investment Plan for Workforce Development and Training, NYSERDA has issued solicitations for employer and training provider partnerships to develop on-the-job training modules, internships, or apprenticeships.[28] Examples of utility support for workforce training include Eversource's EPUT program at Bunker Hill Community College, which provides a pathway for students to work for the utility company or Roxbury Community College's Center for Smart Building Technology, which was also launched with utility support and funding.[29]

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[26] Technical high schools that do not offer energy efficiency-specific training still have the potential to support the sector given the skill transferability opportunities from carpentry or automotive programs to mechanical and electrical building trades. This finding is from the executive interviews that were conducted for the report and highlights skill transferability as a potential new area of research to explore in future studies.

[27] Cities and Clean Energy Workforce Development, American Council for an Energy-Efficiency Economy, 2020. https://aceee.org/sites/default/files/Cities%20Workforce%20Development%20v2_0.pdf

[28] New York State Energy Research and Development Authority. Clean Energy Fund Investment Plan: Workforce Development and Training Chapter. April 2019.

[29] See generally: https://www.bhcc.edu/eput/; http://rcc.mass.edu/banner/1140-enroll-today-in-our-smart-building-technology-program?highlight=WyJzbWFydCIsImJ1aWxkaW5ncyIsInNtYXJ0IGJ1aWxkaW5ncyJd

2. **Plan new public education campaigns that target young adults and high school students.** Raising public awareness through partnerships with community-based and non-profit organizations or high schools about the benefits and career opportunities in the energy efficiency sector is vital, as the general population is unaware of these careers and the numerous employment benefits associated with them. Such public education campaigns might include information on the high levels of career satisfaction and various benefits offered such as healthcare, retirement, professional growth, or flexibility, and perhaps recruit current energy efficiency workers to speak at career fairs at middle and high schools. The career profiles in Chapter 4 of this report could serve as a marketing tool for these campaigns. Additionally, it is important to identify and showcase how these careers, especially in the vocational trades, connect to environmental and climate change goals, as high school students seeking to enter environmental fields often default to environmental science-related university degrees. A narrative that connects energy efficiency to climate change mitigation and environmental responsibility would likely attract young talent to the industry. In their Energy Efficiency Business Plan for 2018 to 2025, Pacific Gas and Electric Company in California included a chapter on Workforce Development and Training which details how the utility's efforts span K-12 education in addition to post-secondary schooling and focus on raising awareness of energy efficiency careers and teaching energy and sustainability fundamentals.[30]

3. **Facilitate partnerships between cities, employers, utilities and program administrators, non-profits, and training providers.** Each of these entities provides an important strength in the workforce development system, and improved communication and coordination could make better use of such cross-sector partnerships. It is especially important to incorporate technical high schools and non-profits into any energy efficiency workforce development strategy as these organizations are on the frontlines of recruiting both middle and high school students into the vocational trades and also play an important role in engaging low-income and minority communities. Examples of facilitating partnerships include structuring program opportunity notices (PON) that require applicants to partner with another entity in order to be eligible, such as the building operator training PON offered through NYSERDA.[31] In Chattanooga, Tennessee, the City partnered with a non-profit in order to develop the Built It Green (BIG) workforce development program which combines mentorship, non-technical, and technical skill development and training. The program also incorporates OSHA certification and other industry-relevant certifications.[32] Examples where utilities have done something similar by supporting workforce training include Exelon and Baltimore Gas and Electric Company (BGE), where

[30] Pacific Gas and Electric Company, Energy Efficiency Business Plan 2018-2025. https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-efficiency-solicitations/PGE-Energy-Efficiency-Business-Plan.pdf

[31] NYSERAD, Workforce Training – Building Operations and Maintenance (PON 3715) https://portal.nyserda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt000000Zn7WNAAZ

[32] Cities and Clean Energy Workforce Development, American Council for an Energy-Efficiency Economy, 2020. https://aceee.org/sites/default/files/Cities%20Workforce%20Development%20v2_0.pdf

partnerships with local vocational technical high schools have resulted in field exposure, scholarships, and internships.[33]

4. **Identify disadvantaged or high unemployment communities and provide them with access to training and career pipelines.** Employers report a small hiring pool which is likely attributable to the fact that they use mostly word of mouth and general job sites to find new workers. There are potentially untapped pools of talent across the state, particularly in low-income or minority communities that have higher rates of unemployment. Methods of increasing diversity in the energy efficiency space might involve offering resources such as transportation stipends, scholarships, or business support to minority- or women-owned businesses, or by focusing recruitment in underrepresented communities—hosting middle and high school career fairs in these communities, inviting current energy efficiency workers to speak about their experience and highlight the benefits of an energy efficiency career pathway. More direct modes of engagement would involve the development of training programs that specifically target low-income or marginalized communities, something similar to San Jose's Work2Future program or the City of Boston, which provides pre-apprenticeship training to residents of the Boston Housing Authority, Section 5 properties, young adults eligible for YouthBuild, and other low-income communities.[34]

5. **Facilitate web-connected computer access to ensure that at least basic certifications are easily accessible and attainable.** Most of the required certifications—OSHA, HVAC Manuals, Certified Energy Manager, BPI Energy Auditing, and Weatherization Crew Chief—are available online. Computer and web access are easily overlooked components of workforce development, yet 10 percent of households in Massachusetts do not have a computer and 15 percent have no broadband Internet subscription.[35] It is important to ensure that potential energy efficiency jobseekers have access to the internet in order to complete required certifications. This component of workforce development could easily be folded into an existing training program with non-profits or vocational schools, as seen in the Build It Green example in Chattanooga, Tennessee.[36]

6. **Develop or fund mentorship programs with energy efficiency employers.** This is an overlooked but important component of career success and progression. Few employers have formal programs, yet the current workforce cites the important of both formal and informal career guidance and mentorship. NYSERDA currently sponsors a mentorship program for building operations and maintenance occupations by providing funding to eligible applicants—a training

[33] See generally: https://apnews.com/202c395a6da84853a2cfb52445ff397e; https://www.bge.com/News/Pages/Press%20Releases/BGE-Program-Helps-Prepare-Future-Workforce-for-Utility-Skilled-Positions.aspx; https://bgesmartenergy.com/business/business-programs/building-operation-training.
[34] Cities and Clean Energy Workforce Development, American Council for an Energy-Efficiency Economy, 2020. https://aceee.org/sites/default/files/Cities%20Workforce%20Development%20v2_0.pdf
[35] U.S. Census Bureau QuickFacts, July 2019. https://www.census.gov/quickfacts/MA. Retrieved 29 January 2020.
[36] Cities and Clean Energy Workforce Development, American Council for an Energy-Efficiency Economy, 2020. https://aceee.org/sites/default/files/Cities%20Workforce%20Development%20v2_0.pdf

provider in conjunction with an employer—for a variety of activities which include mentorship and career coaching.[37]

CHAPTER 1:
Energy Efficiency Employment in Massachusetts

Chapter 1 provides an overview of energy efficiency employment in Massachusetts, including the depth and breadth of energy efficiency activities and technologies across the Commonwealth. This offers context for the analysis of employer demand, skill profiles, and training provisions for a subset of nine occupations within the overall energy efficiency industry. These nine occupations have been identified as important to the energy efficiency sector, with high near-term demand and are as follows:

- Engineers or Project Designers
- Energy Auditors or HERS Raters
- Heating, Air Conditioning, Hot Water, and Refrigeration Mechanics and Installers
- Electrical Contractors and Installers
- Manufacturer Representatives or Sales and Distribution Representatives
- Insulation and Weatherization Installers, Contractors, and Technicians
- Plumbers, Pipefitters, or Steamfitters
- Mechanical Contractors
- Architects

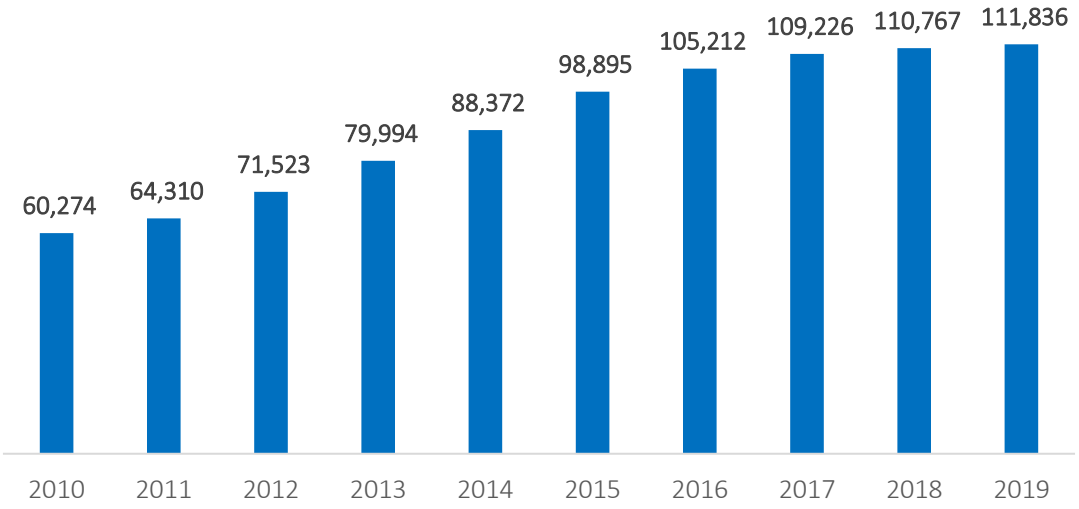
Many training providers also indicated that demand for workers with interdisciplinary knowledge is growing, particularly for building operators and facilities management trades. The growth and rapidly changing nature of building technologies is creating a gap in the workforce supply; current building and facilities operators are unable to meet the skill and knowledge demands of these changing technologies while new workers do not have access to the necessary training. This is largely due to the cross-disciplinary nature of the field, which requires a mix of technical—computer science, software, HVAC, electrical—and non-technical skills such as professional communication and management. The variability across manufacturers and lack of a singular occupation title that encompasses this nascent field of work adds to the complexity of developing a specific "building automated systems" program, as the occupation lies somewhere between engineer, architect, and tradesman.[38] Because of this, the Massachusetts Clean Energy Center is conducting a study similar to this that will focus entirely on building operators and facilities maintenance occupations.[39]

[37] NYSERAD, Workforce Training – Building Operations and Maintenance (PON 3715) https://portal.nyserda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt000000Zn7WNAAZ
[38] This finding is from the executive interviews that were conducted for this report.
[39] For more information, please refer to the MassCEC Building Operator Report.

Industry Employment

Overall, energy efficiency employment[40] in Massachusetts has seen continued growth since 2010. Over the last decade, energy efficiency jobs have increased from just over 60,000 to nearly 112,000 workers; this represents a growth rate of 86 percent in ten years (Figure 1).[41]

Figure 1. Total Energy Efficiency Employment, 2010-2019

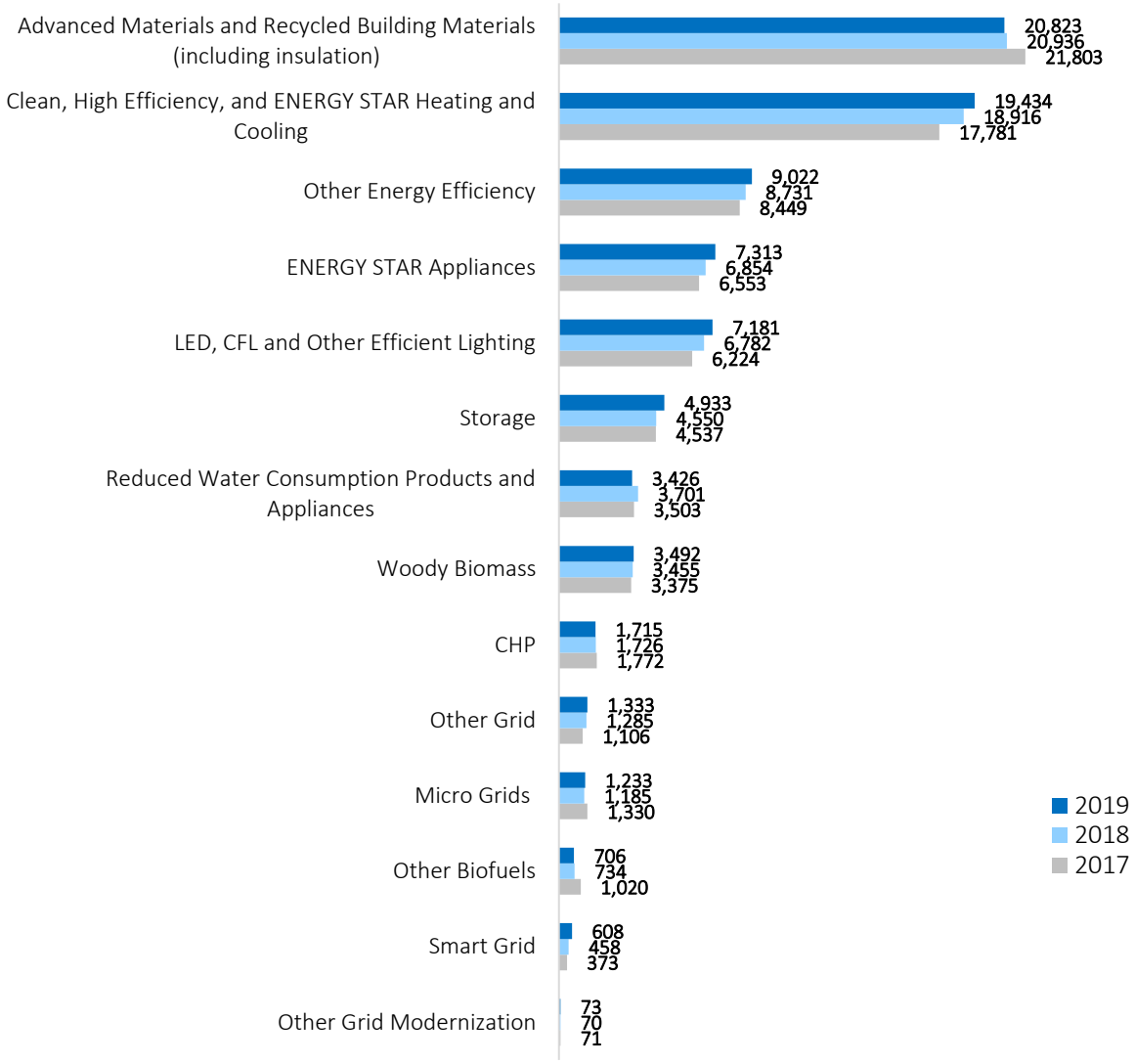


The sector employs individuals who work across a variety of technologies, including advanced building materials, ENERGY STAR appliances, HVAC, efficient lighting, grid modernization and storage, reduced water consumption, biomass and biofuels, and combined heat and power.

The largest of these sectors is advanced and recycled building materials (including insulation), which accounted for 20,823 workers in 2019 (19 percent of energy efficiency workers in Massachusetts). The second-largest technology behind building materials is clean, high efficiency, and ENERGY STAR heating and cooling, which account for 19,434 jobs, or 17 percent of the energy efficiency workforce (Figure 2).[42]

Figure 2. Energy Efficiency Employment by Sub-Technology, 2017-2019

[40] It is important to note that the Program Administrators are also increasingly moving beyond traditional energy efficiency into active demand management and renewable thermal and photovoltaics.
[41] United States Energy and Employment Report, 2019 (USEER 2019). https://www.usenergyjobs.org/.
[42] *Id.*



CHAPTER 2:

The Energy Efficiency Labor Market

An overview of industry employment is useful to understand where energy efficiency activity is concentrated, and which technologies are prolific across the Commonwealth. Using this as a foundation, this report investigates in-demand occupations, skillsets associated with those jobs, and other details about the energy efficiency labor market, such as workplace demographics and market differences. To provide detail on these areas, Chapter 2 is broken out into the following four sections:

1. Employer Needs
2. Market Differences
3. Workplace Demographics

4. Career Benefits

These sections investigate different aspects of energy efficiency workforce development, identifying the needs of the energy efficiency business community, including skill and certification requirements, education, and work experience. The research includes three supplemental surveys of energy efficiency employers, current energy efficiency workers, and potential energy efficiency workers in order to identify trends in skill or experience requirements or potential gaps and inefficiencies in the hiring process. The chapter also draws on findings from executive interviews as well as publicly available data from the Bureau of Labor Statistics, Economic Policy Institute, and U.S. Census Bureau.

The Career Benefits section of Chapter 2 profiles current energy efficiency workers, including career satisfaction, professional growth opportunities, activities that have contributed to career success, and employment benefits. This data is juxtaposed with the preferences and sentiments of potential workers to identify how energy efficiency careers fulfill the needs of potential new workers.[43]

Employer Needs

The Employer Needs section details energy efficiency employer's hiring challenges and preferences as well as skill and certification requirements.

HIRING CHALLENGES & PREFERRED SOURCES

In general, hiring difficulty is high mostly due to lack of experience or industry-specific knowledge, a small applicant pool, and competition with other industries. Employers have reported significant difficulty finding energy efficiency workers over the last 12 months. About nine in ten employers (92 percent) indicated that hiring has been either "very" or "somewhat" difficult over the past year, and 45 percent reported that hiring was very difficult over that time. Only eight percent of employers indicated hiring has not been difficult (Figure 3).

The levels of hiring difficulty do vary by occupation. In general, however, more than half of employers reported at least some level of difficulty in hiring across each of the nine occupations. Occupations that had the highest proportion of employers report that hiring had been "very difficult" include plumbers, pipefitters, or steamfitters (63 percent), HVAC workers (61 percent), and insulation and weatherization workers (50 percent).

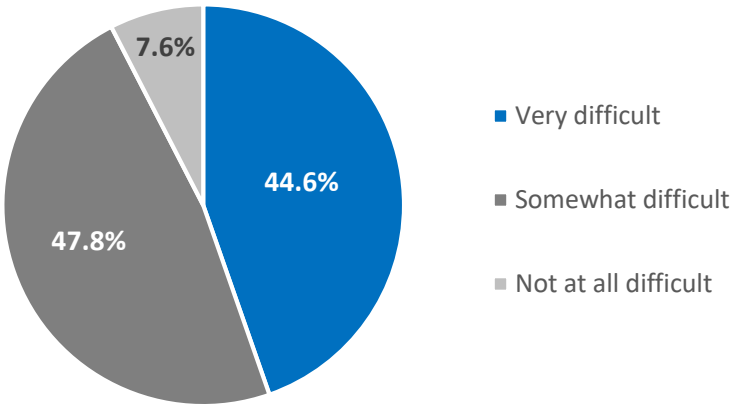
Sixty-seven percent of employers indicated that hiring architects has been "somewhat difficult", but no employers reported that it had been "very difficult". Out of all nine occupations, architects were comparatively the easiest positions to fill; 33 percent of employers reported hiring was "not at all difficult" (Figure 4).

In a time where the Commonwealth has a particularly low unemployment rate of 2.9 percent, it is not surprising that a small applicant pool is one of the reported reasons for hiring difficulties. However, the

[43] For detailed information on Mass Save® program awareness, participation, and administrators as well as employer promotion pathways, please refer to the Employer Survey Toplines in Appendix C.

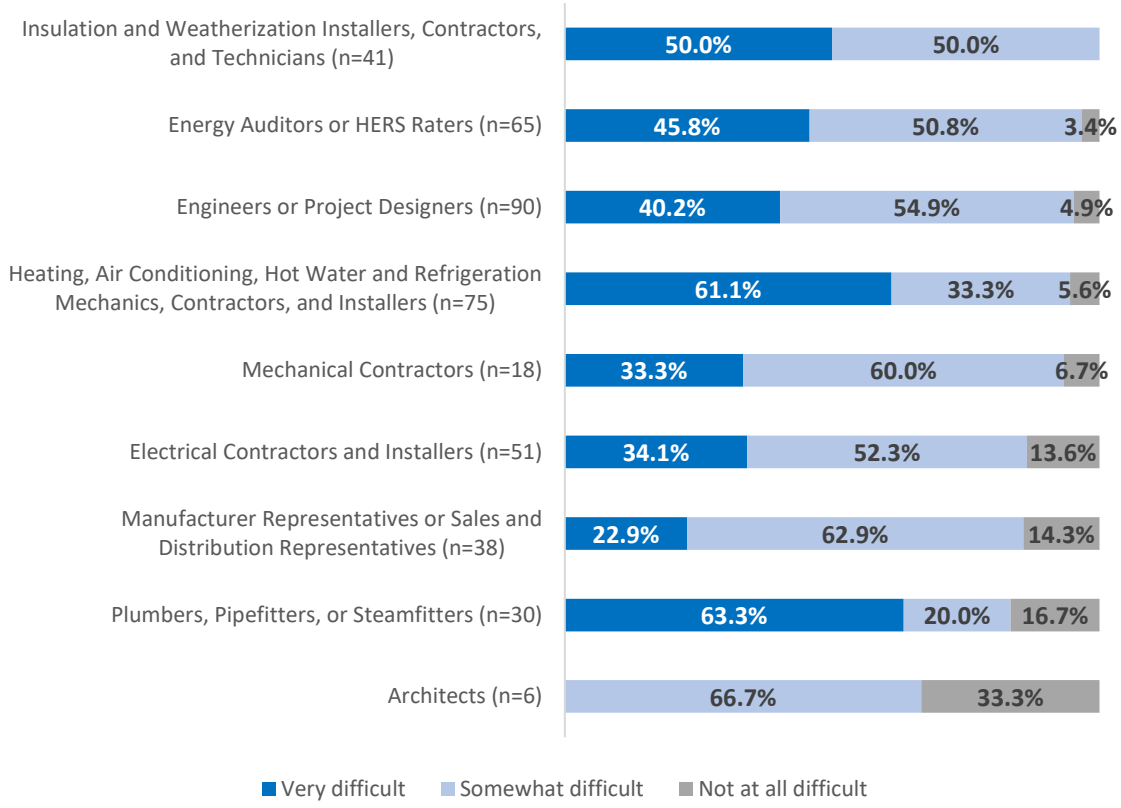
overall unemployment rate masks high unemployment communities such as African American communities (3.7 percent unemployment) and Hispanic or Latinx communities (4.2 percent).[44]

Figure 3. Overall Hiring Difficulty over the Last 12 Months (n=414) – Employer Survey



[44] Economic Policy Institute analysis of Bureau of Labor Statistics Local Area Unemployment Statistics (LAUS) and Current Population Survey (CPS), 2019 Q3. https://www.epi.org/indicators/state-unemployment-race-ethnicity/.

Figure 4. Hiring Difficulty by Occupation – Employer Survey



Overall, the most significant reasons for the reported hiring difficulty include lack of experience or industry-specific knowledge; about a quarter of employers selected this as their top reason for hiring difficulties over the past 12 months. Following lack of experience was a small applicant pool (21 percent) and competition with other industries (16 percent). Fewer than 15 percent of employers reported that insufficient non-technical skills or insufficient certifications, high turnover, failing a substance use test or background check contributed to hiring difficulty (Figure 5).

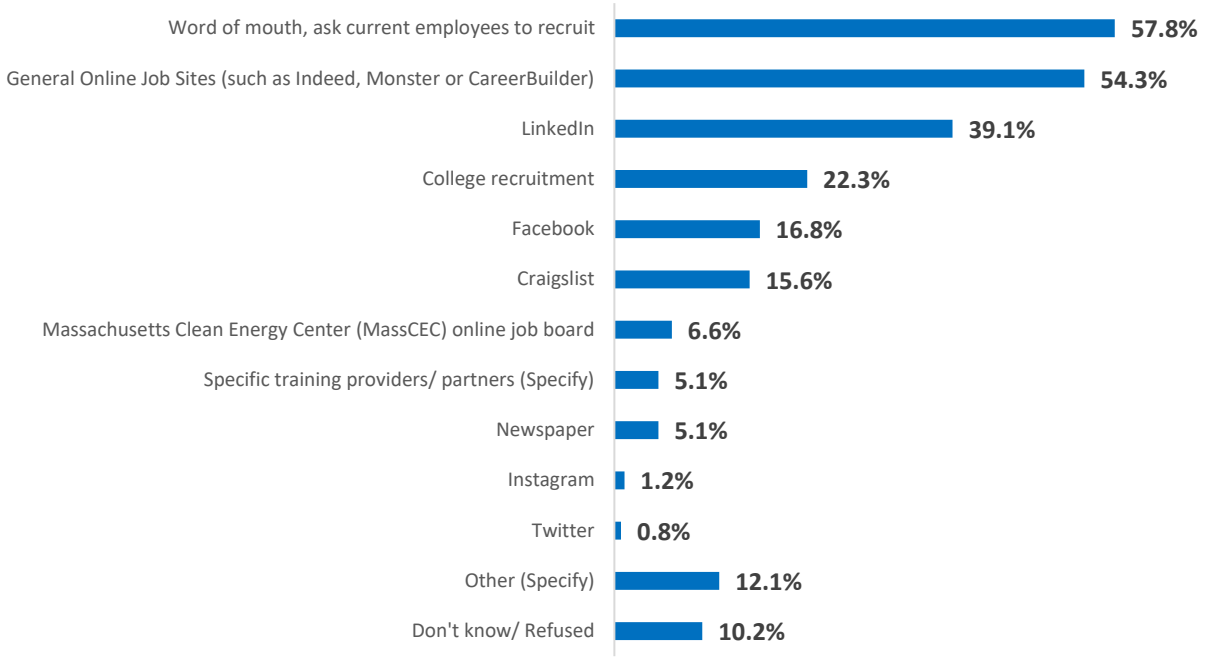
This distribution holds true across each individual occupation, where lack of experience is the most significant reason for reported hiring difficulty, closely followed by a small applicant pool.

Figure 5. Most Significant Reasons for Hiring Difficulty (n=341) – Employer Survey[45]

Employers largely rely on word of mouth when searching for qualified candidates, followed by general online job sites such as Indeed, Monster, or CareerBuilder, and LinkedIn. Almost six in ten, or 58 percent, of surveyed employers reported that they use word of mouth or ask current employees to recruit new workers. Fifty-four percent note that they also search general online job sites, and 39 percent indicated they use LinkedIn. Only 22 percent of employers recruit from colleges to fill open positions, and less than 20 percent use social media sites, the newspaper, Craigslist, MassCEC, or specific online job boards (Figure 6).

[45] For additional information on substance use and criminal background check, please refer to the Employer Survey Toplines in Appendix C.

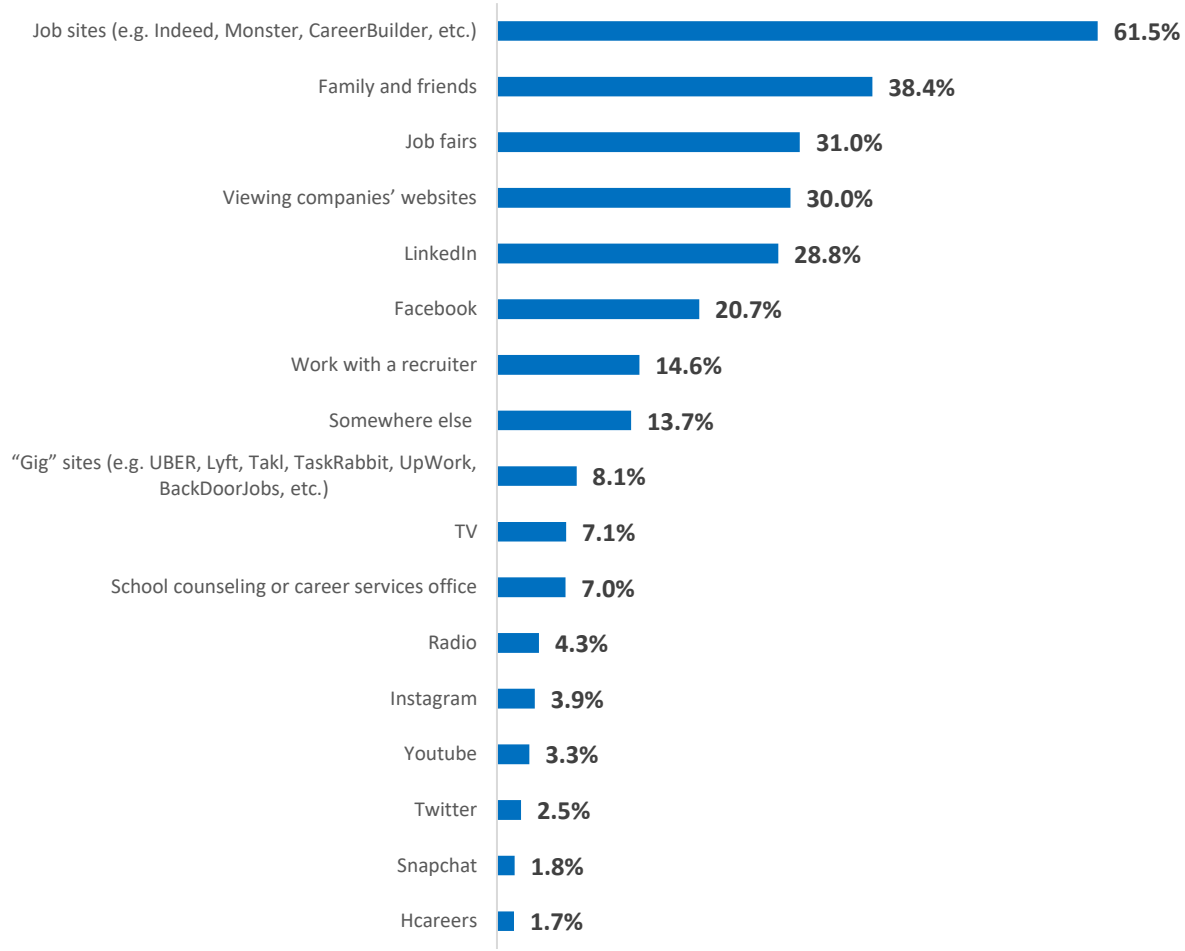
Figure 6. Hiring Sources (n=256) – Employer Survey



Workers surveyed from the potential talent pipeline also typically use job sites (62 percent) when searching for a new job, as well as family and friends (38 percent), job fairs (31 percent), and company websites (30 percent). Potential workers also use Facebook when searching for a job; about 21 percent reported using this social media site for job hunting. By comparison, only 17 percent of employers use Facebook to find potential job candidates (Figure 7).[46]

[46] For more information on professional communication preferences, frequency of communication, and sources of information and news, please refer to the Potential Worker Survey Toplines in Appendix E.

Figure 7. Sources when Searching for a New Job (n=593) – Potential Worker Survey



SKILL & CERTIFICATION REQUIREMENTS

Overall educational requirements for the nine energy efficiency occupations is mostly split between a Bachelor's degree or a high school diploma. Thirty-one percent of employers report that they require applicants to have a Bachelor's degree and 27 percent of employers require a high school diploma or less (Figure 8).

This variance is due to the differences in vocational trade occupations and professional service jobs. Ninety-seven percent of employers require at least a high school diploma or certification for insulation and weatherization workers, while 88 percent require the same for plumbers, pipefitters, or steamfitters. Similarly, about eight in ten employers also require a high school diploma or certification for HVAC workers, mechanical contractors, and electrical contractors. These requirements are reversed for energy auditors, manufacturer or sales representatives, engineers, and architects. All employers reported requiring either a Bachelor's or Master's degree for architects, and the majority (between 57 and 84 percent) also reported requiring a some type of degree for engineers or project designers and sales representatives (Figure 9).

Figure 8. Educational Requirements (n=512) – Employer Survey

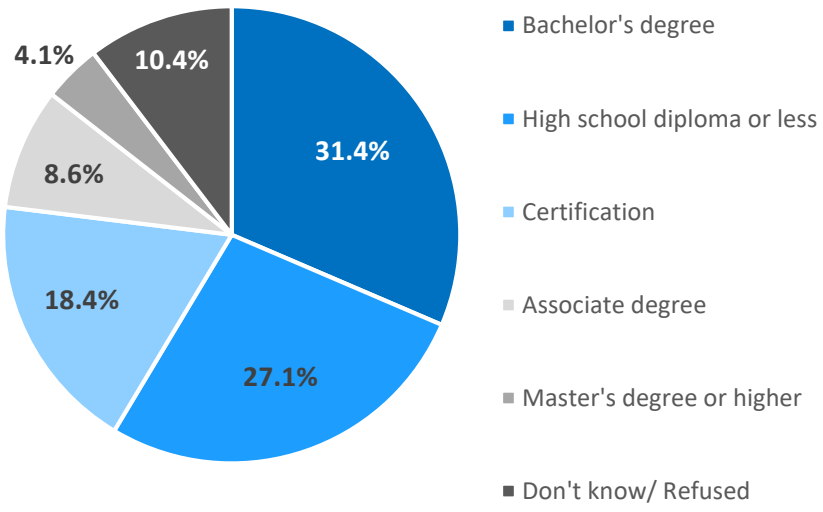
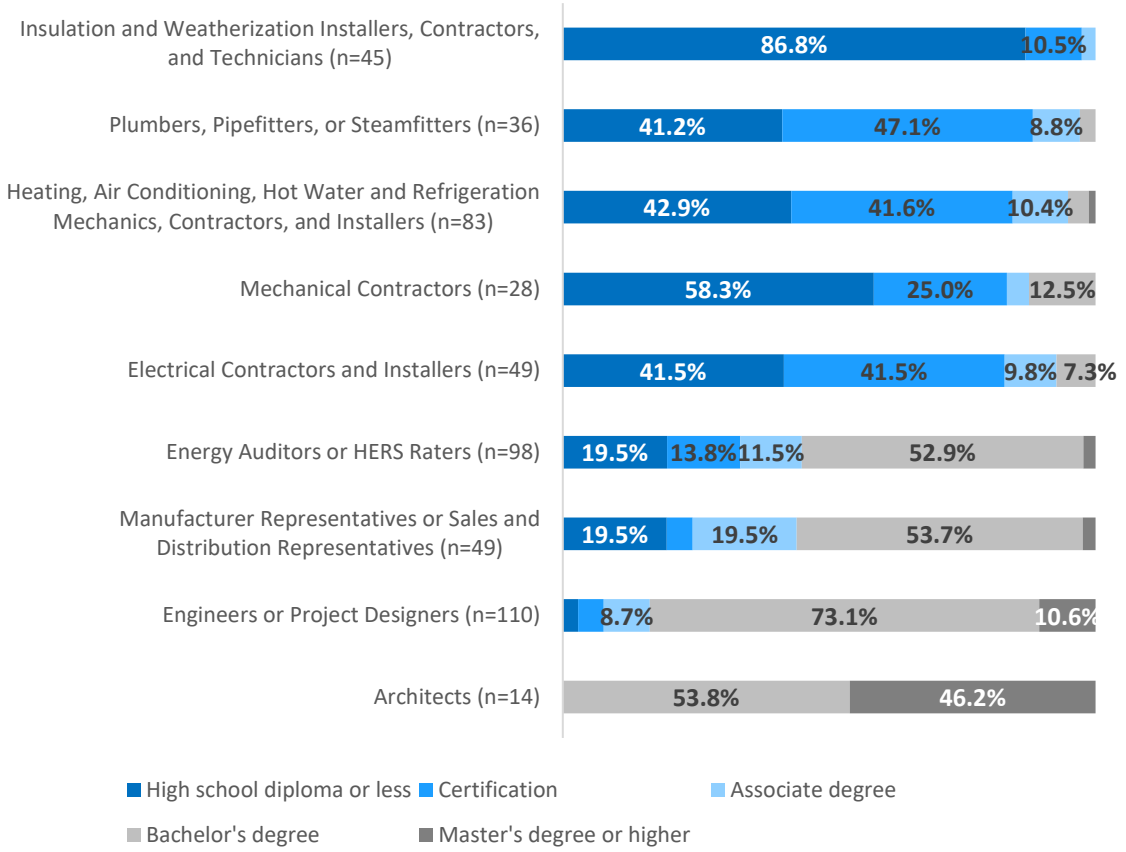


Figure 9. Educational Requirements by Occupation – Employer Survey



Work experience is important in the energy efficiency sector, as cited by both energy efficiency employers and current workers. Eighty-five percent of employers require some amount of work experience, while only 15 percent indicated that they require no formal work experience. The largest group of employers (32 percent) reported requiring one to three years of experience in a comparable position, followed by 23 percent of employers which required at least up to 12 months of experience in a comparable position (Figure 10).

Occupations that require the most experience—more than three years—include engineers and architects. At least forty percent of employers reported that they require engineers (47 percent) and architects (42 percent) to have more than three years of work experience. About 38 percent of employers reported requiring more than three years of experience for mechanical contractors (38 percent) and plumbers (38 percent) as well.

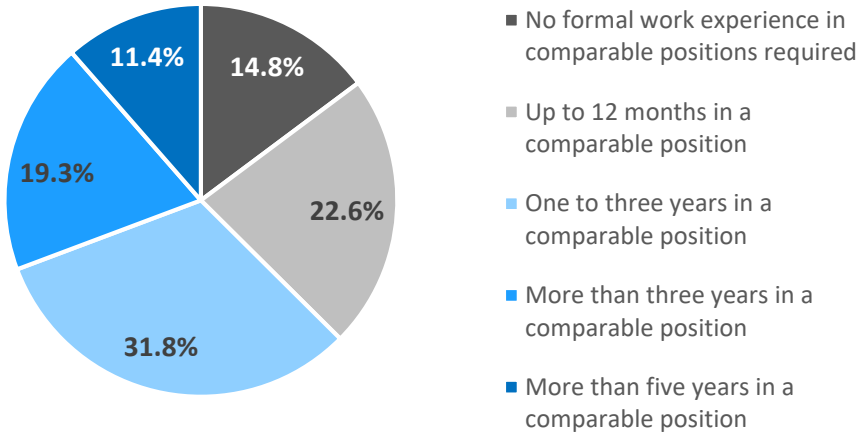
On the other hand, insulation workers, electrical contractors, HVAC workers, energy auditors, and manufacturer representatives require the least amount of work experience. Insulation and weatherization workers are the only category for which many employers indicated no requirement for formal work experience (42 percent) (Figure 11).

In follow up interviews, employers again highlighted the value of on-the-job training and work experience. Training programs and certifications can provide individuals with basic skills and knowledge, but

experiential learning more often prepares workers for the daily demands required of energy efficiency trades. The ability to master the manual tasks and physical dexterity required to be successful in the energy efficiency industry is often not learned in a classroom. Because of this, employers indicated that most training must occur internally or on-the-job.[47] In many ways, this is where technical high schools both directly and indirectly support energy efficiency training. Those schools that are directly focused on energy efficiency-related jobs partner with employers to understand what skills and certifications are needed from the workforce. Graduates are oftentimes directly employable, having completed hands-on training, internships, OSHA certifications, computer program certifications, and FIRE safety training. In fact, businesses are beginning to recruit straight from such high schools. Technical high schools that do not offer energy efficiency-specific training still have the potential to support the sector given the skill transferability opportunities from carpentry or automotive programs.[48]

In addition to technical skills, education, and work experience, employers and educators alike note an increased need for non-technical skills such as professional communication, work ethic, and management. This is particularly true of individuals coming out vocational-technical schools that have not yet had work experience. It is also an offshoot of the demand for more building operators with a diverse background of skillsets, including project management and client communication. The demand for this was so high, Wentworth Institute of Technology replaced a class in the continuing education program with a course on Professional Communication.[49]

Figure 10. Work Experience Requirements (n=512) – Employer Survey

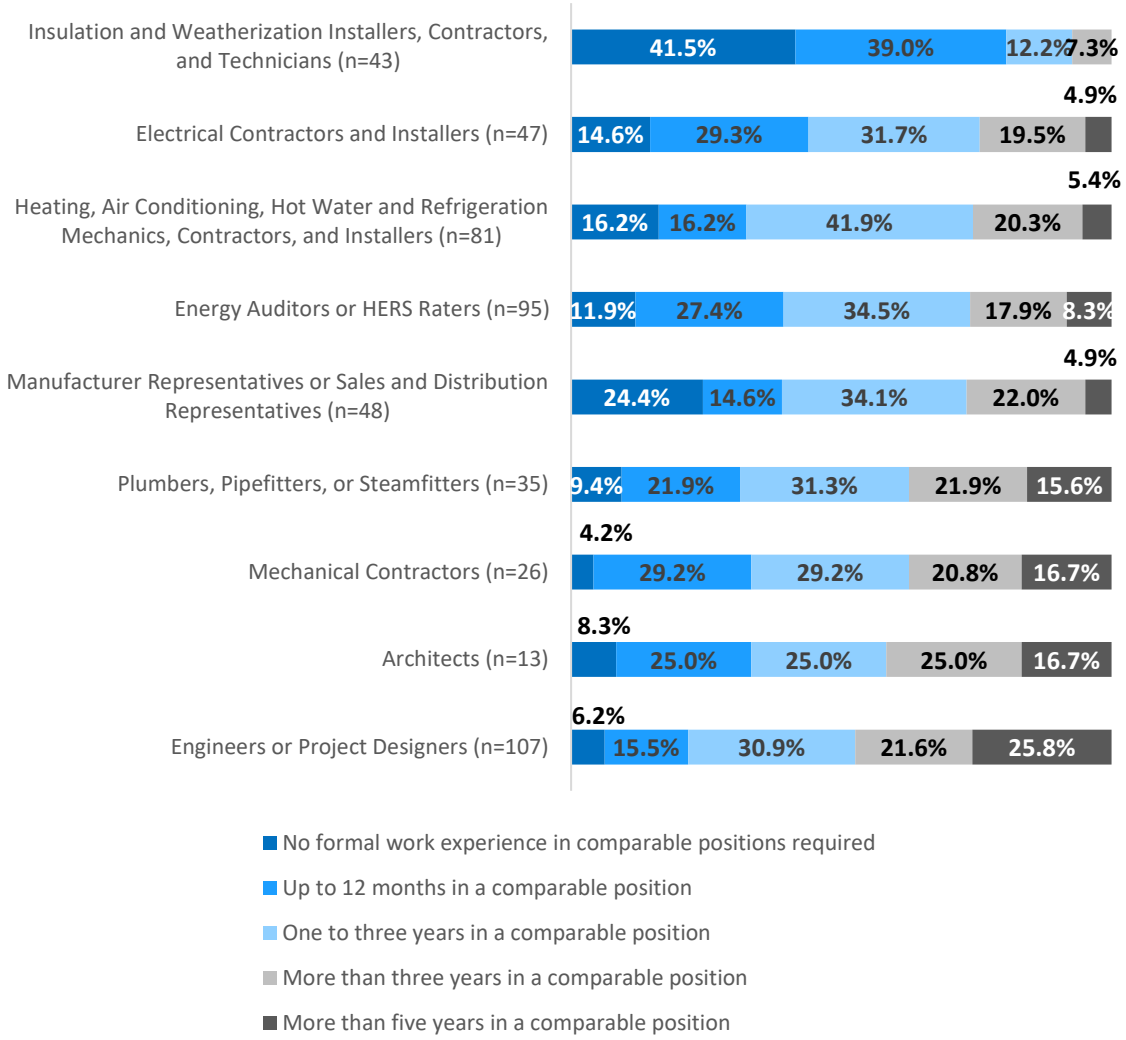


[47] This employer feedback was gathered from a convening of the Best Practices Working Group of residential independent installation contractors and home performance contractors.

[48] This finding is from the executive interviews that were conducted for the report.

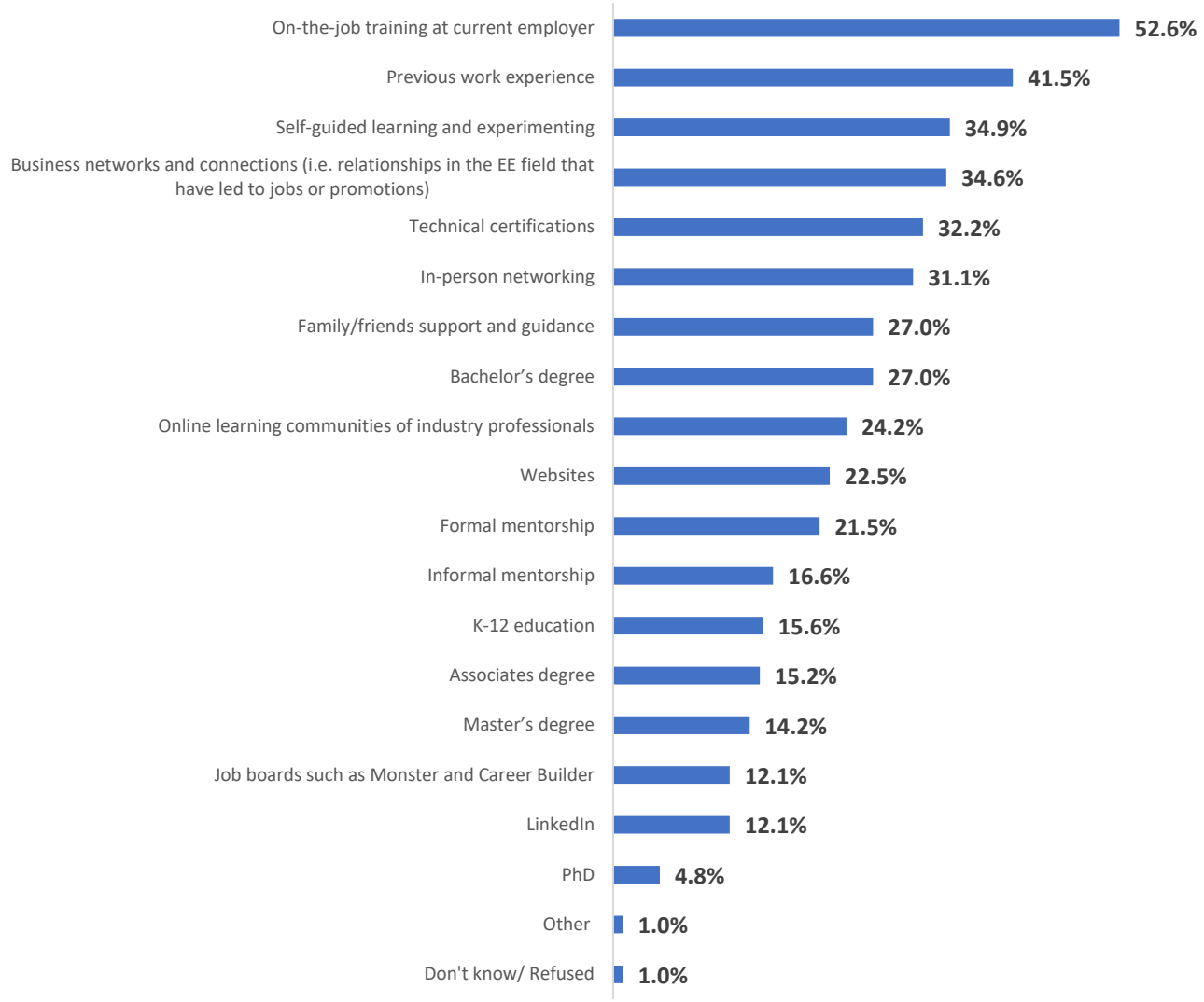
[49] *Id.*

Figure 11. Work Experience Requirements by Occupation – Employer Survey



The importance of work experience in the energy efficiency sector is echoed by current workers as well. For these individuals, the most important activities that have contributed to their successful career navigation are largely based on hands-on experience. The top two selected answers include on-the-job training at their current employer (53 percent) and previous work experience (42 percent). About a third of workers indicated that self-guided learning and experimenting (35 percent), business network connections (35 percent), technical certifications (32 percent), and in-person networking (31 percent) are also important to successful career navigation (Figure 12).

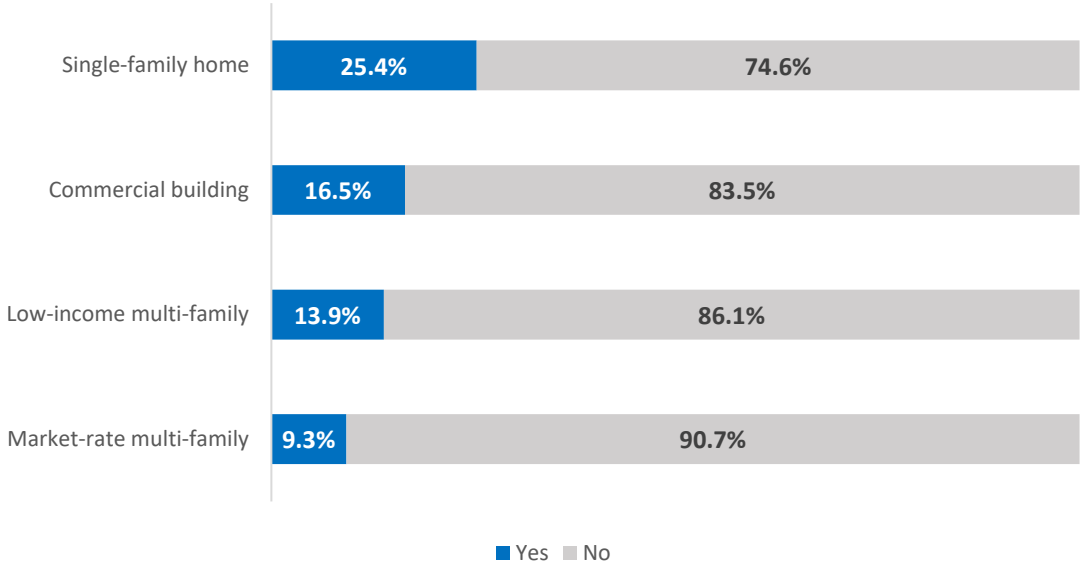
Figure 12. Important Activities for Successful Career Navigation (n=289) – Current Worker Survey



Market Differences

Few employers require special certifications for their employees to work on specific markets, such as residential, commercial, or market-rate, and low-income housing. The majority, at least three-quarters, of employers indicated that they do not require these certifications (Figure 13). These findings are similar across each of the nine occupations. However, in a follow-up discussion with a Best Practice Working Group of residential independent installation contractors and home performance contractors, employers highlighted the fact that while the required skills are similar, it is helpful to have at least one or two individuals, such as supervisors or crew chiefs, on staff that are specifically aware of additional regulations or requirements for specific markets.

Figure 13. Certifications Required by Specific Markets (n=887) – Employer Survey



Employers were also asked to select all types of buildings that their energy efficiency workers spend any amount of time working on; note that the percentages will not sum to 100 because employers could select as many markets as applied.

The average across all nine occupations indicates that many employees spend their time working on commercial or industrial buildings, such as offices and hospitals or manufacturing plants; 79 percent of employers selected this option. The next most common buildings that employers indicated their energy efficiency workers spend time working on are market-rate multi-family residential buildings (47 percent). Only 37 percent of employers selected single-family homes and 33 percent selected low-income multi-family residential buildings (Figure 14).

This distribution is similar across each of the nine occupations (Table 1). Table 1 illustrates the percentage of employers that indicated their workers spend time working across each of the building types. For each occupation, the majority of employers selected that these individuals spend time working on commercial buildings. Manufacturer or sales representatives and engineers are most likely to spend time working with commercial buildings; nine in ten employers selected this option for each occupation. For plumbers, HVAC workers, and insulation and weatherization workers, these individuals are more likely than average to be spending their labor hours working on single-family homes.[50]

[50] For additional detail on where energy auditors and HVAC workers spend the majority of their labor hours, please refer to the Employer Survey Toplines in Appendix C.

Figure 14. Types of Buildings Energy Efficiency Workers Spend Time On (n=620) – Employer Survey

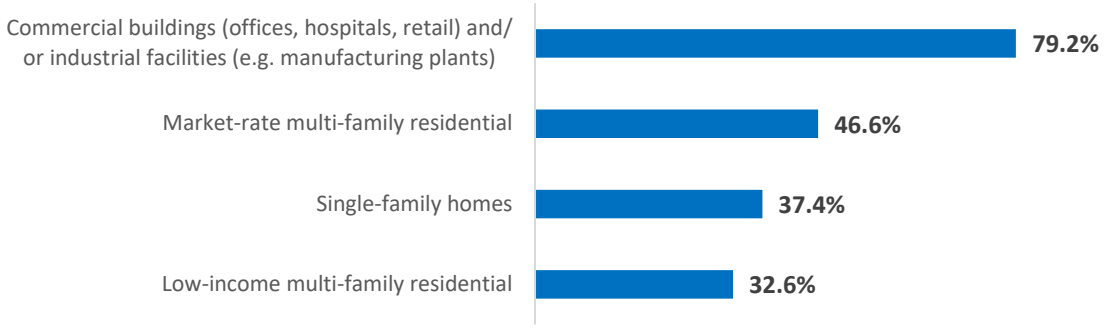


Table 1. Types of Buildings by Occupation[51] – Employer Survey

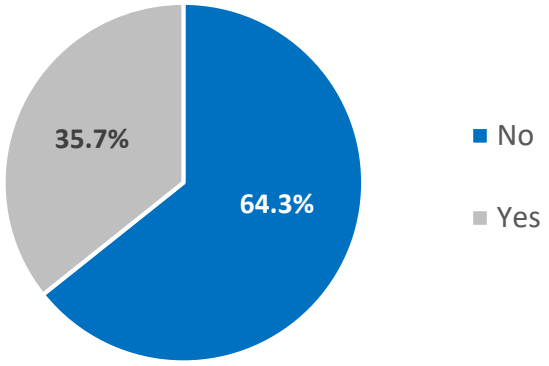
	Low-income multi-family residential	Market-rate multi-family residential	Single-family homes	Commercial buildings
Overall Average	**32.6%**	**46.6%**	**37.4%**	**79.2%**
Energy Auditors or HERS Raters (n=113)	29.2%	46.0%	25.7%	85.0%
Engineers or Project Designers (n=131)	27.5%	38.9%	13.7%	93.9%
Electrical Contractors and Installers (n=62)	25.8%	35.5%	22.6%	88.7%
Mechanical Contractors (n=36)	25.0%	36.1%	22.2%	83.3%
Insulation and Weatherization Installers, Contractors and Technicians (n=54)	46.3%	57.4%	74.1%	51.9%
Heating, Air Conditioning, Hot Water and Refrigeration Mechanics, Contractors, and Installers (n=104)	35.6%	51.9%	72.1%	61.5%
Plumbers, Pipefitters, or Steamfitters (n=49)	32.7%	53.1%	59.2%	65.3%
Architects (n=13)[52]	46.2%	53.8%	30.8%	69.2%
Manufacturer Representatives or Sales and Distribution Representatives (n=58)	41.4%	56.9%	25.9%	93.1%

[51] Percentages do not sum to 100 because this is a multiple-choice question.
[52] Please note that the survey responses are low for this category and readers should be cautioned in interpreting and generalizing these results.

Workplace Demographics

Few employers have a formal diversity program at their business. Just over a third of employers (36 percent) indicated that they do have some type of formal diversity or affirmative action programs at their business, while 45 percent reported they have no formal diversity programs (Figure 15).

Figure 15. Formal Diversity or Affirmative Action Programs (n=218) – Employer Survey



Most workers are Caucasian men who speak English as their primary language. Eighty-seven percent of individuals employed in the nine occupations are male and 79 percent are Caucasian (Figure 17 and Figure 18). Eighty-five percent do not identify as Hispanic or Latinx and 90 percent speak English as their primary language (Figure 19 and Figure 20). Only seven percent of workers are Veterans of the U.S. Armed Forces (Figure 21).

The overall population in Massachusetts is 80.8 percent White, 8.9 percent African American, 0.5 percent American Indian or Alaska Native, 7.1 percent Asian, and 0.1 percent Native Hawaiian or Other Pacific Islander. About 2.5 percent of the population if two or more races and 12.3 percent of the population is Hispanic or Latinx.[53] About 51.5 percent of the state's population is female.[54]

The age range of energy efficiency workers is mostly distributed across the spectrum from 20 through 54. About 37 percent of the workforce is 20 to 34 years old, 29 percent of the workforce is 35 to 44 years old, and 21 percent is 45 to 54 (Figure 16).

In terms of occupational differences, about seven to eight percent of electrical and mechanical contractors are reported to speak primarily Spanish. Insulation and weatherization workers have the highest percentage of Hispanic or Latinx individuals (48 percent) compared to any other occupation as well as the highest proportion of young workers between the ages of 20 and 34 (66 percent). Of the occupation tested, energy auditors (16 percent), architects (39 percent), engineers (24 percent), and manufacturer or sales representatives (19 percent) had the highest proportion of female workers.

[53] U.S. Census Bureau QuickFacts, July 2019. https://www.census.gov/quickfacts/MA. Retrieved 28 January 2020.
[54] *Id.*

Figure 16. Age Distribution (n=532) – Employer Survey

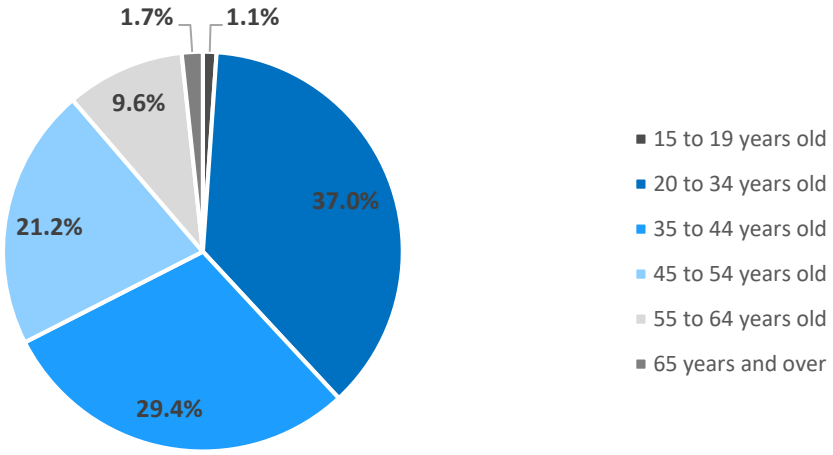


Figure 17. Gender (n=532) – Employer Survey

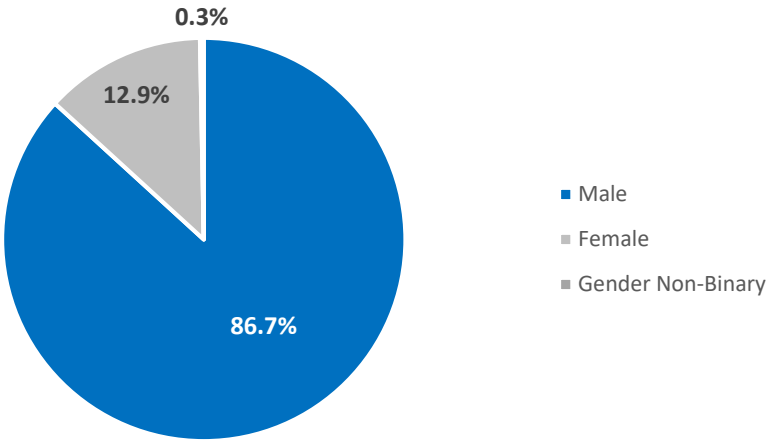


Figure 18. Race (n=532) – Employer Survey

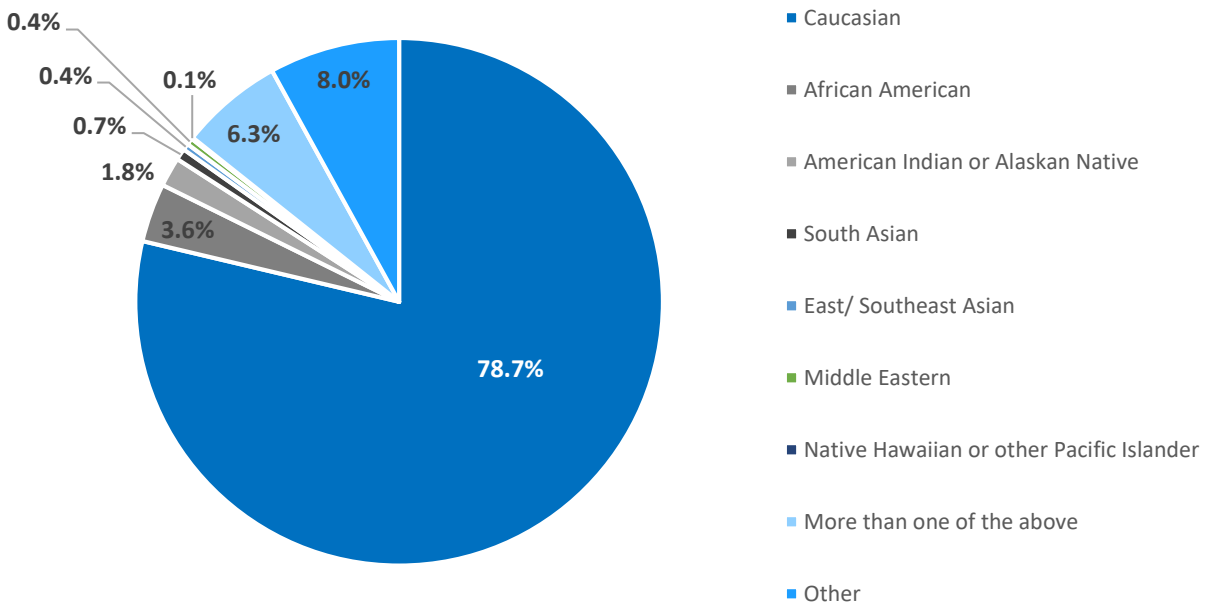


Figure 19. Ethnicity (n=532) – Employer Survey

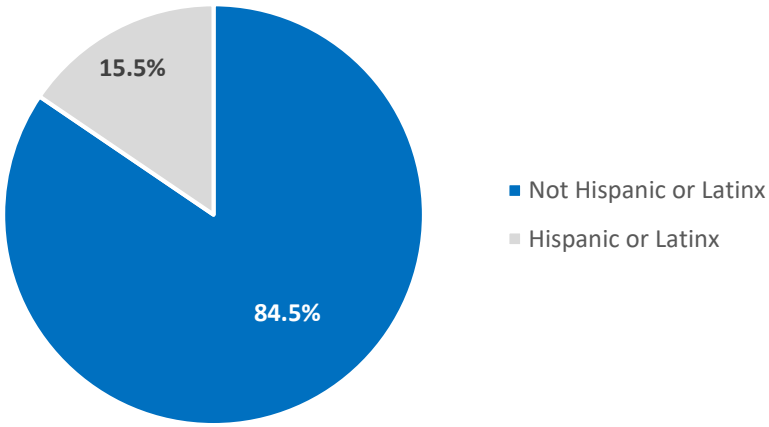


Figure 20. Primary Language (n=532) – Employer Survey

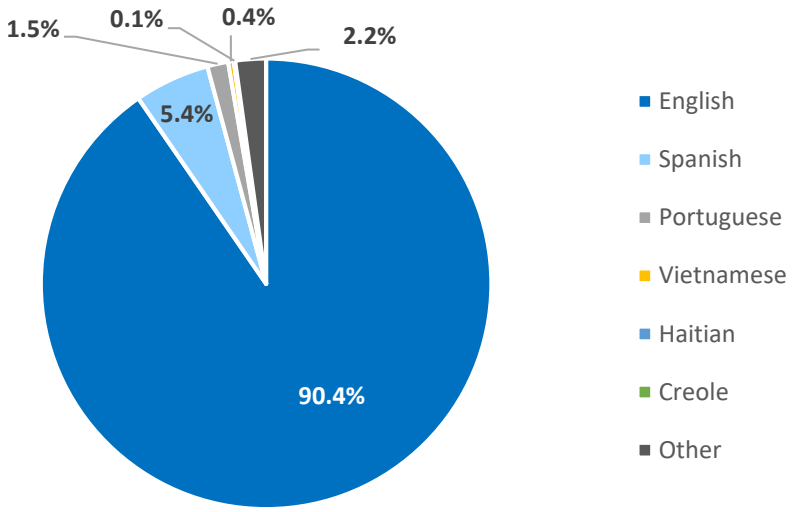
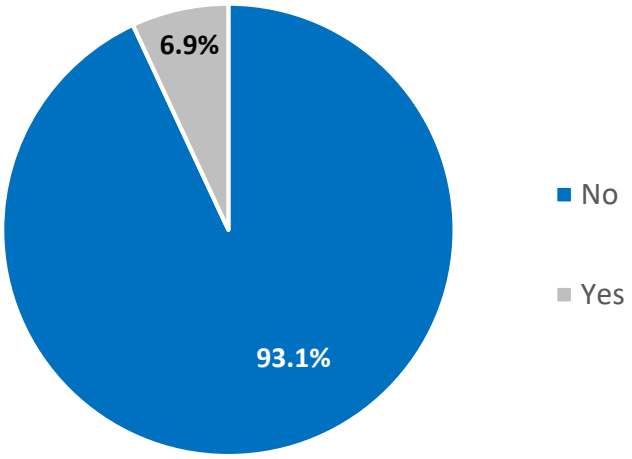


Figure 21. Veterans of U.S. Armed Forces (n=289) – Current Worker Survey



Career Benefits

This section profiles responses from energy efficiency workers who are currently employed in one of the nine occupations of interest and compares them to the preferences and priorities of the potential supply of energy efficiency workers.

CAREER SATISFACTION

The majority of energy efficiency workers (89 percent) are satisfied with their careers. In fact, just over six in ten, or 62 percent, indicated that they are "very satisfied" with their energy efficiency career, and another 27 percent noted they are "somewhat satisfied." About 11 percent indicated they are indifferent and only 0.7 percent reported that they are "somewhat unsatisfied" (Figure 22).

Energy auditors are the most satisfied with their careers; 83 percent reported they are "very satisfied" and 17 percent indicated they are "somewhat satisfied." They are followed by HVAC workers, with 93 percent total satisfaction, engineers, and electrical contractors. In general, more than 80 percent of individuals for each occupation indicated that they are satisfied with their energy efficiency career (Table 2).

Throughout this report, any statistically significant demographic differences by language, age, race, ethnicity, or gender are noted in grey call-out boxes.

Caucasians and African Americans were more likely to report that they are "very satisfied" with their energy efficiency careers compared to Asians.

Figure 22. Energy Efficiency Career Satisfaction (n=289) – Current Worker Survey

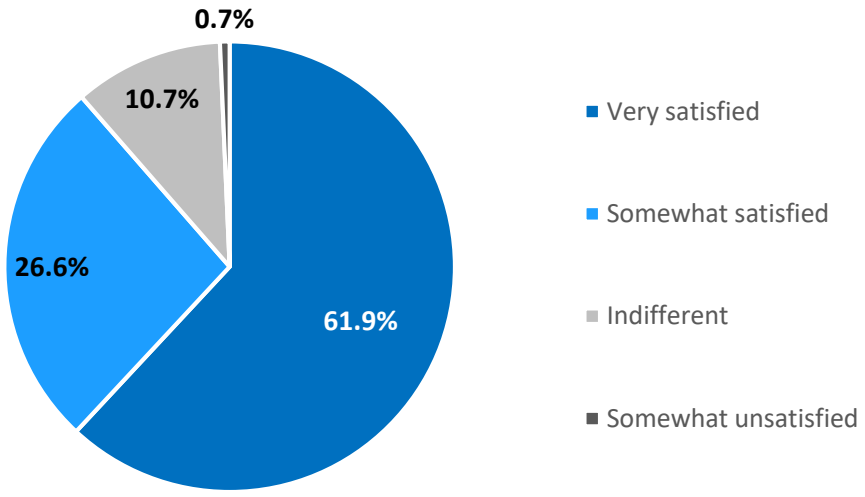


Table 2. Career Satisfaction by Occupation

	Insulation and weatherization installer, contractor, or technician	Electrical contractor or installer	Engineer or project designer	Heating, air conditioning, hot water & refrigeration mechanic, contractor, and installer	Plumber, pipefitter, or steamfitter	Mechanical contractor	Energy auditor or HERS rater
Very satisfied	52.9%	58.2%	63.0%	68.3%	55.6%	69.2%	83.3%
Somewhat satisfied	31.4%	30.9%	26.1%	24.4%	25.9%	19.2%	16.7%
Indifferent	14.3%	9.1%	10.9%	7.3%	18.5%	11.5%	0.0%
Somewhat unsatisfied	1.4%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Very unsatisfied	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

PROFESSIONAL GROWTH & CAREER PATHWAYS

Energy efficiency workers are optimistic about next steps in their career. Almost three-quarters of surveyed employees (73 percent) indicated that they expect to advance within their company and another 17 percent noted that they expected to advance at another company but in the same field. Only six percent indicated they expect no advancement and three percent noted they would advance, but in another industry or field (Figure 23).

In order to be eligible for a promotion, however, employees largely report that they need more experience; 52 percent of surveyed workers indicated that they would need more experience in order to be eligible for a promotion. Only 15 percent noted that they would need more education, and seven percent reported they would need another certification or license (Figure 24).

The top two perceived obstacles to promotion include the lack of opportunities or open positions (35 percent) as well as the lack of career guidance or mentorship (13 percent). Forty-five percent of current workers predict no obstacles to promotion (Figure 25).

Individuals who identified as Hispanic or Latinx were more likely to report that K-12 education, an Associate's degree, Bachelor's degree, and informal mentorship have been important in successfully advancing in their energy efficiency career. Workers who speak Spanish as their primary language were more likely to indicate that a Master's degree was important to their successful career navigation compared to those who primarily speak English.

Caucasian individuals were more likely to indicate that business networks and connections were important compared to African Americans.

Women were more likely to find that business networks and connections, a Bachelor's degree, and a Master's degree were important to their successful career navigation.

Those who live in the city or a suburban area just outside of the city were more likely to cite informal mentorship as key to career navigation compared to those who live in the country or rural areas.

African Americans were more likely to indicate that lack of career guidance or mentorship would be an obstacle to promotion in the energy efficiency field compared to Caucasians. Individuals who identify as Hispanic or Latinx were also more likely to indicate education might be an obstacle to a promotion compared to those who did not identify as Hispanic or Latinx.

Figure 23. Career Next Steps (n=289) – Current Worker Survey

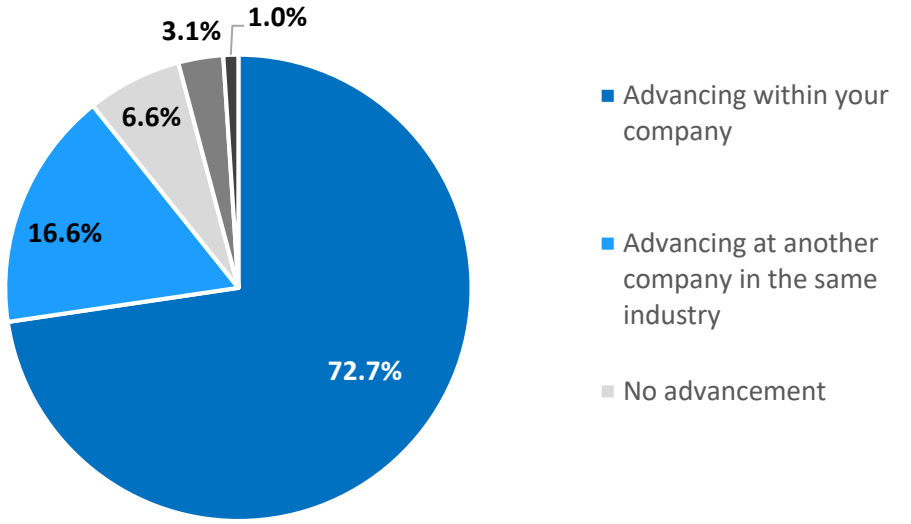


Figure 24. Career Next Steps for Promotion (n=256) – Current Worker Survey

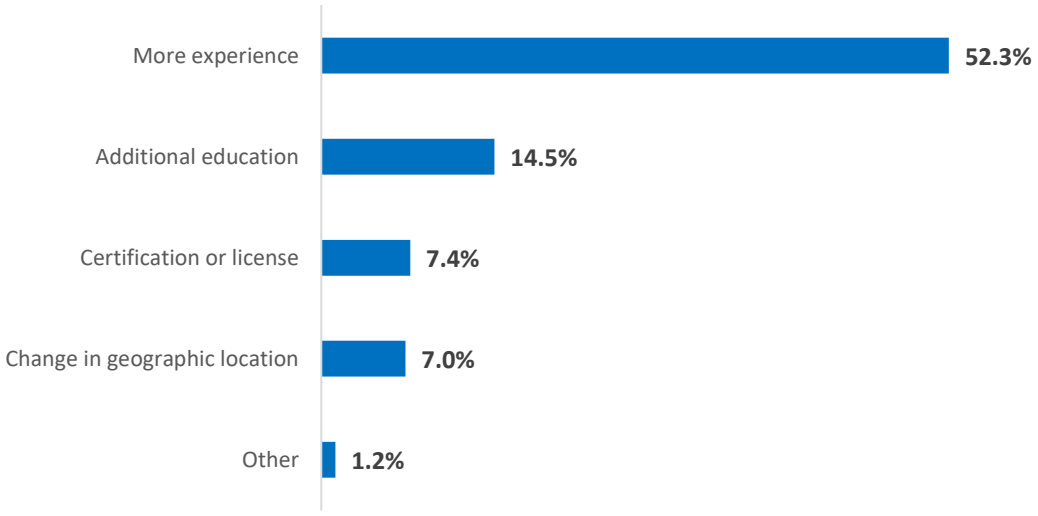
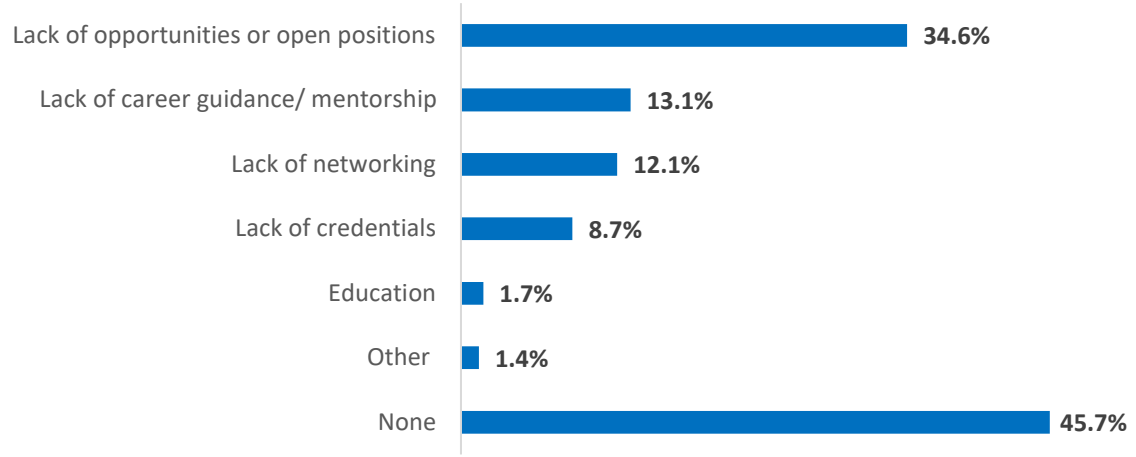
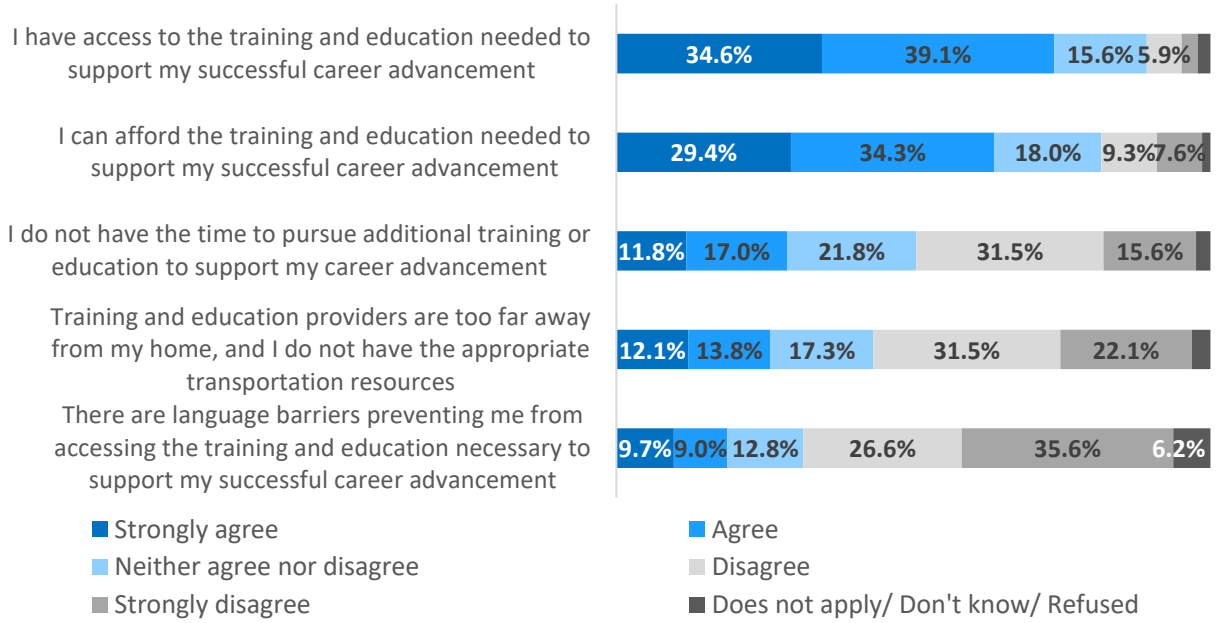


Figure 25. Obstacles to Promotion (n=289) – Current Worker Survey



For the most part, current energy efficiency workers feel they have had access to the training and education needed to support their successful career advancement. Almost three-quarters (74 percent) of surveyed workers indicated that they agree with this statement. Sixty-four percent of workers also indicated that they could afford the training and education needed to support successful career advancement. The greatest challenge for current workers is finding the time to pursue additional training or education that would support career advancement (28 percent agree), followed by the distance of providers and insufficient access to transportation resources (26 percent) (Figure 26).

Figure 26. Potential Barriers to Entry (n=289) – Current Worker Survey

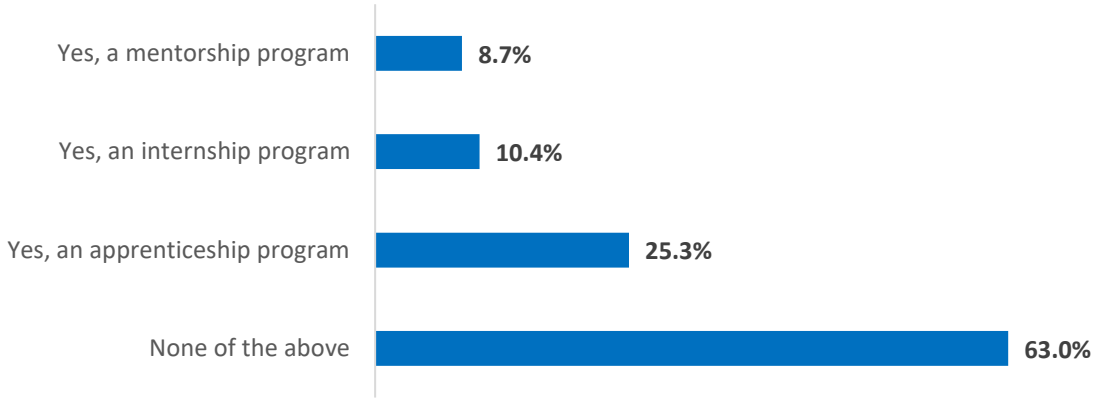


Very few workers have participated in a mentorship, internship, or apprenticeship program. In fact, the majority have not; 63 percent of surveyed employees have not participated in any of these types of programs. Only 10 percent of workers report they have participated in a mentorship program and nine percent indicated they have participated in an internship program. About a quarter of current workers, however, did indicate that they participated in an apprenticeship program (Figure 27).[55]

Of employees who have gone through one of these programs, the vast majority indicate they have been important to their career success. Ninety percent of surveyed workers report that participation in a mentorship, internship, or apprenticeship program improved their successful career navigation (Figure 28).

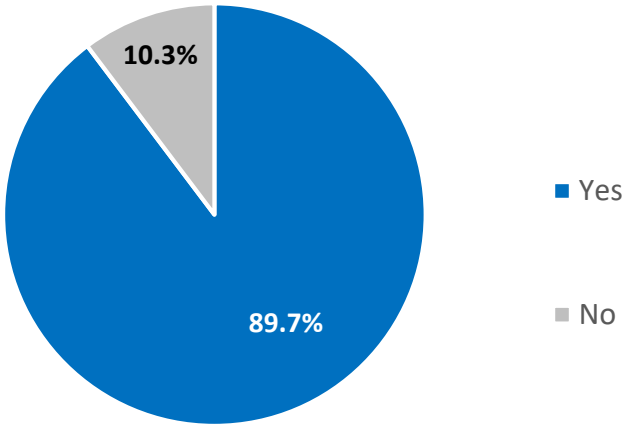
Individuals who speak Spanish as their primarily language were more likely to report that they have participated in a mentorship program. Workers who live in the city or urban area are also more likely to have participated in an internship program compared to those who live in a suburban area or outside of the city.

Figure 27. Mentorship, Internship, or Apprenticeship Program Participation (n=289) – Current Worker Survey



[55] Seventy-one percent of employers do not offer a formal mentorship program. To view this data, please refer to the Employer Survey Toplines in Appendix C.

Figure 28. Mentorship, Internship, or Apprenticeship Program Improve Career Success (n=107) – Current Worker Survey



ENERGY EFFICIENCY EMPLOYMENT BENEFITS

Energy efficiency careers often provide employment benefits such as healthcare, retirement benefits, paid vacation from work, flexible work schedules, and more. Seventy-seven percent of current workers report that they receive some type of healthcare benefit from their company; 52 percent of workers indicated that their company pays for all their health insurance and 24 percent report that their company pays for part of their health insurance. Only 23 percent indicated that their employer does not contribute to health insurance (Figure 29).

Similarly, 70 percent of surveyed workers indicate that they do receive some type of retirement benefits through their company (Figure 30), and 75 percent also receive paid vacation from work (Figure 31).

Additional benefits include flexible schedule and work hours (43 percent), a company vehicle (40 percent), tuition support (28 percent), and a transportation stipend (27 percent) (Figure 32).

Men and individuals who live in rural areas are less likely to receive health insurance from their employers.

African Americans are more likely to receive retirement benefits compared to Caucasians or Asians.

Those who live in the city or an urban area are more likely to receive paid vacation compared to individuals who live in the country or rural areas.

Figure 29. Healthcare Benefits (n=289) – Current Worker Survey

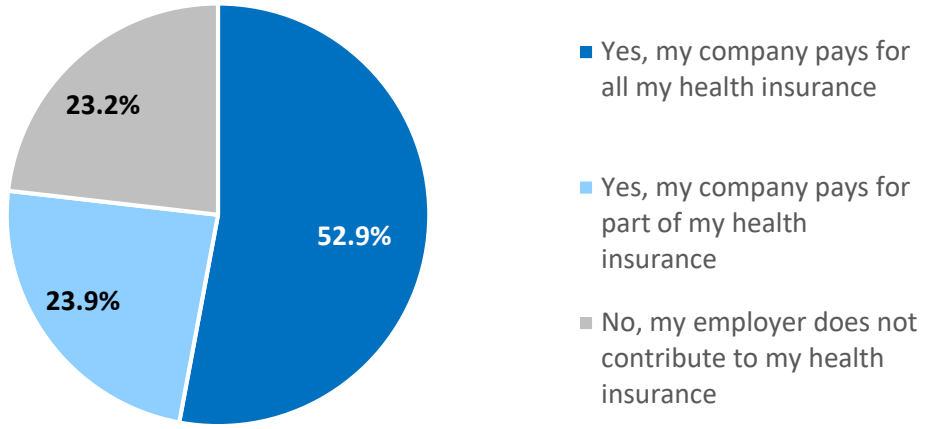


Figure 30. Retirement Benefits (n=289) – Current Worker Survey

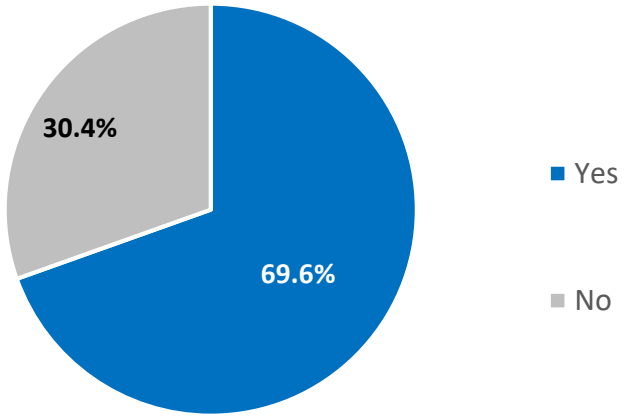


Figure 31. Paid Vacation from Work (n=289) – Current Worker Survey

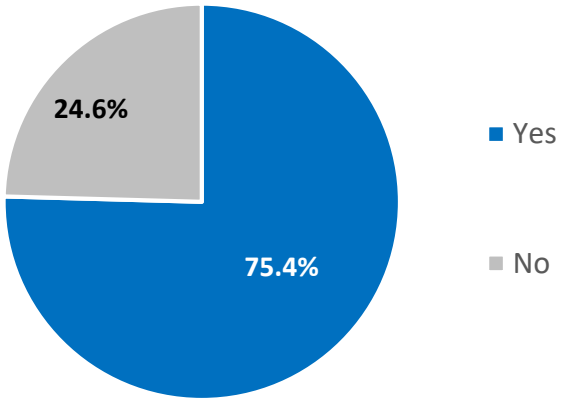
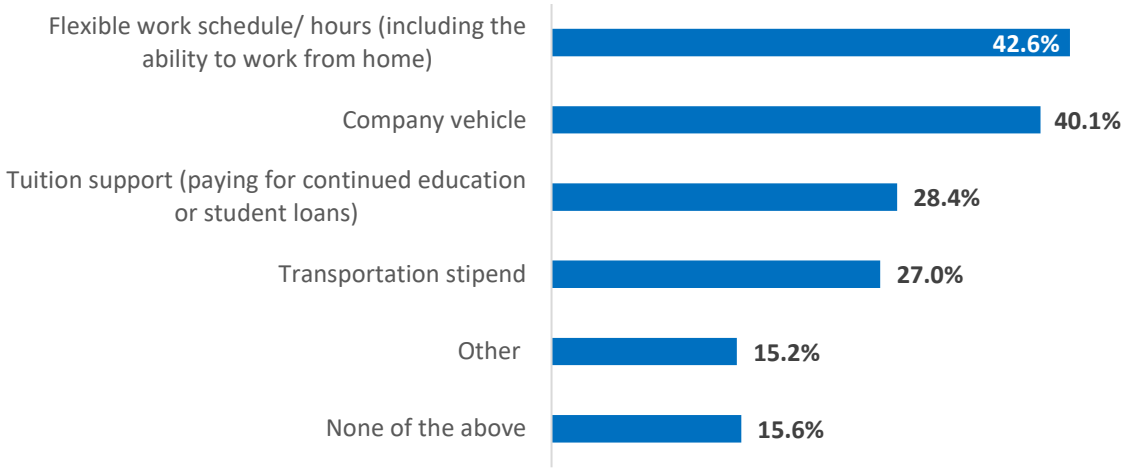


Figure 32. Additional Benefits (n=289) – Current Worker Survey



With regards to occupational differences in employment benefits, energy auditors, mechanical contractors, engineers, and electrical contractors are more likely to get all their health insurance covered by their company. These occupations as well as plumbers and pipefitters are also more likely to receive retirement benefits or paid vacation from work. In general, insulation and weatherization workers are least likely to receive healthcare, retirement, and paid vacation benefits compared to other occupations (Table 3).

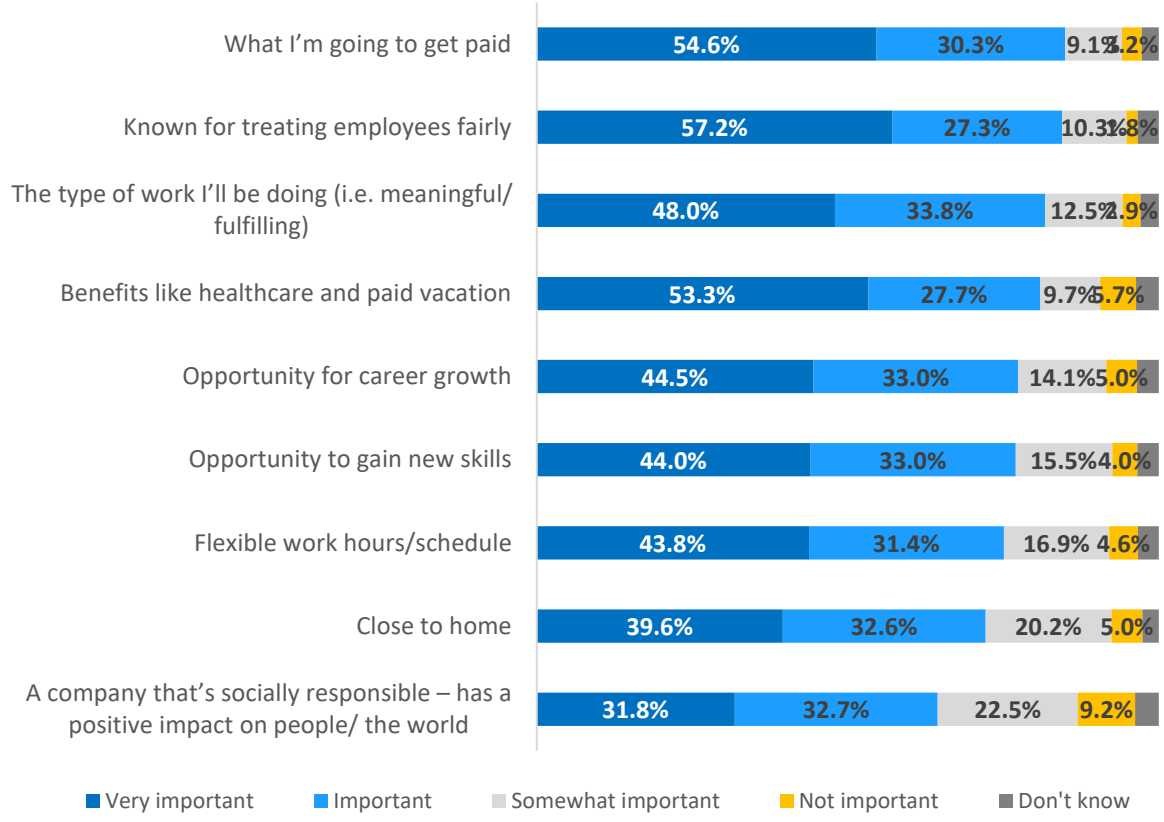
Table 3. Benefits by Occupation (total n=289) – Current Worker Survey

	Insulation and weatherization installer, contractor, or technician	Electrical contractor or installer	Engineer or project designer	Heating, air conditioning, hot water & refrigeration mechanic, contractor, & installer	Plumber, pipefitter, or steamfitter	Mechanical contractor	Energy auditor or HERS rater
Healthcare Benefits							
Yes, my company pays for all my health insurance	38.6%	58.2%	60.9%	51.2%	37.0%	61.5%	79.2%
Yes, my company pays for part of my health insurance	14.3%	18.2%	26.1%	31.7%	51.9%	26.9%	12.5%
No, my employer does not contribute to my health insurance	47.1%	23.6%	13.0%	17.1%	11.1%	11.5%	8.3%
Retirement Benefits							
Yes	54.3%	63.6%	80.4%	68.3%	77.8%	84.6%	83.3%
No	45.7%	36.4%	19.6%	31.7%	22.2%	15.4%	16.7%
Paid Vacation							
Yes	60.0%	76.4%	89.1%	75.6%	70.4%	88.5%	83.3%
No	40.0%	23.6%	10.9%	24.4%	29.6%	11.5%	16.7%
Additional Benefits							
Flexible work schedule/ hours (including the ability to work from home)	37.1%	43.6%	58.7%	26.8%	29.6%	50.0%	58.3%
Company vehicle	27.1%	38.2%	45.7%	58.5%	33.3%	50.0%	37.5%
Tuition support (paying for continued education or student loans)	25.7%	18.2%	32.6%	24.4%	40.7%	50.0%	20.8%
Transportation stipend	24.3%	23.6%	43.5%	26.8%	14.8%	26.9%	25.0%

The important job attributes for potential workers are largely what can be provided in an energy efficiency career, such as healthcare and paid vacation, opportunities for career growth, or flexible work hours. In general, the most important attributes when considering working for a company include compensation, fair treatment, meaningful work, and benefits such as healthcare and paid vacation. At least 80 percent of survey respondents indicated that these are either "very" or "somewhat" important to them. These top tier attributes are also followed by career growth opportunities, the opportunity to gain new skills, flexible work hours, ability to work close to home, and working for a company that is socially responsible or has a positive impact (Figure 33).

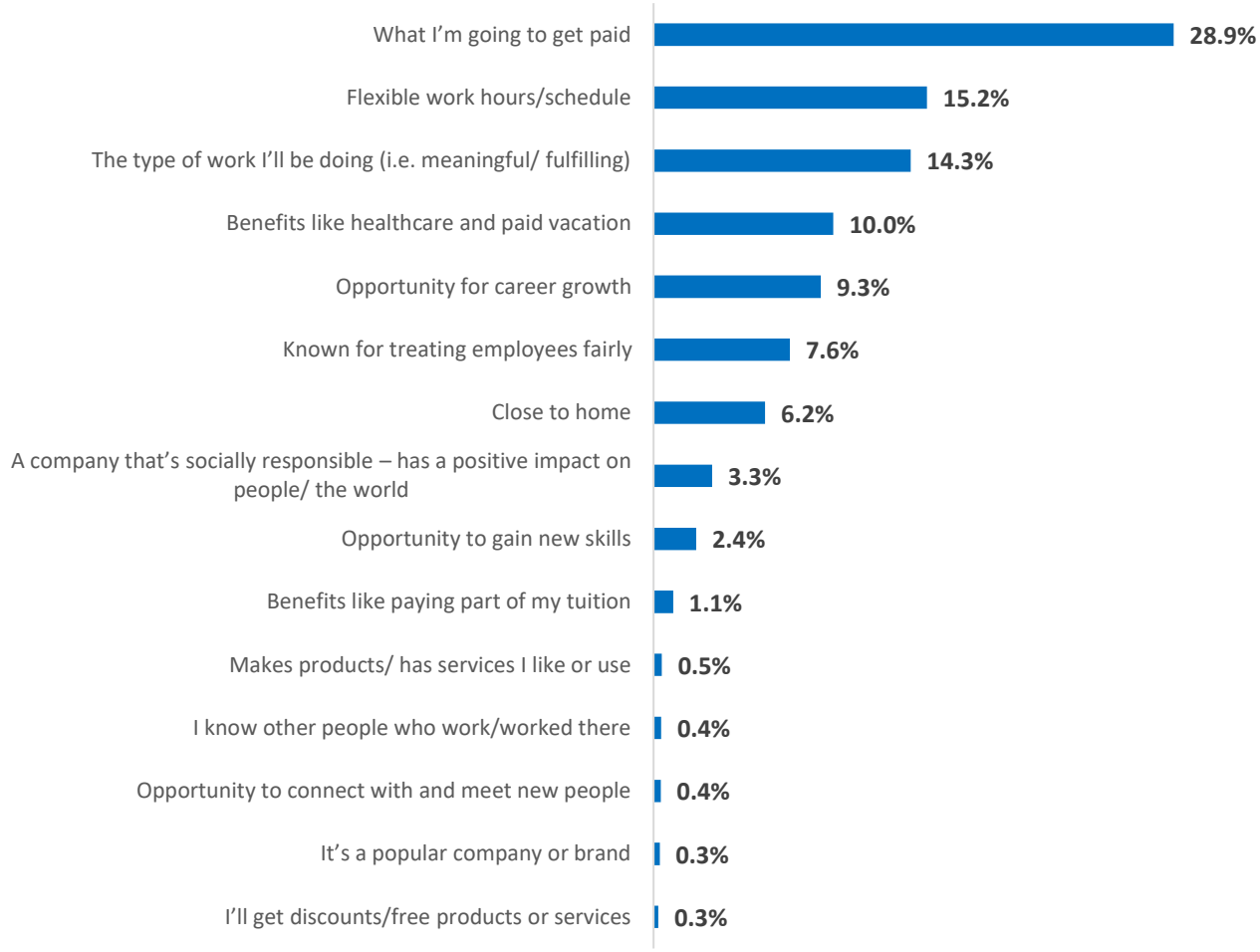
Potential workers were then asked, of the factors that were rated "very important", which is the most important when thinking about a new job or career. In general, the most important attribute when seeking a new job is compensation. When asked to select the top most important aspect, 23 percent of respondents indicated compensation was most important to them, followed by flexible work hours (15 percent) and meaningful or fulfilling work (14 percent) (Figure 34).[56]

Figure 33. Level of Importance for Various Attributes in a Job and Workplace (n=593) – Potential Worker survey



[56] For detailed survey toplines on the least important attributes when searching for work, please refer to the Potential Worker Survey Toplines in Appendix E.

Figure 34. Most Important Attribute in a Job and Workplace (n=463) – Potential Worker Survey



CHAPTER 3:

The Energy Efficiency Training Landscape & Potential Talent Pipeline

The overall training landscape in Massachusetts indicates that there is a growing network of activity and synergy between vocational-technical schools, universities, non-profits, and employers. Apprenticeship programs, for example, rely on the connectivity to neighboring schools, non-profits, and other organizations to improve training outcomes for students. Examples of these combined efforts include the geographic proximities of Madison Park Vocational High School, Roxbury Community College, and Wentworth Institute of Technology, which creates efficient pathways for high school graduates to learn technical skills, gain workplace experience, and move up the career ladder with continued education. These synergies prove to be effective as each organization contributes a strength to the process—universities provide classroom experience, non-profits provide work experience via apprenticeships, and community colleges and vocational schools provide the technical training.

However, there is still a need to strengthen this talent pipeline and feeder system, particularly for entry-level vocational trade workers. These individuals are most in demand, and they tend to have fewer resources for networking compared to college graduates or individuals in professional service occupations such as engineering. Improving lines of communication between employers, training organizations, non-profits, utilities and program administrators, cities, and other stakeholders would have the added benefit of reducing hiring costs for employers by ensuring that potential workers are job-ready and efficiently connected to the talent pipeline.[57]

Chapter 3 provides more detail on the current training landscape for energy efficiency jobs across Massachusetts as well as the motivations and sentiments of potential energy efficiency workers. It begins with an overview of programs that are currently funded by the Massachusetts Program Administrators, followed by a gap analysis of the current availability and distribution of in-demand certifications compared to what is currently being funded.

The latter half of Chapter 3 details the preferences and priorities of potential energy efficiency workers by detailing findings from a supplemental survey of the general population in Massachusetts. This section identifies sentiments on career navigation and advancement as well as prevailing perceptions of the energy efficiency industry.

The following is a brief overview of each of the training entities profiled in the inventory and this report.

Community Colleges: *Community colleges offer complete training pathways for certain technical occupations, like energy systems managers and electricians. They also occasionally host courses to directly certify or prepare for certification exams within career pathways. Finally, community colleges can provide a more financially attainable path to an eventual 4-year Bachelor's degree program in an advanced career, like engineering.*

[57] These findings are from the executive interviews that were conducted for the report.

Technical Schools: *Technical schools are a broad category of organizations that host courses aimed for adults looking to both enter a new career or further their current career. Technical schools are occasionally an after-hours continuing education branch of a high school but are most often private entities that either prepare for existing certificates (like OSHA or BPI) or create programs that aim to prepare workers and signal value to potential employers (like HVAC technician trainings). Technical schools have a range of costs but are typically structured as for-profit entities.*

Vocational High Schools: *In Massachusetts, vocational high schools are state-funded and exist in nearly every county. The intention of most vocational high school programs is to provide the complete training necessary for entry to a given career.*

Trade Associations: *Trade Associations offer certificate programs similar to those of technical schools (including OSHA, BPI, and CEM) but are not-for-profit organizations. Thus, trade association programs, though significantly fewer in number, are typically more financially attainable than technical school programs.*

Four-year College/University: *Colleges/Universities offer Bachelor's, Master's, and Doctoral degrees for individuals seeking careers that require advanced training (like Electrical Engineering or Building Sciences). Some larger schools have also hosted trade association events and training programs.*

Manufacturers: *Manufacturing companies occasionally offer trainings that allow current employees to improve their technical knowledge of the company's specific technological instrumentation. While some trainings are baked into onboarding and promotion, others are optional and allow employees to both improve productivity at a given level or develop skills for promotion.*

Energy Efficiency Training in Massachusetts

PA-FUNDED ENERGY EFFICIENCY WORKFORCE DEVELOPMENT

Table 4 below provides a list of all training programs currently funded by Program Administrators. At the moment, PA-Funded training is largely focused on weatherization and insulation-related occupations with trainings such as the Weatherization Retrofit Installer, Weatherization Crew Chief Trainings, and Weatherization Boot Camp. There are also offerings for HVAC trades, energy auditing, building operator, passive house, LEED, heat pump, and lighting. Overall, the Program Administrators' workforce development expenditures total just over $1.56 million between 2013 and 2018 for both residential and commercial and industrial gas and electric programs (Figure 35).[58]

[58] Source: https://www.masssavedata.com/Public/PerformanceDetails. By comparison, Pacific Gas and Electric Company (PG&E) spent roughly $10.7 million in Workforce Education and Training in 2018 alone. In 2018, the Massachusetts Program Administrators dedicated 0.05 percent of the total budget to workforce development compared to PG&E's 2.8 percent over the same time. Source: Pacific Gas and Electric Company, Energy Efficiency Business Plan 2018-2025. https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-efficiency-solicitations/PGE-Energy-Efficiency-Business-Plan.pdf. It should be noted that the Massachusetts PA expenditures from the Mass Save website do not include the additional spending that vendors pay for their own training and workforce development as part of sales, administrative, and technical budgets from the Program

In addition to the PA-Funded trainings, BW Research identified 316 additional training programs across the Commonwealth from universities, community colleges, manufacturers, energy efficiency associations, technical high schools, and vocational schools. For a full list of this training inventory, please refer to Appendix A.[59]

Table 4. PA-Funded Training Programs

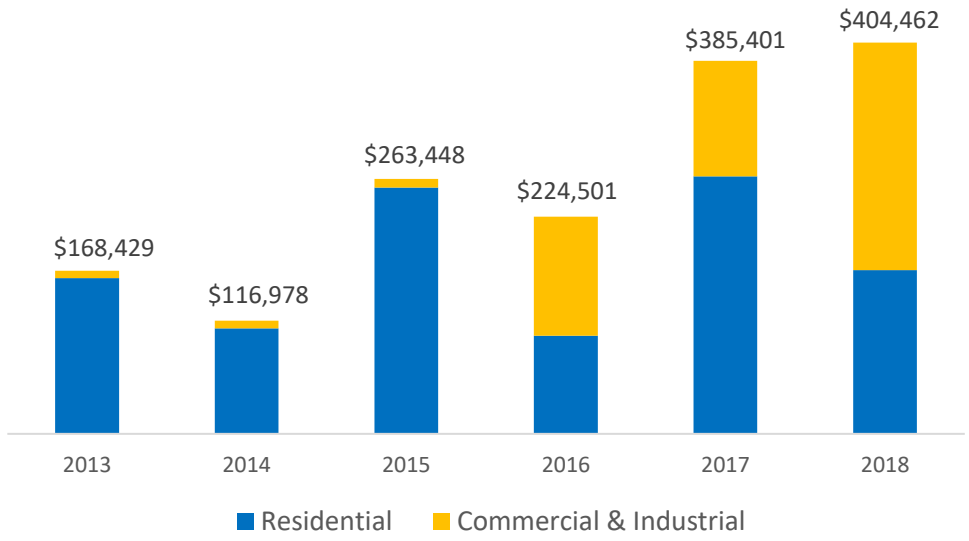
PROGRAM	PROVIDER	LOCATION
LEED Prep: LEED Green Associate	EcoRise	Web
BPI Building Analyst	Heyoka Solutions	Falmouth
Building Operators Certification	Roxbury Community College	Roxbury
Ultra-Low Temp Freezer Service	Stirling Ultracold	Various
Building Operator Certification (BOC)	Northwest Energy Efficiency Council	Various
HVAC Contractor Mtg on Res, LI and C&I HVAC Programs	Cape Light Compact	Yarmouth
Lighting Distributor Event	Manufacturers - Signify and RAB	Various
Lighting Distributor Event (training on heat pumps)	Electric PA Staff	Various
BPI Certification	Everblue, Abode, RISE, CLEAResult, HomeWorks Energy	Various
Various[60]	Green Jobs Academy	Various
CLEAResult Wx boot camps	CLEAResult	Westborough
Wx Crew Chief Training	CLEAResult	Westborough
Commercial Energy Auditor training	Acela Energy	Norfolk
AMP auditor refresher training	Action Inc	Gloucester
New technology/ heat pump training	Abode	Arlington
MA Energy Efficiency Partnership	UMass Amherst	Amherst
Passive House Certification	ICF/Passive House MA	Boston, Newton, Westwood, Cambridge
Project Expeditors Training	National Grid	Worcester

Administrators. It also does not include residential education budgets that are in part used to provide educational training for K-12 students.

[59] If there are additional programs not listed here, please contact BW Research to add these programs to the inventory.

[60] The Program Administrators provide reimbursement to vendors or contractors for attending courses at the Green Jobs Academy (GJA), but there is no direct funding for GJA's operations or training programs. The PAs will reimburse up to 50 percent of these costs on an annual basis.

Figure 35. Total Workforce Development Expenditures by Program Administrators, 2013-2018



IN-DEMAND CERTIFICATIONS

The following analysis is based on employer-reported responses for in-demand certifications. The certifications included in the survey for testing were based on feedback from Program Administrators. The top three selected certifications from employers are:

- OSHA 10 Hour[61]
- Certified Energy Manager
- OSHA Confined Spaces Training

Overall, the OSHA 10 Hour is the most desired certification; 46 percent of employers selected this certification. Certified Energy Manager was important to 37 percent of employers, followed by OSHA Confined Spaces Training (21 percent) (Figure 36).

In general, few employers require their workers to have certifications when working on zero net energy or passive house buildings. Eight in ten (81 percent) reported they do not require these certifications (Figure 37).

[61] It should be noted that OSHA 10 Hour Certifications are required in Massachusetts for contractors that wish to bid on public sector work.

Figure 36. Overall In-Demand Certifications (n=318) – Employer Survey

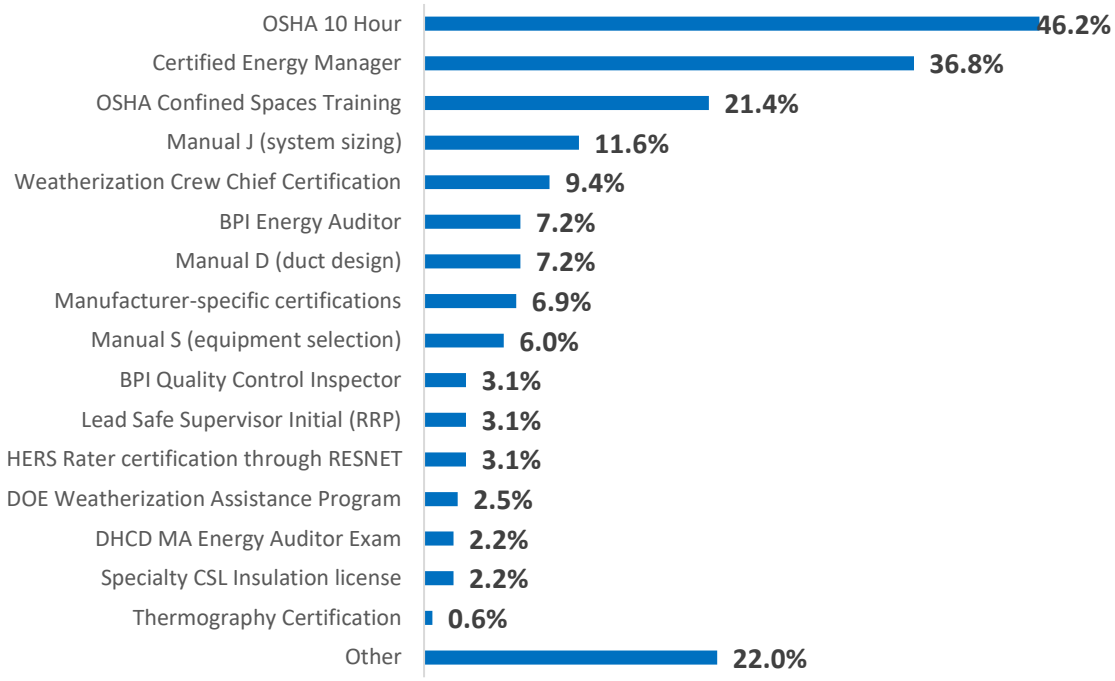


Figure 37. Zero Net Energy or Passive House Certifications (n=487)

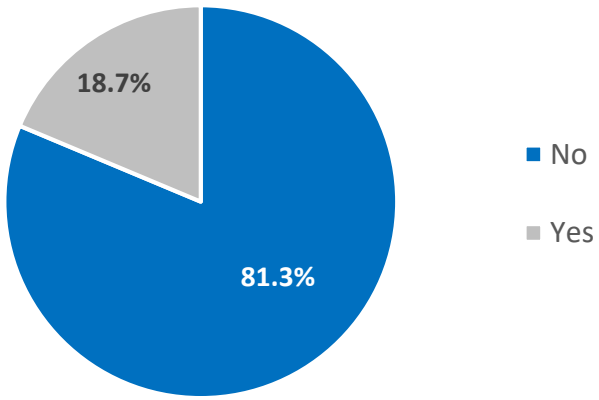
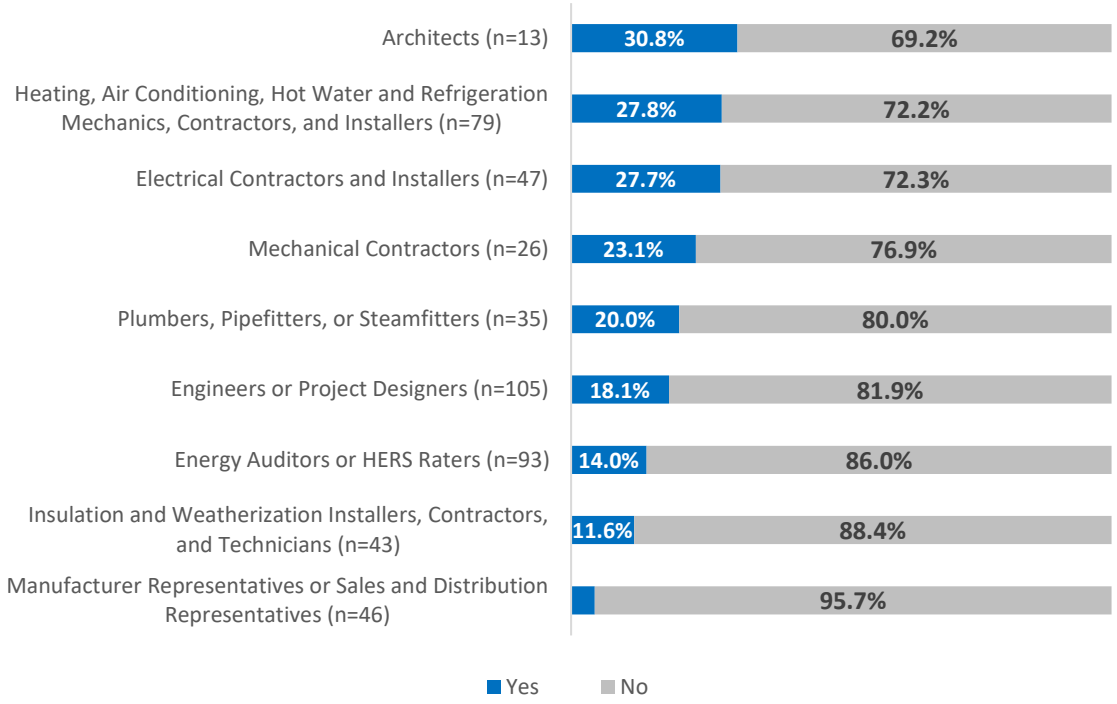


Figure 38. Zero Net Energy or Passive House Certifications by Occupation



The following tables highlight the in-demand certifications from Figure 36 by each of the nine occupations studied for this report. For the most part, the top demanded certifications by employers remain roughly the same—Certified Energy Manager, OSHA 10 Hour, and OSHA Confined Spaces Training. For Energy Auditors, employers also value the BPI Energy Auditor certification (Table 5). In addition to OSHA training, weatherization and insulation workers need Weatherization Crew Chief Certifications as well as training on the DOE Weatherization Assistance Program (Table 9). Both mechanical contractors and HVAC workers need the Manual trainings for system sizing, equipment selection, and duct design (Manual J, Manual S, and Manual D) (Table 8 and Table 10).

Based on the above findings, BW Research analyzed offerings in the training inventory and identified the quantity and geographic distribution of the in-demand certifications. There are 32 total OSHA trainings for 10 Hour and Confined Spaces which are offered both online and on-site in the counties of Barnstable, Berkshire, Bristol, Essex, Hampden, Middlesex, Norfolk, Plymouth, and Worcester.[62] There are six BPI Energy Auditing trainings offered either online or in Middlesex, Suffolk, or Worcester county. The training inventory identified one Certified Energy Manager training on the web and two Weatherization Crew Chief trainings in addition to those funded by the Program Administrators which are offered either online or in Worcester. The research team used HVAC programs as a proxy for the Manual J, Manual S, and Manual D trainings as the Manual trainings are often folded into overall HVAC-related programs. There

[62] These OSHA trainings are in addition to the OSHA 10 training that is built into the curriculum for students studying building trades (electrical, carpentry, plumbing, HVAC, etc.) at a vocational technical high school in Massachusetts. With the addition of these vocational technical schools, OSHA trainings are offered in every county across the state. There are a total of 102 vocational technical high school programs for HVAC, electricians, plumbers, and building managers.

are 17 HVAC Manuals offered both online and across several counties including Barnstable, Bristol, Essex, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, and Worcester (Table 14).

Table 5. In-Demand Certifications for Energy Auditors or HERS Raters – Employer Survey

Certified Energy Manager	44.4%
OSHA 10 Hour	30.0%
BPI Energy Auditor	25.6%
OSHA Confined Spaces Training	13.3%
HERS Rater certification through RESNET	11.1%
Lead Safe Supervisor Initial (RRP)	11.1%
BPI Quality Control Inspector	11.1%
DHCD MA Energy Auditor Exam	7.8%
Manufacturer-specific certifications	4.4%
Thermography Certification	2.2%
Other	13.3%

Table 6. In-Demand Certifications for Engineers or Project Designers – Employer Survey

Certified Energy Manager	57.7%
Manufacturer-specific certifications	2.9%
Other	26.0%

Table 7. In-Demand Certifications for Electrical Contractors – Employer Survey

OSHA 10 Hour	48.9%
OSHA Confined Spaces Training	20.0%
Manufacturer-specific certifications	6.7%
Certified Energy Manager	4.4%
Other	4.4%

Table 8. In-Demand Certifications for Mechanical Contractors – Employer Survey

OSHA 10 Hour	42.3%
OSHA Confined Spaces Training	30.8%
Manual J (system sizing)	19.2%
Certified Energy Manager	15.4%
Manual S (equipment selection)	11.5%
Manual D (duct design)	11.5%
Manufacturer-specific certifications	7.7%
Other	15.4%

Table 9. In-Demand Certifications for Insulation and Weatherization Workers – Employer Survey

Weatherization Crew Chief Certification	69.8%
OSHA 10 Hour	60.5%
OSHA Confined Spaces Training	27.9%
DOE Weatherization Assistance Program	18.6%
Specialty CSL Insulation license	16.3%
Manufacturer-specific certifications	0.0%
Other	4.7%

Table 10. In-Demand Certifications for HVAC Workers – Employer Survey

OSHA 10 Hour	55.3%
Manual J (system sizing)	42.1%
Manual D (duct design)	26.3%
Manual S (equipment selection)	21.1%
OSHA Confined Spaces Training	18.4%
Certified Energy Manager	10.5%
Manufacturer-specific certifications	6.6%
Other	13.2%

Table 11. In-Demand Certifications for Plumbers, Pipefitters, and Steamfitters – Employer Survey

OSHA 10 Hour	57.6%
OSHA Confined Spaces Training	39.4%
Manufacturer-specific certifications	6.1%
Other	15.2%

Table 12. In-Demand Certifications for Architects – Employer Survey

Certified Energy Manager	23.1%
Other	23.1%

Table 13. In-Demand Certifications for Manufacturer or Sales Representatives – Employer Survey

Manufacturer-specific certifications	6.8%
Other	11.4%

Table 14. Geographic Distribution and Quantity of In-Demand Certifications

Certification	# of Programs	Locations
BPI Energy Auditing	6	Middlesex, Suffolk, Worcester, Online
Certified Energy Manager	1	Online
HVAC Manuals	17	Barnstable, Bristol, Essex, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, Worcester, Online
OSHA 10 Hour	22	Barnstable, Berkshire, Bristol, Essex, Hampden, Middlesex, Norfolk, Plymouth, Online
OSHA Confined Space	10	Barnstable, Berkshire, Bristol, Essex, Hampden, Middlesex, Norfolk, Plymouth, Worcester, Online
Weatherization Crew Chief	2	Worcester, Online

Potential Talent Pipeline

The Potential Talent Pipeline section identifies the perceptions of the general population with regards to energy efficiency or related careers in the construction or building trades. Given that employers identified a small and competitive talent pool to be one of the most significant reasons for hiring difficulty, the purpose of this section is to understand the motivations of potential workers that might be a good fit for energy efficiency training.

CAREER NAVIGATION & ADVANCEMENT

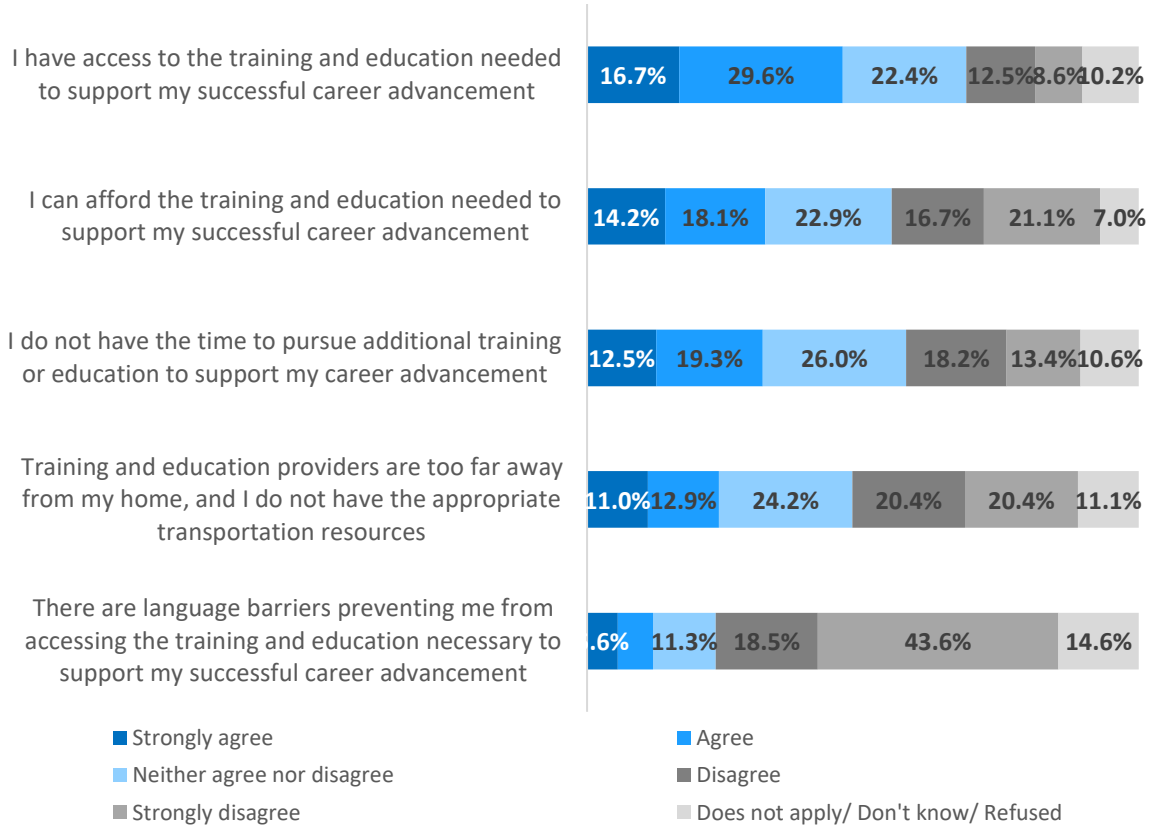
Potential workers are evenly spread across their levels of agreement with regards to the ability to access and afford training and education needed to support successful career advancement or having sufficient time to pursue additional education or certification. About a quarter to roughly a third either agree, disagree, or neither. Only 12 percent of respondents agree with the statement that there are language barriers preventing them from accessing training and education. Forty percent disagree that training providers are too far away from their home (Figure 39).

Men were more likely to indicate that they felt they could afford the training and education required to support successful career advancement, but they were also more likely to indicate that language barriers prevent them from accessing that training and that training providers are too far from their homes.

Caucasians were also more likely to indicate that they can afford the training and education needed to support career advancement compared to Asians or African Americans. They were also most likely to indicate that training providers are too far from their home.

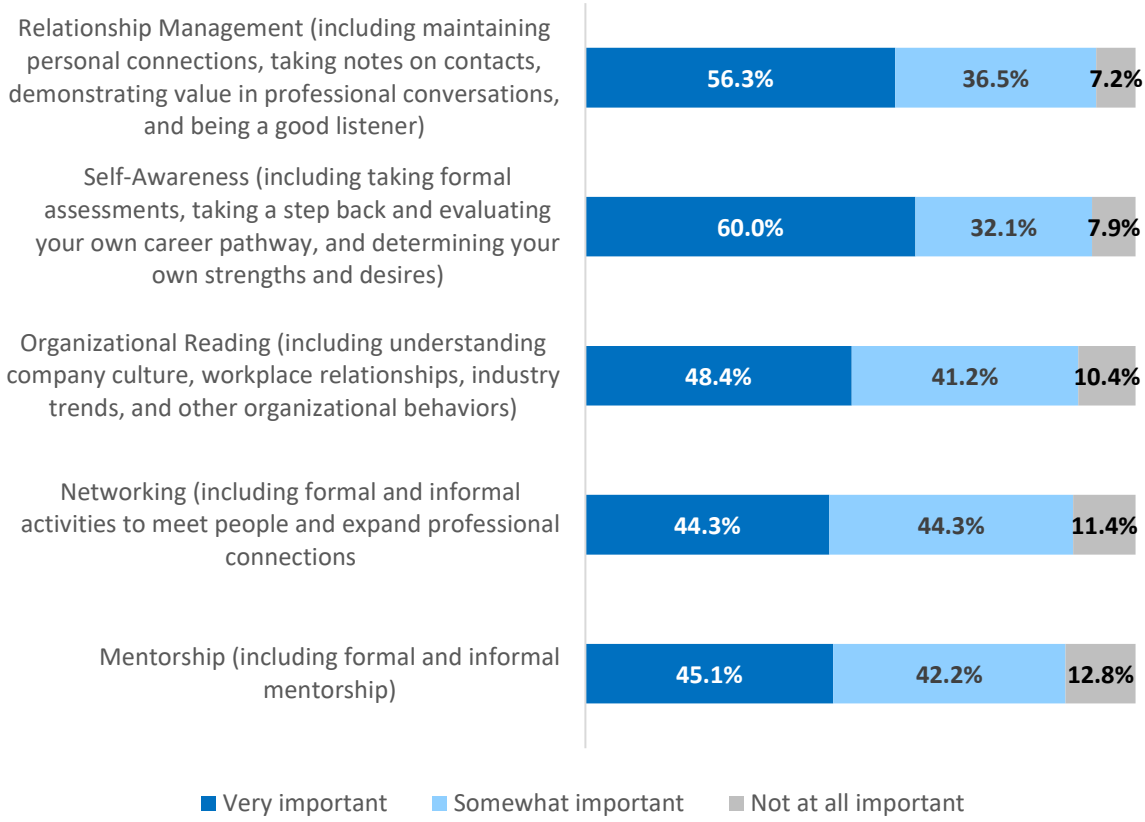
Those who identified as Hispanic or Latinx are more likely to feel that they cannot afford training and education needed to advance in their careers, that language barriers prevent them from accessing this training, that they do not have the time to pursue additional training, or that training and education providers are too far away from their homes.

Figure 39. Barriers to Entry (n=550) – Potential Worker Survey



In general, all the following activities involved in career advancement were deemed either “very” or “somewhat” important to at least 87 percent of potential workers. The most important aspect of successful career advancement, however, is relationship management; 93 percent of surveyed respondents indicated this was important in their personal career advancement. This is followed by self-awareness (92 percent), organizational reading (89 percent), networking (89 percent), and mentorship (87 percent) (Figure 40).

Figure 40. Important Activities for Personal Career Advancement (n=551) – Potential Worker Survey



PERCEPTIONS OF THE ENERGY EFFICIENCY INDUSTRY

Few survey respondents indicated that they have an interest in working in energy efficiency or related trades. Almost 60 percent of potential workers reported that they are not interested in electrical work, installation, repair and maintenance, or construction and building trades. However, this number drops slightly to 47 percent when referencing energy efficiency in general (Figure 41).

Despite this, individuals do agree that construction and building trades typically offer good salaries (60 percent). However, 46 percent note that they do not offer the kind of work they are interested in doing. In general, about four in ten survey respondents also agree that construction jobs offer good benefits and perks or have socially responsible companies and exercise gender quality (Figure 42).

Respondents were least likely to agree that these jobs are for someone like them (27 percent), provide good opportunities for career advancement (29 percent), have flexible work hours and scheduling (31 percent), and offer travel and relocation opportunities (33 percent) (Figure 43).

When asked about energy efficiency specifically, less than half indicate that they agree that these jobs provide a good salary, are careers they would be proud of, offer good benefits and perks, flexible work hours, or the kind of job they want to do. About a quarter or less indicated that these jobs do not have good diversity, provide opportunities for career advancement, that they know other people who work in this industry, or that this industry offers jobs close to where they live. For the most part, individuals were

either neutral or unaware of the sector. Between 40 to 60 percent responded that they were either unaware or have no opinion across each of the items tested.

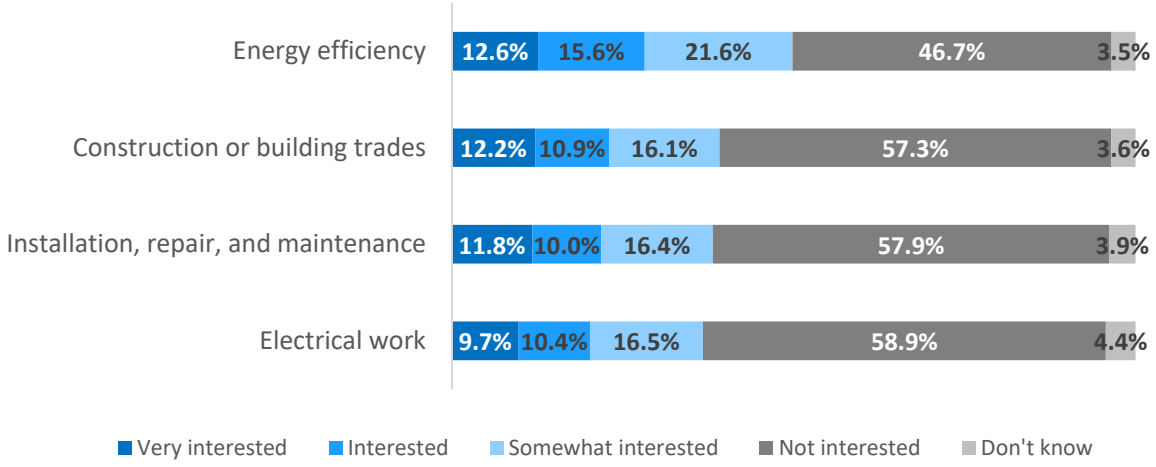
The limited public awareness of the opportunities and benefits of energy efficiency careers was also noted during executive interviews. While the demand for workers in the energy efficiency trades is high, the lack of supply is partly related to a prevailing perception of the field and limited public awareness of the benefits and career opportunities associated with these occupations. High school graduates rarely consider these trades an option, despite having an interest in climate or environmental issues, as parents and guidance counselors more typically advocate for a college education or the career benefits of professional service occupations. To compound this issue, entry-level wages for energy efficiency trades are often low, even though the growth opportunity is high. Few individuals choose to enter technical high schools with a trade focus and direct employability opportunities. One technical high school noted that recruitment is a major challenge, as many young kids remain unaware of the benefits and career opportunities in the energy efficiency sector.[63]

In general, men were much more likely to report interest in working in these industries compared to women.

Caucasians also reported higher interest in working in energy efficiency or related building trades compared to African Americans or American Indians.

Those who identified as Hispanic were less likely to report interest in working in the energy efficiency and related trades.

Figure 41. Interest in Working in Energy Efficiency and Related Sectors (n=531) – Potential Worker Survey



[63] This finding is from the executive interviews that were conducted for the report.

Figure 42. Perceptions of Construction and Building Trades: Highest Agreement (n=550) – Potential Worker Survey

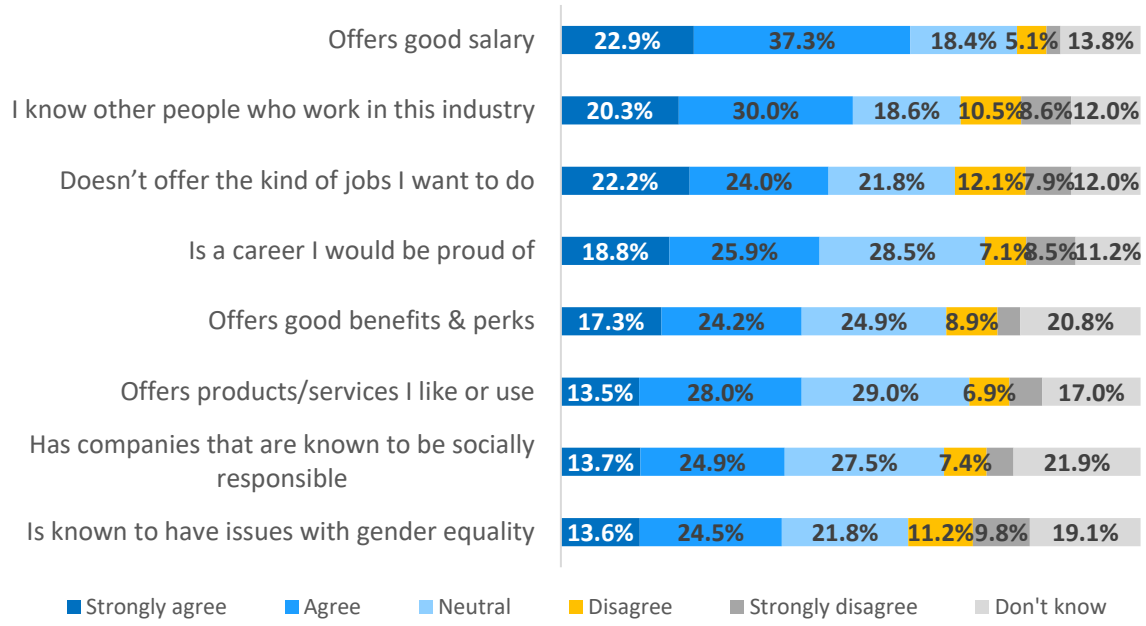


Figure 43. Perceptions of Construction and Building Trades: Lowest Agreement (n=593) – Potential Worker Survey

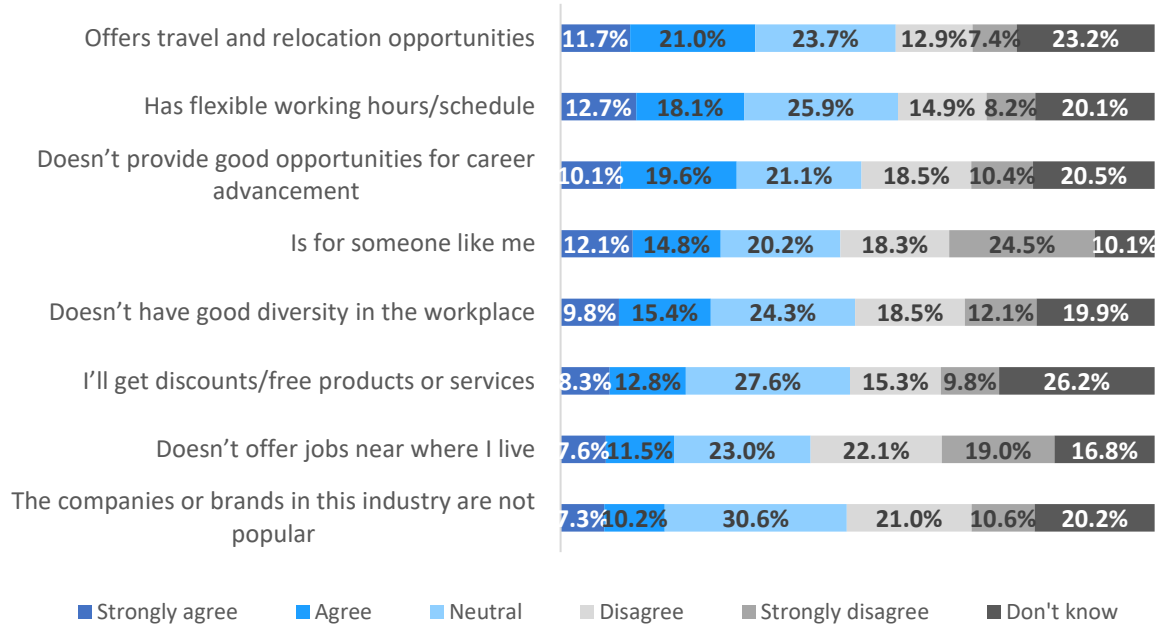


Figure 44. Perceptions of Energy Efficiency: Highest Agreement (n=550) – Potential Worker Survey

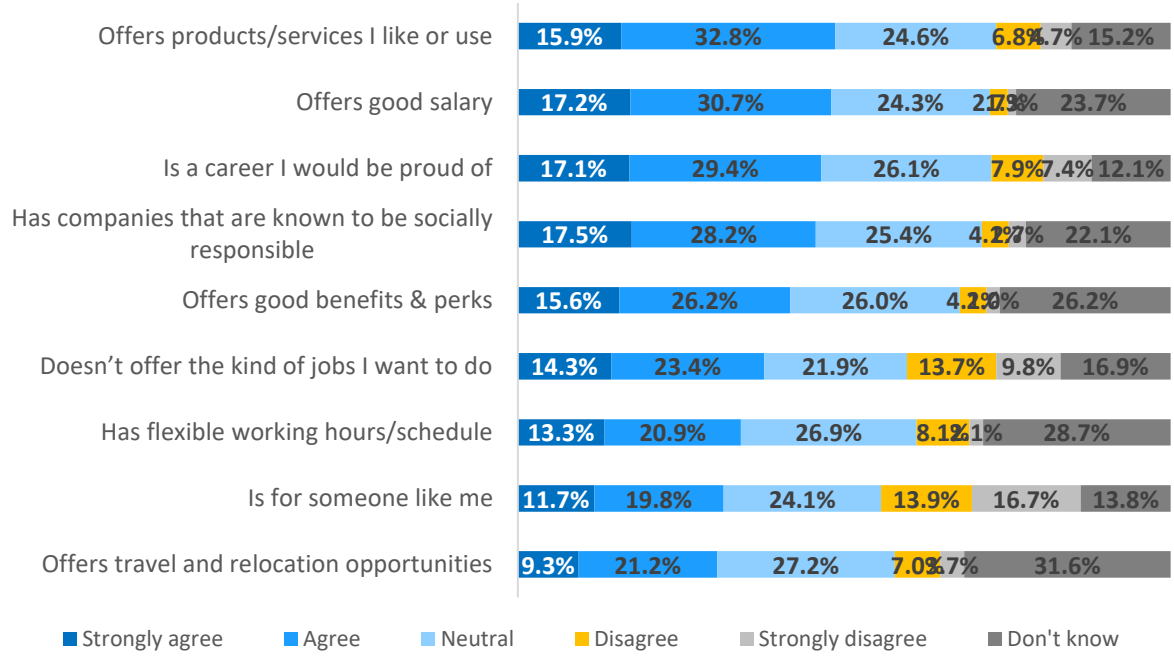
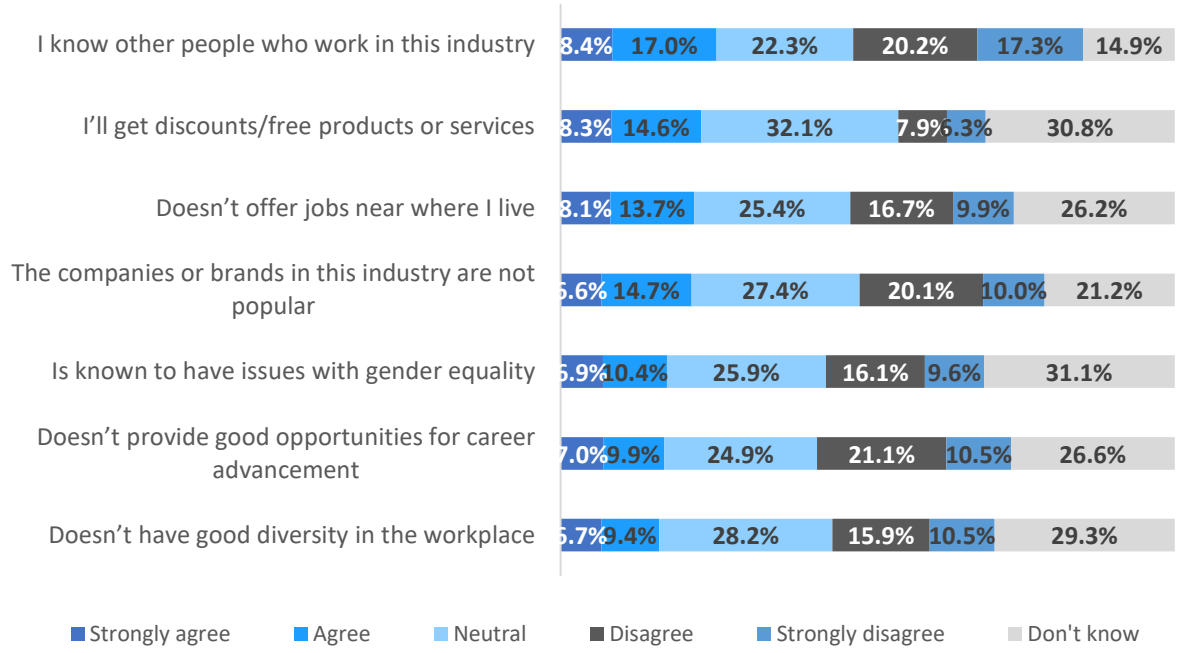


Figure 45. Perceptions of Energy Efficiency: Lowest Agreement (n=550) – Potential Worker Survey



CHAPTER 4:

Energy Efficiency Career Profiles

The following career profiles represent a subset of the original nine occupations that were surveyed for this report. The research team in conjunction with the PAs selected six final occupations to be included in the Career Profile deep dives; this decision was based on projected near-term demand and the need for focused workforce development support in these fields. Data and information for these profiles was pulled from a variety of sources, including public data from the Department of Labor, the United States Energy and Employment Report (USEER), energy efficiency employer and current worker surveys, and proprietary data sources such as Emsi. The occupations were assigned to the nearest corresponding Standard Occupational Classification Code (SOC).

Job descriptions, skills, and knowledge are compiled from O*NET OnLine, a resource managed by the US Department of Labor. Wages are based on existing Bureau of Labor Statistics' Quarterly Census of Employment and Wages and a wage survey connected with the United States Energy and Employment Report (USEER). Feeder and promotion occupations are also tied to responses from the USEER wage survey. The estimated wages are reflective of national wages in Quarter 3 of 2018. Benefits, experience, and education data are sourced directly from the current employer and employee surveys, while annual openings data was extrapolated using the employer survey and Emsi in December 2019. Common certifications are based on secondary literature review and employer responses from the survey.[64]

Information presented in the career profiles is based on the overall workforce, both full-and part-time workers[65] as well as commercial and residential workers.[66]

[64] Certifications were included if at least 20 percent of employer respondents identified them as valuable. Additional secondary literature review was conducted to supplement the employer-reported certifications.
[65] Data leans toward permanent, full-time employment as this represented 80 percent of survey respondents.
[66] Due to insufficient sample size, the research team was unable to identify statistically significant differences by commercial or residential workers in each occupation. Overall, energy efficiency workers operating in commercial buildings were more likely to have health insurance partially or fully covered by their employer than those operating in residential buildings (including single-family, low-income multifamily, and market-rate multifamily). Commercial building workers were also significantly more likely to receive retirement contributions from their employers. There were no significant differences between commercial and residential building workers in expected education or experience upon hiring, but commercial building employers were more likely to hire from outside their organization than residential employers.

ENERGY AUDITORS /
HERS Raters*

Energy Auditors identify opportunities to improve the operation, maintenance, or energy efficiency of building or process systems; identify and prioritize energy-saving measures; and analyze technical feasibility of energy-saving measures, using knowledge of engineering, energy production, energy use, construction, maintenance, system operation, or process systems.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$17.81	$30.36	$50.57**

KNOWLEDGE

Building and Construction
Customer and Personal Service
Mathematics
Engineering and Technology
Mechanical

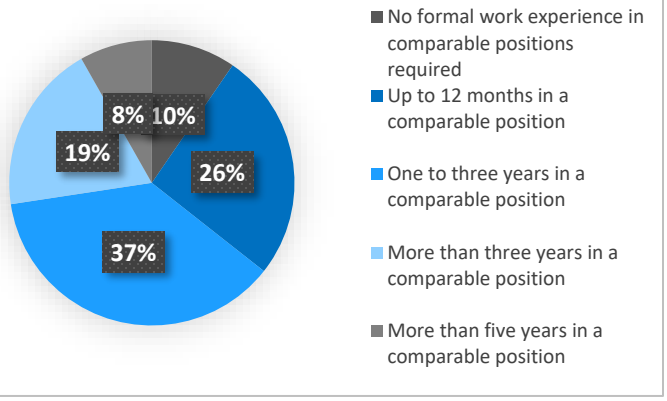
SKILLS

Active Listening
Reading Comprehension
Critical Thinking
Judgment and Decision Making
Speaking

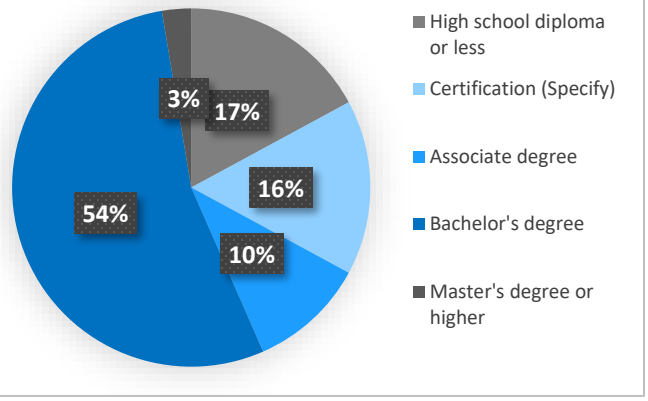
COMMON CERTIFICATIONS

RESNET HERS Rater
BPI Energy Auditor
OSHA 10 Hour
Certified Energy Manager

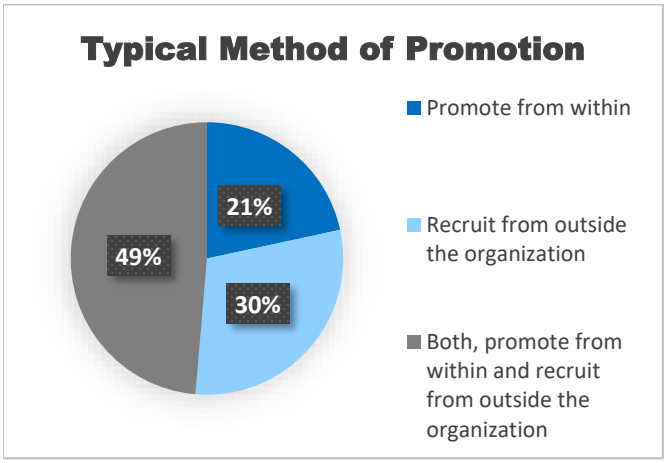
Required Level of Experience

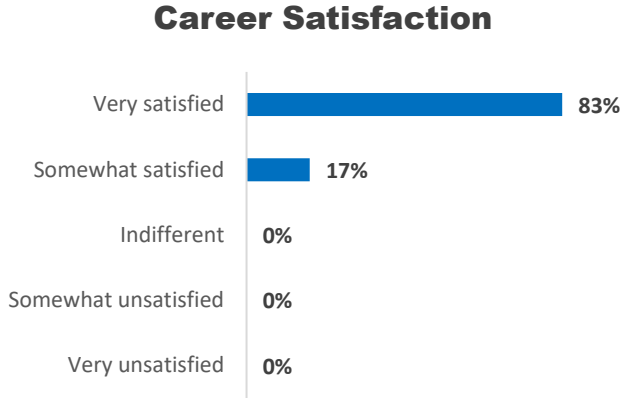


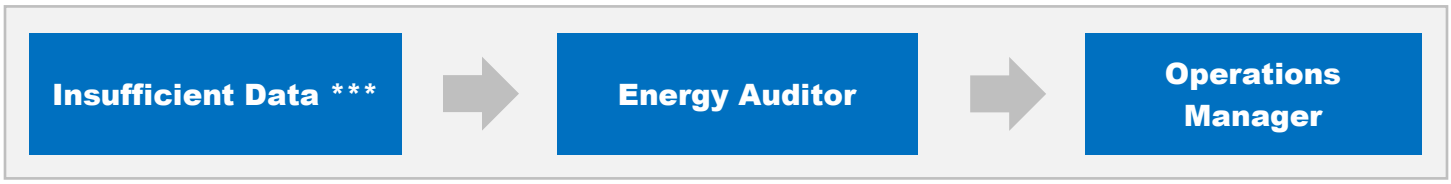
Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
79% Full Benefits 13% Partial Benefits 8% No Benefits	83% With Benefits 17% No Benefits	83% With Benefits 17% No Benefits







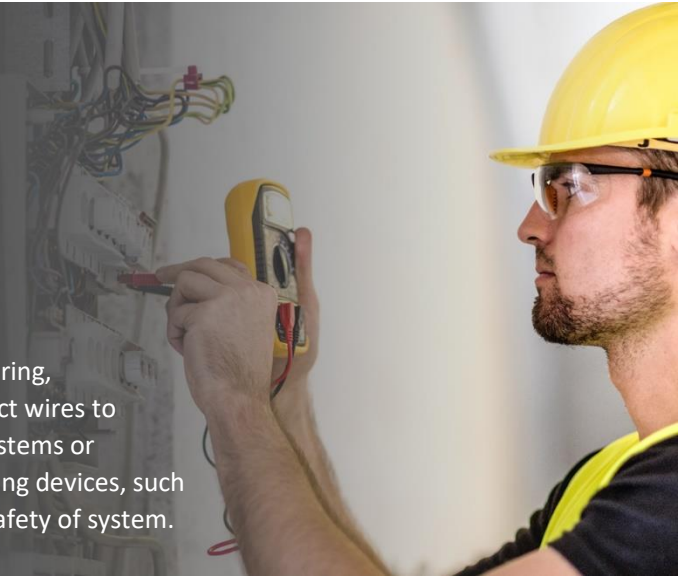
County	Annual Openings
Barnstable	1
Berkshire	1
Bristol	2
Dukes	0
Essex	3
Franklin	0
Hampden	2
Hampshire	0
Middlesex	12
Nantucket	0
Norfolk	3
Plymouth	3
Suffolk	5
Worcester	4

*SOC Code: 13-1199

**Energy Auditors do not have an exclusive SOC code and are most closely related to SOC 13-1199 (Business Operations Specialists, All Other). The high-level wage for this SOC is $61.89 according to O*NET. Because the wages for these profiles are extrapolated using a mix of public BLS and private USEER data sources, the high-level energy auditor wage may be slightly inflated compared to job posting data. Online job postings place the high-level wage for Energy Auditors between $28/hour and $41/hour.

***Though there was insufficient data to reach a consensus over a feeder occupation, current employees cited various fields in which they had worked prior to becoming an Energy Auditor – including electrical, construction, and HVAC.

ELECTRICAL CONTRACTORS / INSTALLERS



Electrical Contractors assemble plan layout and installation of electrical wiring, equipment, or fixtures, based on job specifications and local codes; connect wires to circuit breakers, transformers, or other components; and test electrical systems or continuity of circuits in electrical wiring, equipment, or fixtures, using testing devices, such as ohmmeters, voltmeters, or oscilloscopes, to ensure compatibility and safety of system.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$17.26	$26.67	$42.89

KNOWLEDGE

Building and Construction
Mechanical
Mathematics
Design
English Language

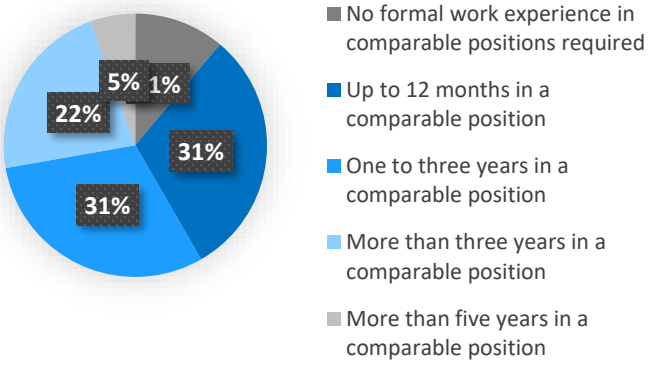
SKILLS

Troubleshooting
Repairing
Active Listening
Critical Thinking
Judgment and Decision Making

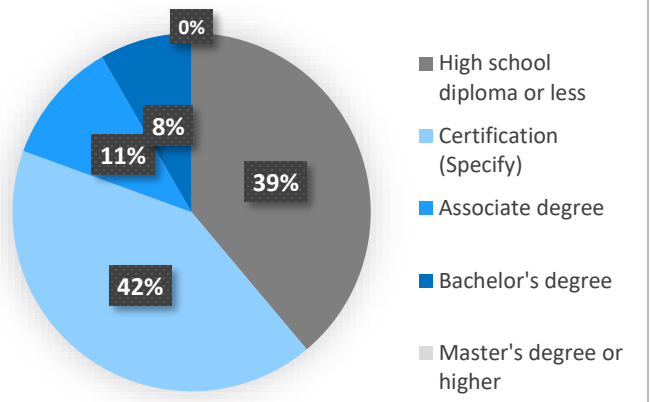
COMMON CERTIFICATIONS

Journeyman Electrician License
Master Electrician License
OSHA 10 Hour

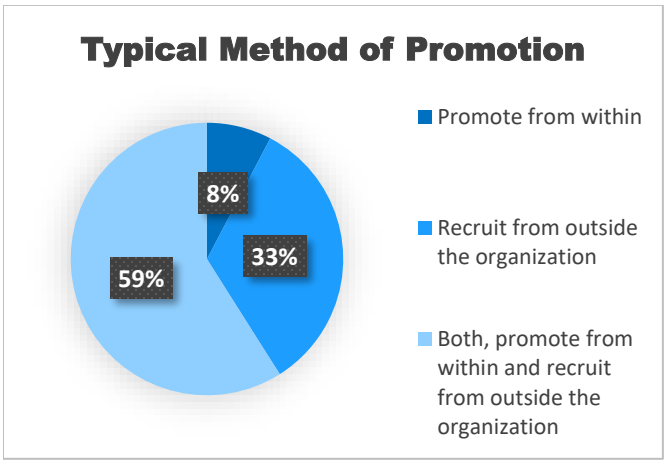
Required Level of Experience

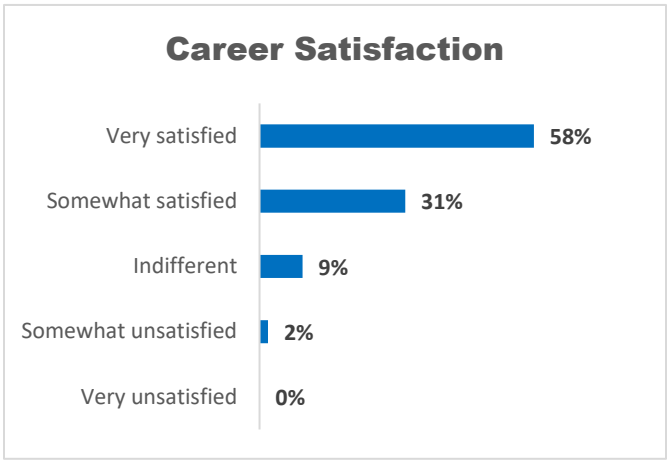


Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
58% Full Benefits 18% Partial Benefits 24% No Benefits	64% With Benefits 36% No Benefits	76% With Benefits 24% No Benefits





County	Annual Openings
Barnstable	19
Berkshire	18
Bristol	56
Dukes	3
Essex	69
Franklin	4
Hampden	48
Hampshire	9
Middlesex	280
Nantucket	4
Norfolk	126
Plymouth	86
Suffolk	79
Worcester	101

MECHANICAL CONTRACTORS*

Mechanical Contractors inspect, operate, or test machinery or equipment to diagnose machine malfunctions; dismantle machines, equipment, or devices to access and remove defective parts, using hoists, cranes, hand tools, or power tools; and perform routine maintenance, such as inspecting drives, motors, or belts, checking fluid levels, replacing filters, or doing other preventive maintenance actions.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$11.91	$18.04	$27.99

KNOWLEDGE

Mechanical
Building and Construction
Customer and Personal Service
Public Safety and Security
English Language

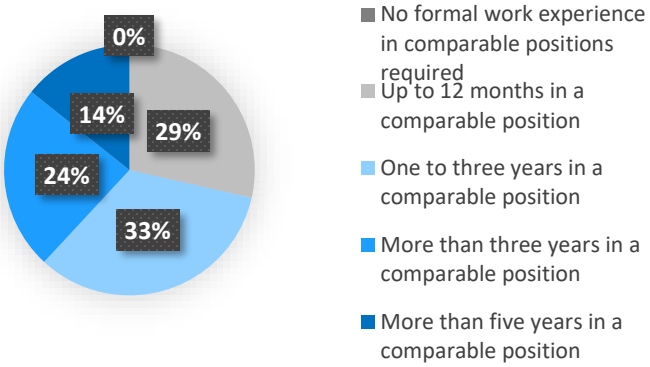
SKILLS

Equipment Maintenance
Repairing
Troubleshooting
Critical Thinking
Equipment Selection

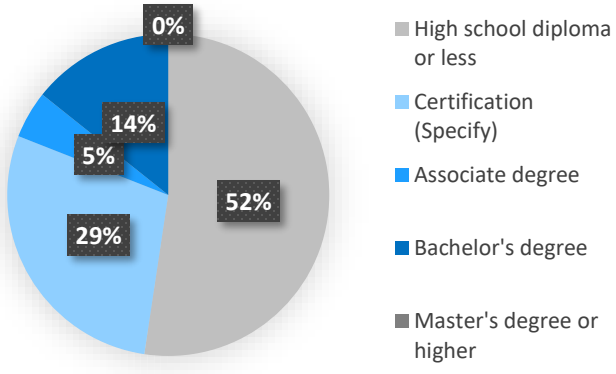
COMMON CERTIFICATIONS

OSHA 10 Hour
OSHA Confined Spaces Training

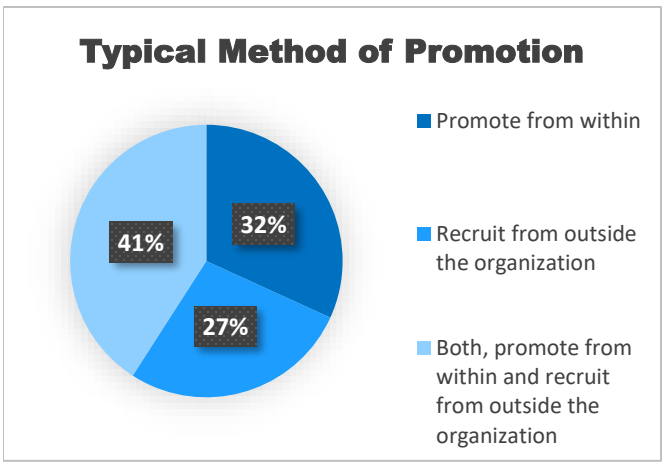
Required Level of Experience

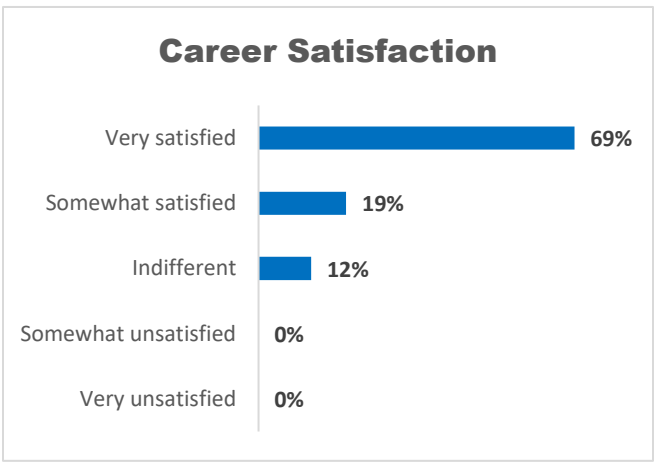


Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
61% Full Benefits 27% Partial Benefits 12% No Benefits	85% With Benefits 15% No Benefits	88% With Benefits 12% No Benefits





County	Annual Openings
Barnstable	1
Berkshire	1
Bristol	2
Dukes	0
Essex	3
Franklin	0
Hampden	2
Hampshire	0
Middlesex	7
Nantucket	0
Norfolk	3
Plymouth	2
Suffolk	3
Worcester	3

*SOC Code: 49-9071

**Though there was insufficient data to reach a consensus over a feeder occupation, Current Employees cited various industries in which they had worked prior to becoming a Mechanical Contractor – including electrical, construction, and HVAC.

INSULATION & WEATHERIZATION INSTALLERS / CONTRACTORS / TECHNICIANS

Insulation Workers measure and cut insulation for covering surfaces, using tape measures, handsaws, power saws, knives, or scissors; fit, wrap, staple, or glue insulating materials to structures or surfaces, using hand tools or wires; and cover and line structures with blown or rolled forms of materials to insulate against cold, heat, or moisture, using saws, knives, rasps, trowels, blowers, or other tools and implements.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$13.12	$18.60	$28.58

KNOWLEDGE

Building and Construction
Customer and Personal Service
Mechanical

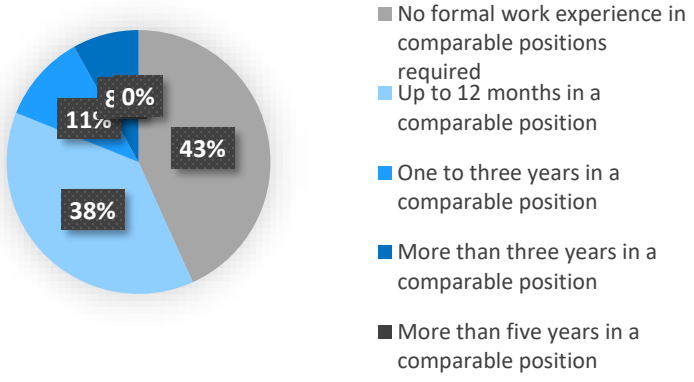
SKILLS

Active Listening
Critical Thinking
Operation and Control
Speaking

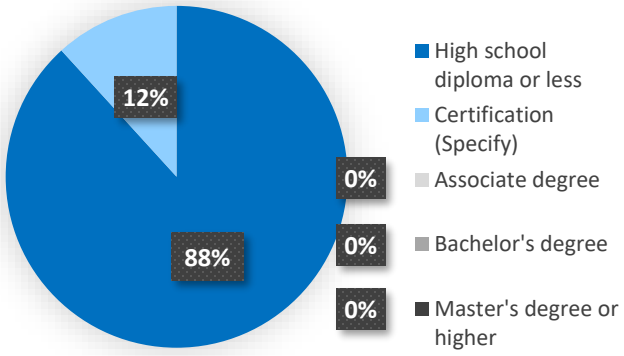
COMMON CERTIFICATIONS

Weatherization Crew Chief Certification
OSHA 10 Hour
OSHA Confined Spaces Training

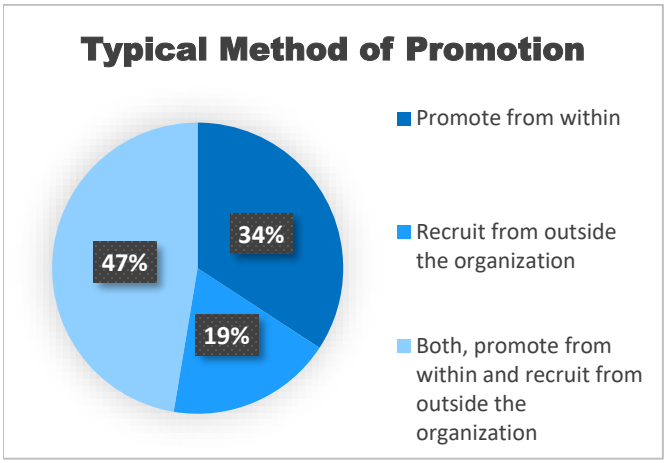
Required Level of Experience

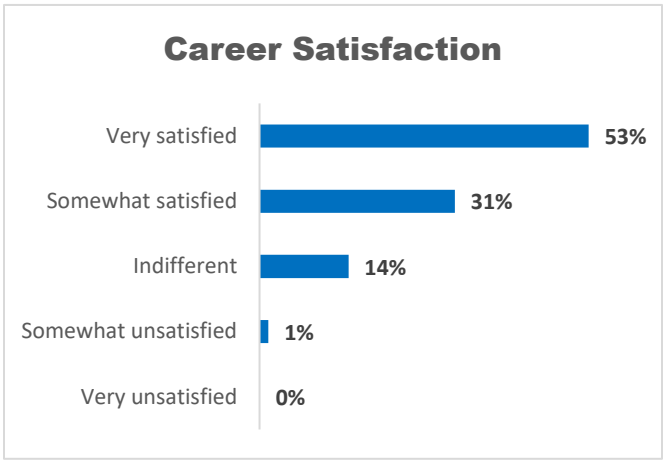


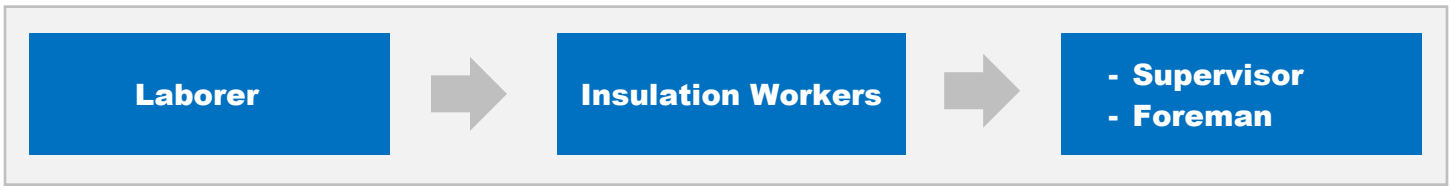
Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
39% Full Benefits	**54% With Benefits**	**60% With Benefits**
14% Partial Benefits	46% No Benefits	40% No Benefits
47% No Benefits		







County	Annual Openings
Barnstable	2
Berkshire	0
Bristol	10
Dukes	0
Essex	6
Franklin	0
Hampden	3
Hampshire	1
Middlesex	20
Nantucket	0
Norfolk	5
Plymouth	3
Suffolk	14
Worcester	4

HEATING, AIR CONDITIONING, HOT WATER and REFRIGERATION MECHANICS / CONTRACTORS / INSTALLERS

HVAC Mechanics test pipe or tubing joints or connections for leaks, using pressure gauge or soap-and-water solution; test electrical circuits or components for continuity, using electrical test equipment; and repair or replace defective equipment, components, or wiring.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$14.90	$22.42	$34.19

KNOWLEDGE

Mechanical
Customer and Personal Service
Building and Construction
Design
Physics

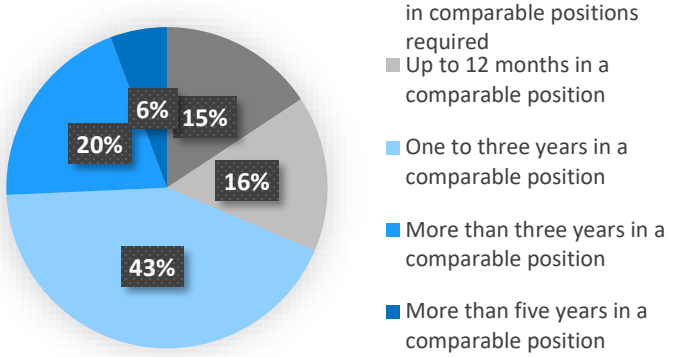
SKILLS

Equipment Maintenance
Installation
Quality Control Analysis
Troubleshooting
Operation Monitoring

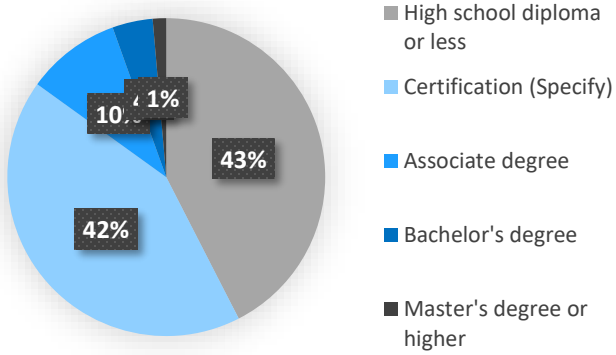
COMMON CERTIFICATIONS*

OSHA 10 Hour
Manual J
Manual S
Manual D

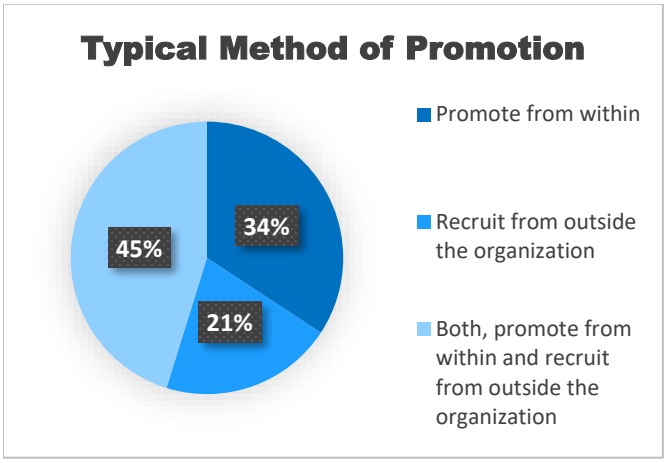
Required Level of Experience

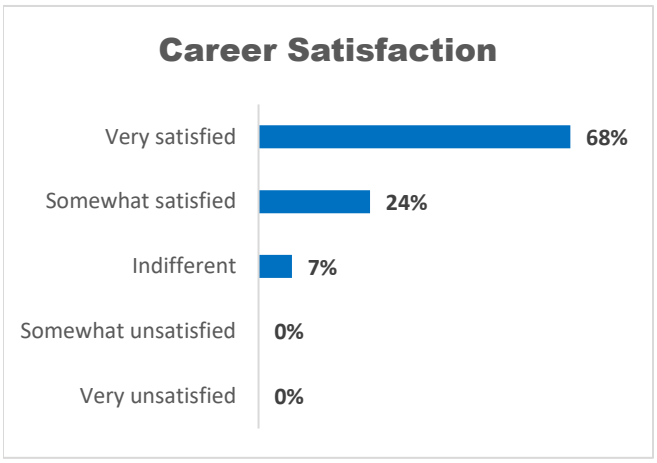


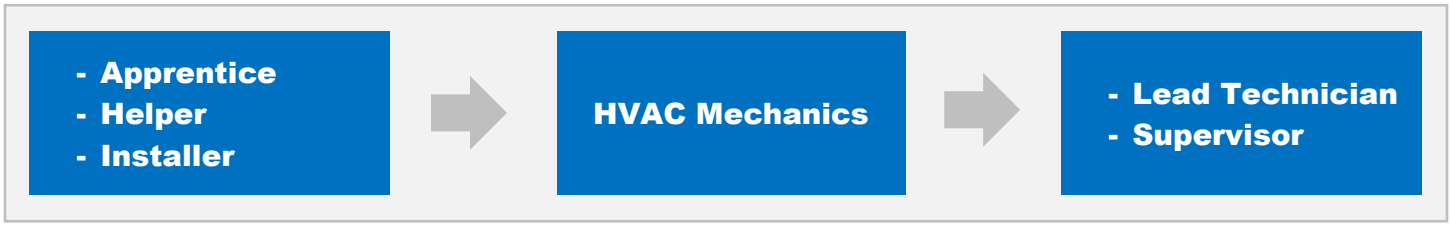
Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
51% Full Benefits 32% Partial Benefits 17% No Benefits	68% With Benefits 32% No Benefits	76% With Benefits 24% No Benefits







County	Annual Openings
Barnstable	13
Berkshire	5
Bristol	18
Dukes	2
Essex	30
Franklin	2
Hampden	18
Hampshire	4
Middlesex	88
Nantucket	2
Norfolk	51
Plymouth	36
Suffolk	12
Worcester	28

*Massachusetts does not require a specific license for general HVAC technicians and contractors, but the state does require licensing for specific job functions that technicians may be involved in depending on job requirements. These include the following: Refrigeration Technician License, EPA Section 608 Certification, Oil Burner Technician Certificate, and Sheet Metal Workers License.

PLUMBERS / PIPEFITTERS / STEAMFITTERS

Plumbers and Pipefitters cut, thread, or hammer pipes to specifications, using tools such as saws, cutting torches, pipe threaders, or pipe benders; lay out full scale drawings of pipe systems, supports, or related equipment, according to blueprints; and assemble or secure pipes, tubes, fittings, or related equipment, according to specifications, by welding, brazing, cementing, soldering, or threading joints.

ENTRY-LEVEL WAGE	MID-LEVEL WAGE	HIGH-LEVEL WAGE
$16.82	$26.06	$42.48

KNOWLEDGE

Mechanical
Building and Construction
Design
Mathematics
English Language

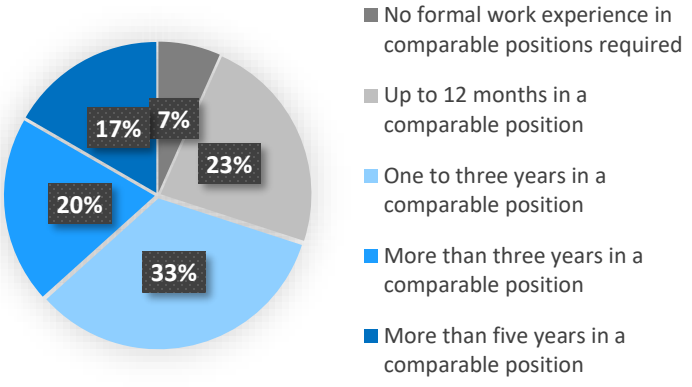
SKILLS

Active Listening
Critical Thinking
Reading Comprehension
Speaking
Time Management

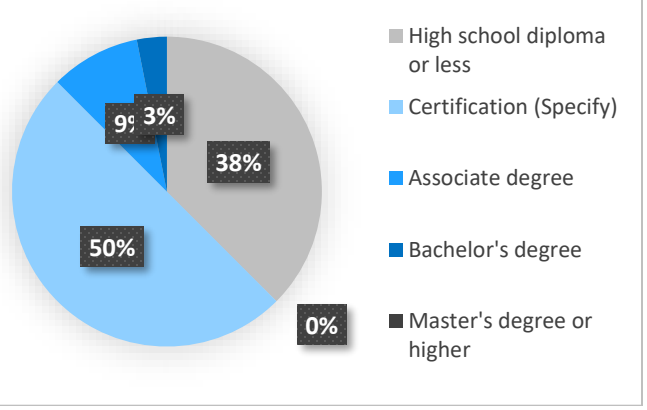
COMMON CERTIFICATIONS

OSHA 10 Hour
OSHA Confined Spaces Training
Plumbing License

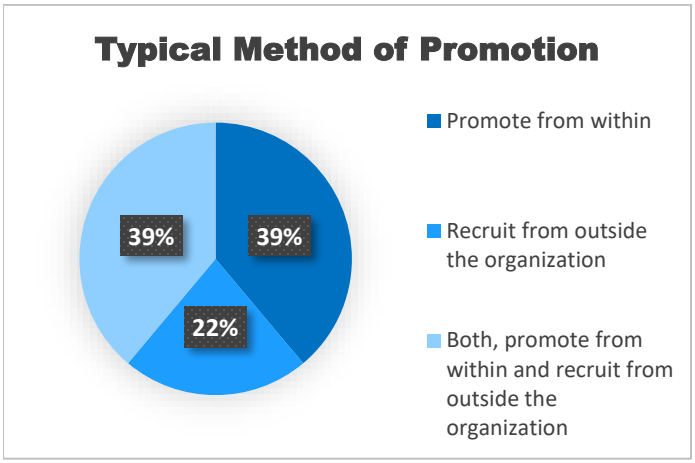
Required Level of Experience

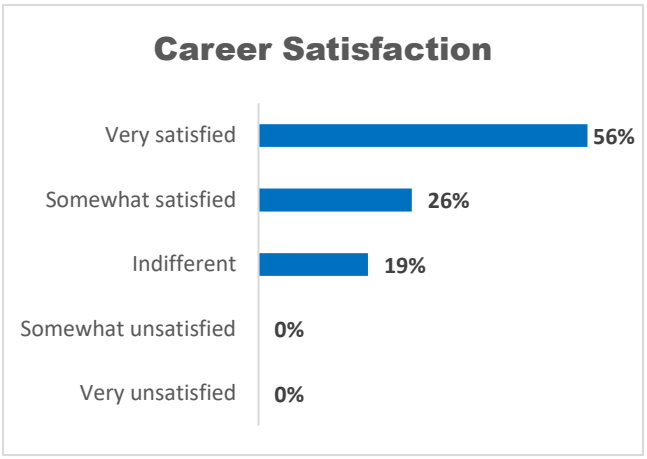


Required Level of Education



Healthcare Benefits	Retirement Benefits	Paid Vacation
37% Full Benefits 52% Partial Benefits 11% No Benefits	78% With Benefits 22% No Benefits	70% With Benefits 30% No Benefits





County	Annual Openings
Barnstable	45
Berkshire	18
Bristol	61
Dukes	7
Essex	105
Franklin	6
Hampden	61
Hampshire	13
Middlesex	305
Nantucket	6
Norfolk	172
Plymouth	123
Suffolk	50
Worcester	103

Appendix A: Training Inventory

The following table is an inventory of energy efficiency-related training programs across the state of Massachusetts. If additional programs should be added, please contact BW Research to update the database.[67]

TRAINING NAME	PROVIDER	OCCUPATIONAL FOCUS	LOCATION
OSHA 10 Hour	360 Training	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	360 Training	Energy Auditing, Mechanical, Weatherization, Plumbing	web
BPI Energy Auditing/Certification	Abode	Energy Auditing	Arlington
Heat Pump Training	Abode	HVAC	Arlington
Commercial Energy Auditor Training	Acela Energy	Energy Auditing	Norfolk
Light Commercial HVAC Design for Quality Installation	Air Conditioning Contractors of America	HVAC	web
Residential HVAC Design for Quality Installation	Air Conditioning Contractors of America	HVAC	web
AMP Auditor Refresher Training	All PAs, Action Inc.	Energy Auditing	Various
HVAC Design Training: Levels I and II	American Society of Heating, Refrigerating and Air-Conditioning Engineers	Engineering	Hartford
Building Energy Efficient Maintenance Skills (BEEMS)	Asian American Civic Association	Weatherization	Boston
Energy Efficiency Technician Apprenticeship Program (EETAP)	Asian American Civic Association	Energy auditing	Boston
Plumbing	Assabet Valley Adult Education	Plumbing	Marlborough
Plumbing	Assabet Valley Technical	Plumbing	Marlborough
HVAC	Assabet Valley Technical	HVAC	Marlborough
Electrical	Assabet Valley Technical	Electrical	Marlborough
OSHA 10 Hour	Associated General Contractors of MA	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Wellesley
Certified Energy Manager Online Training Program	Association of Energy Engineers	Energy Auditing	web
Certified Sustainable Development Professional Online Training Program	Association of Energy Engineers	Engineering	web

[67] It is important to note that all vocational technical high schools include OSHA 10 certifications in their curriculum. These trade-specific programs are listed in the database. To prevent double counting, these programs were not listed twice, as the OSHA 10 training is a built-in component of the curriculum. The additional number of OSHA 10 trainings from technical high school curriculums is called out in the body of the report in Chapter 3.

CEM Training Program	Association of Energy Engineers New England Chapter	Engineering	Canton
OSHA 10 Hour	ATC Associates	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	West Springfield
Plumbing	Attleboro High School	Plumbing	Attleboro
HVAC	Attleboro High School	HVAC	Attleboro
Electrical	Attleboro High School	Electrical	Attleboro
Appliance Installation and Repair Technology/Technician	Bay State School of Technology	Electrical	Canton
Electrical and Electronic Engineering Technologies/Technicians, Other	Bay State School of Technology	Electrical	Canton
Energy Management and Systems Technology/Technician	Bay State School of Technology	Engineering	Canton
Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Bay State School of Technology	HVAC	Canton
Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician	Bay State School of Technology	HVAC	Canton
Plumbing	Baypath High School	Plumbing	Charlton
Electrical	Baypath High School	Electrical	Charlton
HVAC	Baypath High School	HVAC	Charlton
Building and Property Management	Baypath High School		Charlton
Plumbing	Baypath Technical School	Plumbing	Charlton
Electrical and Electronics Engineering	Benjamin Franklin Institute of Technology	Engineering	Boston
Electrical, Electronic and Communications Engineering Technology/Technician	Benjamin Franklin Institute of Technology	Electrical	Boston
Electrician	Benjamin Franklin Institute of Technology	Electrical	Boston
Plumbing	Benjamin Franklin Institute of Technology	Plumbing	Boston
Electrical, Electronic and Communications Engineering Technology/Technician	Berkshire Community College	Electrical	Pittsfield
Energy Efficiency Science Course	Blackstone Valley Vocational Regional Training School District	Energy Auditing	Blackstone
Energy Efficiency Weatherization & Green Roofs	Blackstone Valley Vocational Regional Training School District	Weatherization	Blackstone
Photovoltaic Training Curriculum	Blackstone Valley Vocational Regional Training School District	Energy Auditing	Blackstone

Plumbing	Blackstone Valley Vocational Regional Training School District	Plumbing	Upton
Solar Thermal Train-the-Trainer	Blackstone Valley Vocational Regional Training School District	Weatherization	Blackstone
Electrical	Blackstone Valley Vocational Regional Training School District	Electrical	Upton
HVAC	Blackstone Valley Vocational Regional Training School District	HVAC	Upton
Electrical	Blue Hills Regional Technical School	Electrical	Canton
HVAC	Blue Hills Regional Technical School	HVAC	Canton
Environmental Science and Technology	Boston Green Academy	Engineering	Brighton
Architectural and Building Sciences/Technology	Boston University	Engineering	Boston
Electrical and Electronics Engineering (Bachelor's)	Boston University	Engineering	Boston
Electrical and Electronics Engineering (Master's)	Boston University	Engineering	Boston
OSHA 10 Hour	Boyle Construction Safety Services	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Melrose
Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Branford Hall Career Institute-Springfield Campus	HVAC	Springfield
Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician	Branford Hall Career Institute-Springfield Campus	HVAC	Springfield
Construction Engineering Technology/Technician	Bristol Community College	Engineering	Fall River
Electricians	Bristol Community College	Electrical	Fall River
Engineering Technology, Electrical Technology Career	Bristol Community College	Engineering	Falll River
Green Energy Design & Building Online Modules	Bristol Community College	Energy Auditing	Web
Hazardous Materials Management and Waste Technology/Technician	Bristol Community College	Engineering	Fall River
Solar Energy Technology/Technician	Bristol Community College	Energy Auditing	Fall River
Heating, Ventilation,Air Conditioning and Refrigeration (HVAC/R)-In-District	Bristol-Plymouth Regional Tech	HVAC	Taunton
Heating, Ventilation,Air Conditioning and Refrigeration (HVAC/R)-Out of District	Bristol-Plymouth Regional Tech	HVAC	Taunton
Plumbing	Bristol-Plymouth Regional Tech	Plumbing	Taunton

Electrical	Bristol-Plymouth Regional Tech	Electrical	Taunton
Plumbing	Bristol-Plymouth Technical School	Plumbing	Taunton
Building Pathways Pre-Apprenticeship Training Program	Building Pathways, Inc	Weatherization	Roxbury
SkillsBuild	Building Pathways, Inc	Weatherization	Roxbury
Electrical/Electronics Maintenance and Repair Technology, Other	Bunker Hill Community College	Electrical	Boston
Energy Management and Systems Technology/Technician	Bunker Hill Community College	Engineering, Energy Auditing	Boston
Heating Professional	Cape and Islands Self-Reliance Corporation	HVAC	North Falmouth, web
LEED® Green Associate v4™ Exam Prep	Cape and Islands Self-Reliance Corporation	HVAC	North Falmouth, web
Measuring Duct Leakage	Cape and Islands Self-Reliance Corporation	HVAC	North Falmouth, web
Construction Engineering Technology/Technician	Cape Cod Community College	Engineering	Barnstable
Environmental Control Technologies/Technicians, Other	Cape Cod Community College	Energy Auditing	Barnstable
Water Quality and Wastewater Treatment Management and Recycling Technology/Technician	Cape Cod Community College	Energy Auditing	Barnstable
Plumbing	Cape Cod Plumbing School	Plumbing	Hyannis, web
Electrical	Cape Cod Technical High School	Electrical	Harwich
HVAC	Cape Cod Technical High School	HVAC	Harwich
Plumbing	Cape Cod Technical High School	Plumbing	Harwich
HVAC Contractor Mtg on Res, LI, and C&I HVAC Programs	Cape Light Compact	HVAC	Yarmouth
Building an Airtight House Workshop	Center for EcoTechnology	Weatherization	web
IECC Overview Workshop	Center for EcoTechnology	Weatherization	web
Plumbing	Central Mass Technical School	Plumbing	Auburn
ELECTRICAL LICENSURE	Chicopee Comprehensive High School	Electrical	Chicopee
Plumbing	Chicopee Comprehensive High School	Plumbing	Chicopee
HVAC Contractor Mtg on Res, LI and C&I HVAC Programs	CLC staff	HVAC	N/A
BPI Energy Auditing/Certification	CLEAResult	Energy Auditing	Westborough
Wx Boot Camp	CLEAResult	Weatherization	Westborough
Wx Crew Chief Training	CLEAResult	Weatherization	Westborough
OSHA 10 Hour	Click Safety	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web

Plumbing	Coastal Career Academy	Plumbing	Fall River
Heavy Construction Academy	Construction Training LLC	Weatherization	Brentwood NH
OSHA 10 Hour	Contractors Risk Management	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Concord, NH
Plumbing	Diman High School	Plumbing	Fall River
Electrical	Diman High School	Electrical	Fall River
HVAC	Diman High School	HVAC	Fall River
Plumbing	Diman Technical School	Plumbing	Fall River
Electrical and Electronics Engineering	Eastern Nazarene College	Electrical	Quincy
OSHA 10 Hour	Easy OSHA Training	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	Easy OSHA Training	Energy Auditing, Mechanical, Weatherization, Plumbing	web
LEED Prep: LEED Green Associate	EcoRise	HVAC, Energy Auditing	Web
RESNET HERS Rater Training	Energy Raters of Massachusetts	Energy Auditing	Amesbury
Plumbing	Essex North Shore Agricultural School	Plumbing	Hathorne
BPI Certification	Everblue	Energy Auditing	Various
BPI Building Analyst and IDL Blended	Everblue	Energy Auditing	web
BPI Building Analyst Blended	Everblue	Energy Auditing	web, Mansfield
BPI Building Analyst, Envelope Professional and IDL Blended	Everblue	Energy Auditing	web
BPI Envelope Professional Blended	Everblue	Energy Auditing	web
LEED Green Associate Exam Prep	Everblue	Energy Auditing	web
Architectural Technology/Technician	Fitchburg State University	Architecture	Fitchburg
Electrical and Electronics Engineering	Fitchburg State University	Engineering	Fitchburg
Plumbing	Franklin County Technical	Plumbing	Turners Falls
Electrical	Franklin County Technical	Electrical	Turners Falls
Electrical and Electronics Engineering	Franklin W Olin College of Engineering	Electrical	Needham
Electrical	Gloucester High School	Electrical	Gloucester
OSHA 10 Hour	Gould Construction Institute	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Andover, Canton, Chatham, Franklin, Holyoke, Medford, North Adams, Plymouth, Springfield, Taunton, Westfield
OSHA Confined Space	Gould Construction Institute	Energy Auditing, Mechanical, Weatherization, Plumbing	Andover, Canton, Chatham, Franklin, Holyoke, Medford,

			North Adams, Plymouth, Springfield, Taunton, Westfield
Plumbing	Gould Construction Institute	Plumbing	Andover, North Adams, Northampton
Electricians	Greater Boston Joint Apprentice Training Center	Electrical	Boston, Brockton, Springfield, Worcester
Plumbing	Greater Lawrence High School	Plumbing	Andover
Electrical	Greater Lawrence High School	Electrical	Andover
HVAC	Greater Lawrence High School	HVAC	Andover
Plumbing	Greater Lowell Technical	Plumbing	Tyngsboro
Electrical	Greater Lowell Technical	Electrical	Tyngsboro
HVAC	Greater Lowell Technical	HVAC	Tyngsboro
Freshman HVAC Solar Thermal Curriculum	Greater New Bedford Vocational Technical High School	HVAC	New Bedford
Plumbing	Greater New Bedford Vocational Technical High School	Plumbing	New Bedford
Senior HVAC Solar Thermal Curriculum	Greater New Bedford Vocational Technical High School	HVAC	New Bedford
Electrical	Greater New Bedford Vocational Technical High School	Electrical	New Bedford
IREC Accreditation	Green Jobs Academy	N/A	Various
Wx Installer Training	Green Jobs Academy	Weatherization	Worcester, Web
Wx Crew Chief	Green Jobs Academy	Weatherization	Worcester, Web
Duct Sealing & Insulation	Green Jobs Academy	Weatherization	Worcester, Web
ASHRAE 62.2 Training	Green Jobs Academy	Energy Auditing	web
BPI Energy Auditing	Green Jobs Academy	Energy Auditing	Framingham
Environmental Control Technologies/Technicians, Other	Green Jobs Academy	Weatherization	web
OSHA 10 Hour	Green Jobs Academy	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Worcester
Quality Control Inspector	Green Jobs Academy	Architecture	web
BPI Energy Auditing	Green Training USA, LLC	Energy Auditing	web
Weatherization Crew Chief	Green Training USA, LLC	Weatherization	web
Plumbing	Greenfield Community College	Plumbing	Greenfield
Renewable Energy/Energy Efficiency Certificate	Greenfield Community College	Energy Auditing	Greenfield
Plumbing	Harold Brothers Training Institute, LLC	Plumbing	Weymouth

Electrical and Electronics Engineering	Harvard University	Electrical	Boston
Electrical and Electronics Engineering	Harvard University	Architecture	Boston
BPI Building Analyst	Heyoka Solutions	Energy Auditing	Falmouth
Clean Energy Certificate Program	Holyoke Community College	HVAC	Holyoke
Plumbing Technology/Plumber	Holyoke Community College	Energy Auditing	Holyoke
Energy Upgrade Work Parties	Home Energy Efficiency Team (HEET)	Energy Auditing	Cambridge
Manual-J "Fundamentals" Online Anytime training	Home Energy Partners	HVAC	web
BPI Certification	HomeWorks Energy	Energy Auditing	Various
North American Technician Excellence (NATE) Certified Technician Program	HVACRedu	Energy Auditing	web
Massachusetts Online CE Session 10 - Plumbers	IAPMO	Plumbing	web
Massachusetts Online CE Session 11 - Plumbers	IAPMO	Plumbing	Boston, Dedham, Hyannis, Leicester, Stoughton, Swansea, Wakefield, Yarmouth, web
Massachusetts Online CE Session 12 - Plumbers	IAPMO	Plumbing	Attleboro, Boston, Chicopee, Dedham, Deerfield, Eastham, Gardner, Hyannis, Leicester, Leominster, Marlborough, South Hadley, New Bedford, Plymouth, Sandwich, Stoughton, Swansea, Tewksbury, Wakefield, Wellesley, Yarmouth
Massachusetts Online CE Session 5 - Plumbers	IAPMO	Plumbing	web
Massachusetts Online CE Session 6 – Plumbers	IAPMO	Plumbing	web
Massachusetts Online CE Session 7 – Plumbers	IAPMO	Plumbing	web
Massachusetts Online CE Session 8 - Plumbers	IAPMO	Plumbing	web
Massachusetts Online CE Session 9 - Plumbers	IAPMO	Plumbing	web
Passive House Certification	ICF/Passive House MA	Architecture	Boston, Newton, Westwood, Cambridge
Asbestos courses	Institute for Environmental Education	Weatherization	web
OSHA 10 Hour	Institute for Environmental Education	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Wilmington
OSHA 10 Hour	Integrated House Wrights, LLC	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Wareham

Engineering Pathways	John D. O'Bryant School of Mathematics and Science	Engineering	Boston
BUILDING AUTOMATION SYSTEMS COURSES	Johnson Controls	Mechanical	Boston
HVAC INDUSTRY COURSES	Johnson Controls	HVAC	web
Instructor Led Distance Learning & eLearning Courses	Johnson Controls	HVAC	web
Plumbing	Keefe Technical School	Plumbing	Framingham
Electrical	Keefe Technical School	Electrical	Framingham
Asbestos Contractor/Supervisor Initial Training	Lawrence Training School, Inc.	Weatherization	Lawrence
Asbestos Safety Supervisor	Lawrence Training School, Inc.	Weatherization	Lawrence
Asbestos Safety Worker	Lawrence Training School, Inc.	Weatherization	Lawrence
Deleading Safety Worker	Lawrence Training School, Inc.	Weatherization	Lawrence
OSHA 10 Hour	Lawrence Training School, Inc.	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Lawrence
OSHA 10 Hour Training	Lawrence Training School, Inc.	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Lawrence
OSHA 10 Hour	Lead Smart Training Solutions	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	Lead Smart Training Solutions	Energy Auditing, Mechanical, Weatherization, Plumbing	web
Plumbing	Leominster Technical High	Plumbing	Leominster
HVAC	Leominster Technical High	HVAC	Leominster
Electrical	Leominster Technical High	Electrical	Leominster
Plumbing	Local 12 Training Center	Plumbing	Boston
Building and Property Management	Lower Pioneer Valley Cateer Technical Education Center		West Springfield
Plumbing	Lynn High School School	Plumbing	Lynn
Plumbing	Lynn Technical School	Plumbing	Lynn
Electrical Certification Program	Madison Park High School	Electrical	Boston
Facilities Management Certification Program	Madison Park High School	Mechanical	Boston
Plumbing Certification Program	Madison Park High School	Plumbing	Boston
Carpentry and Building Trades	Martha's Vineyard Regional High School	Architecture	Martha's Vineyard
Electricians	Martin Electrical and Technical School	Electrical	Norwood
Electrical, Electronic and Communications Engineering Technology/Technician	Massachusetts Bay Community College	Engineering	Wellesley

Electricians	Massachusetts Electrical Contractors Association	Electrical	Brockton
Electricians	Massachusetts Electrical Contractors Association	Electrical	Brockton
Architectural and Building Sciences/Technology (Bachelor's)	Massachusetts Institute of Technology	Engineering	Cambridge
Architectural and Building Sciences/Technology (Master's)	Massachusetts Institute of Technology	Engineering	Cambridge
Clean Energy Certificate Programs	Massachusetts Institute of Technology	Engineering	Cambridge
Electrical and Electronics Engineering	Massachusetts Institute of Technology	Architecture	Cambridge
Energy Systems	Massachusetts Institute of Technology	Architecture	Cambridge
Energy Systems Engineering	Massachusetts Maritime Academy	Engineering	Bourne
Facilities Engineering	Massachusetts Maritime Academy	Engineering	Bourne
Electrical, Electronic and Communications Engineering Technology/Technician	Massasoit Community College	Engineering	Brockton
Engineering Transfer - Chemical	Massasoit Community College	Engineering	Brockton
Engineering Transfer - Civil	Massasoit Community College	Engineering	Brockton
Engineering Transfer - Electrical	Massasoit Community College	Engineering	Brockton
Engineering Transfer - Mechanical	Massasoit Community College	Engineering	Brockton
Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Massasoit Community College	HVAC	Brockton
Electricians	MassBay Community College	Electrical	Wellesley
Plumbing	Masters Plumbing School	Plumbing	Hyannis, web, Weymouth
Electrical	McCann Technical School	Electrical	North Adams
Electrical and Electronics Engineering (Bachelor's)	Merrimack College	Engineering	North Andover
Electrical and Electronics Engineering (Master's)	Merrimack College	Engineering	North Andover
Basic Energy Auditing	Middlesex Community College	Energy Auditing	Bedford
Certified Indoor Environmentalist Prep	Middlesex Community College	Energy Auditing	Bedford
Electrical, Electronic and Communications Engineering Technology/Technician	Middlesex Community College	Engineering	Bedford
Energy Management and Systems Technology/Technician	Middlesex Community College	Energy Auditing, Engineering	Bedford
Plumbing	Minuteman High School School	Plumbing	Lexington

Electrical	Minuteman High School School	Electrical	Lexington
Plumbing	Minuteman Technical School	Plumbing	Lexington
CITY MULTI Courses	Mitsubishi Electric	HVAC	Cambridge, Southborough
Control Courses	Mitsubishi Electric	HVAC	Cambridge, Southborough
M- & P-Series Courses	Mitsubishi Electric	HVAC	Cambridge, Southborough
Plumbing	Montachusett High School	Plumbing	Fitchburg
Electrical	Montachusett Regional Vocational Technical School	Electrical	Fitchburg
Plumbing	Montachusett Technical School	Plumbing	Fitchburg
Building/Property Maintenance	MotoRing Technical Training Institute	Mechanical	Seekonk
Building/Property Trades	MotoRing Technical Training Institute	Electrical	Seekonk
Electrical, Electronic and Communications Engineering Technology/Technician	MotoRing Technical Training Institute	Mechanical	Seekonk
HVAC/R Technician	MotoRing Technical Training Institute	HVAC	Seekonk
Residential and Commercial Electrician	MotoRing Technical Training Institute	HVAC	Seekonk
Energy Management and Systems Technology/Technician	Mount Wachusett Community College	HVAC	Gardner
Plumbing	Nashoba Valley High School	Plumbing	Westford
Electrical	Nashoba Valley High School	Electrical	Westford
Plumbing	Nashoba Valley Technical School	Plumbing	Westford
Project Expeditors Training	National Grid	Energy Auditing	Worcester
HVAC Day Class Full Time	New England Institute of HVAC	HVAC	North Andover
HVAC Night Class	New England Institute of HVAC	HVAC	North Andover
HVAC	New England Tractor Trailer Training School of Massachusetts	HVAC	North Andover
Building/Home/Construction Inspection/Inspector	North Bennet Street School	Weatherization	Boston
HVACR 103 (HVACR & Facility Maintenance Program)	North Bennet Street School	Energy Auditing	Boston
Energy Management and Systems Technology/Technician	North Shore Community College	Engineering	Lynn, Danvers, Middletown
Lineworker	North Shore Community College	Electrical	Lynn, Danvers, Middletown
RESNET Hybrid HERS Rater Training	Northeast Home Energy Rating System Alliance	Energy Auditing	Springfield
Plumbing	Northeast Metro High School	Plumbing	Wakefield

Plumbing	Northeast Metro Technical School	Plumbing	Wakefield
HVAC	Northeast Metropolitan Regional Vocational School	HVAC	Wakefield
Plumbing	Northeast Metropolitan Regional Vocational School	Plumbing	Wakefield
Electrical	Northeast Metropolitan Regional Vocational School	Electrical	Wakefield
Electrical and Electronics Engineering (Bachelor's)	Northeastern University	Engineering	Boston
Electrical and Electronics Engineering (Doctor's)	Northeastern University	Engineering	Boston
Electrical and Electronics Engineering (Master's)	Northeastern University	Engineering	Boston
Electrical, Electronic and Communications Engineering Technology/Technician	Northeastern University	Engineering	Boston
Carpentry/Carpenter	Northern Essex Community College	Weatherization	Haverhill
Electrical and Electronic Engineering Technologies/Technicians, Other	Northern Essex Community College	Engineering	Haverhill
Electrical, Electronic and Communications Engineering Technology/Technician	Northern Essex Community College	Engineering	Haverhill
Weatherization Installer boot camp	Northern Essex Community College	Weatherization	Haverhill
Building Operator Certification (BOC)	Northwest Energy Efficiency Council	HVAC, Energy Auditing	Various
Roots Up Training Program	Nuestras Raices & Co-Op Power	Engineering	Holyoke
OSHA 10 Hour	OSHA Education Center	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	OSHA Education Center	Energy Auditing, Mechanical, Weatherization, Plumbing	web
OSHA 10 Hour	OSHA Outreach Training	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	OSHA Training USA	Energy Auditing, Mechanical, Weatherization, Plumbing	Woburn, Fitchburg
OSHA 10 Hour	OSHA.com	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	OSHA.com	Energy Auditing, Mechanical, Weatherization, Plumbing	web
OSHA 10 Hour	OSHACampusOnline.com	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA 10 Hour	OSHAtraining.com	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	OSHAtraining.com	Energy Auditing, Mechanical, Weatherization, Plumbing	web
Combustion Safety Training	Pathfinder Regional Tech High School	Electrical	Palmer

Electrical	Pathfinder Regional Tech High School	HVAC	Palmer
Plumbing	Pathfinder Regional Tech High School	Plumbing	Palmer
Plumbing	Plumbers & Pipefitters Local 104	Plumbing	Chicopee
Plumbing	Plymouth South High School	Plumbing	Plymouth
Green Engineering Concentration	Porter and Chester Institute	HVAC	Worcester
HVAC/R	Porter and Chester Institute	HVAC	Canton, Chicopee, Westborough, Woburn
Plumbing	Propane Gas Association of NE	Plumbing	East Freetown, Essex, Lee
HVAC	Putnam Vocational Technical Academy	HVAC	Springfield
Electrical	Putnam Vocational Technical Academy	Electrical	Springfield
Management Certification for Manufacturing Professionals Customized	Quality & Productivity Solutions, Inc.	Mechanical	Marlborough
Engineering Technology	Quincy College	Engineering	Quincy
SITRAIN Digital Industry Academy	Quincy College	Engineering	Quincy
Plumbing	Quincy High School	Plumbing	Quincy
Electrical, Electronic and Communications Engineering Technology/Technician	Quinsigamond Community College	Engineering	Worcester
Electromechanical Technology/Electromechanical Engineering Technology	Quinsigamond Community College	Engineering	Worcester
Energy Management and Systems Technology/Technician	Quinsigamond Community College	Engineering	Worcester
Heating, Ventilation and Air Conditioning Certificate	Quinsigamond Community College	HVAC	Worcester
Lighting Distributor Event	RAB Manufacturing	Electrical	Various
BPI Certification	RISE	Energy Auditing	Various
Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Rocky Mountain Institute	Architecture	Roxbury, Boston, Dorchester
Environmental Control Technologies/Technicians, Other	Roxbury Community College	Weatherization	Roxbury
Building Operators Certification	Roxbury Community College	HVAC, Energy Auditing	Roxbury
OSHA 10 Hour	Safety Council of Western New England	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Springfield
OSHA 10 Hour	Safety Equipped, Inc.	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
OSHA Confined Space	Safety Equipped, Inc.	Energy Auditing, Mechanical, Weatherization, Plumbing	web

OSHA 10 Hour	SafetyResources	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	web
Electrical	Salem High School	Electrical	Salem
Building and Property Management	Salem High School		Salem
REALIZE BOSTON CONTRACTOR ACADEMY	Schneider Electric Energy University	HVAC	Foxboro
Plumbing	Shawsheen High School	Plumbing	Billerica
Electrical	Shawsheen High School	Electrical	Billerica
HVAC	Shawsheen High School	HVAC	Billerica
BPI Building Analyst	Siemens	Energy Auditing	web
Lighting Distributor Event	Signify Manufacturing	Electrical	Various
Plumbing	Smith High School	Plumbing	Northampton
Electrical	Smith High School	Electrical	Northampton
Plumbing	Smith Technical School	Plumbing	Northampton
Electrical	Somerville High School	Electrical	Somerville
Electrical	South Shore Technical High School	Electrical	Hanover
HVAC	South Shore Technical High School	HVAC	Hanover
Plumbing	Southeastern Reg. High School	Plumbing	South Easton
Electrical	Southeastern Regional Vocational Technical High School	Electrical	South Easton
HVAC	Southeastern Regional Vocational Technical High School	HVAC	South Easton
Electrician	Southeastern Technical Institute	Plumbing	South Easton
Electromechanical Technology/Electromechanical Engineering Technology	Southeastern Technical Institute	Electrical	South Easton
HVAC-R	Southeastern Technical Institute	HVAC	South Easton
Architectural and Building Sciences/Technology	Springfield Technical Community College	Architecture	Springfield
Building Construction Management Certificate	Springfield Technical Community College	Weatherization	Springfield
Building/Construction Finishing, Management, and Inspection, Other	Springfield Technical Community College	Weatherization	Springfield
Certificate of Completion in Heating/Ventilation/Air Conditioning	Springfield Technical Community College	HVAC	Springfield
Certified Indoor Environmentalist Prep	Springfield Technical Community College	HVAC	Springfield

Electrical Engineering Technology	Springfield Technical Community College	Engineering	Springfield
Electrical, Electronic and Communications Engineering Technology/Technician	Springfield Technical Community College	Engineering	Springfield
Electricians	Springfield Technical Community College	Electrical	Springfield
Electromechanical Technology/Electromechanical Engineering Technology	Springfield Technical Community College	Engineering	Springfield
Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Springfield Technical Community College	HVAC	Springfield
Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician	Springfield Technical Community College	HVAC	Springfield
Ultra-Low Temp Freezer Service	Stirling Ultracold	HVAC	Various
Electrical	Tantasqua Regional Vocational High School	Electrical	Fiskdale
Career Industrial, Commercial, and Residential Electrician	Technology Learning Center Inc.	HVAC	Oxford
HVACR Technician Program (Includes Oil & Gas Heating, AC &Commercial Refrigeration)	Technology Learning Center Inc.	HVAC	Oxford
OSHA 10 Hour	The New England Consortium	Energy Auditing, Electrical, Mechanical, Weatherization, HVAC, Plumbing	Lowell
OSHA Confined Space	The New England Consortium	Energy Auditing, Mechanical, Weatherization, Plumbing	Lowell
3 COMBO ''A'' (HVACR REFRIGERATION, OIL+GAS HEAT)	The Peterson School	HVAC	Woburn, Westwood, Worcester
Basic Electricity	The Peterson School	Electrical	Woburn, Westwood, Worcester
Construction Supervisor License Prep	The Peterson School	Weatherization	Woburn, Westwood, Worcester
HVAC Commercial & Industrial Refrigeration	The Peterson School	HVAC	Woburn, Westwood, Worcester
HVAC Refrigeration, Oil Heat, Basic Electricity - Three Combo ''b''	The Peterson School	HVAC	Woburn, Westwood, Worcester
Plumbing	The Peterson School	Plumbing	Westwood, Woburn
Plumbing	The Plumbing Academy	Plumbing	web
Plumbing	Tri-County High School	Plumbing	Franklin
Electrical	Tri-County High School	Electrical	Franklin
HVAC	Tri-County High School	HVAC	Franklin
Electrical and Electronics Engineering	Tufts University	Engineering	Medford/Somerville
Electrical, Electronic and Communications Engineering Technology/Technician	Tufts University	Engineering	Medford/Somerville

Environmental Control Technologies/Technicians, Other	Tufts University	Engineering	Medford/Somerville
MA Energy Efficiency Partnership	University of Massachusetts-Amherst	N/A	Amherst
Architectural and Building Sciences/Technology	University of Massachusetts-Amherst	Architecture	Amherst
Architectural and Building Sciences/Technology	University of Massachusetts-Amherst	Architecture	Amherst
Electrical and Electronics Engineering	University of Massachusetts-Amherst	Engineering	Amherst
Lighting Distributor Event - trainings on controls, exterior lighting	University of Massachusetts-Amherst	Electrical	N/A
NETTTS HVAC-R Technical Training	University of Massachusetts-Amherst	HVAC	Amherst
Workforce Training and Development for the Journeyman Electrician License	University of Massachusetts-Amherst	Electrical	Amherst
Electrical and Electronics Engineering	University of Massachusetts-Boston	Engineering	Boston
Electrical and Electronics Engineering (Bachelor's)	University of Massachusetts-Dartmouth	Engineering	Dartmouth
Electrical and Electronics Engineering (Doctor's)	University of Massachusetts-Dartmouth	Engineering	Dartmouth
Electrical and Electronics Engineering (Master's)	University of Massachusetts-Dartmouth	Engineering	Dartmouth
HVAC/R Technician Evening	University of Massachusetts-Dartmouth	Engineering	Dartmouth
Electrical and Electronics Engineering (Bachelor's)	University of Massachusetts-Lowell	Engineering	Lowell
Electrical and Electronics Engineering (Doctor's)	University of Massachusetts-Lowell	Engineering	Lowell
Electrical and Electronics Engineering (Master's)	University of Massachusetts-Lowell	Engineering	Lowell
Electrical, Electronic and Communications Engineering Technology/Technician	University of Massachusetts-Lowell	Engineering	Lowell
Electromechanical and Instrumentation and Maintenance Technologies/Technicians, Other	University of Massachusetts-Lowell	Engineering	Lowell
Energy Management and Systems Technology/Technician	University of Massachusetts-Lowell	Engineering	Lowell
Certificate in Heating, Ventilation, Air Conditioning & Refrigeration (HVAC)	Upper Cape Cod Regional Technical School	HVAC	Bourne
Electrical	Upper Cape Cod Regional Technical School	Electrical	Bourne
Plumbing	Upper Cape Cod Regional Technical School	Plumbing	Bourne
Plumbing	Upper Cape Cod Regional Technical School	Plumbing	Bourne
CMP: LEED AP BD+C	US Green Building Council	Weatherization	Boston
CMP: LEED AP HOMES	US Green Building Council	Weatherization	Boston

CMP: LEED AP ID+C	US Green Building Council	Weatherization	Boston
CMP: LEED AP ND	US Green Building Council	Weatherization	Boston
CMP: LEED AP O+M	US Green Building Council	Weatherization	Boston
CMP: LEED Green Associate	US Green Building Council	Weatherization	Boston
Electrical	Waltham High School	Electrical	Waltham
Electrical and Electronics Engineering (Bachelor's)	Wentworth Institute of Technology	Engineering	Boston
Electrical and Electronics Engineering (Master's)	Wentworth Institute of Technology	Engineering	Boston
Electrical, Electronic and Communications Engineering Technology/Technician	Wentworth Institute of Technology	Engineering	Boston
Electricians	Wentworth Institute of Technology	Electrical	Boston
Electrical and Electronics Engineering (Bachelor's)	Western New England University	Engineering	Springfield
Electrical and Electronics Engineering (Master's)	Western New England University	Engineering	Springfield
Electrical	Westfield Technical Academy	Electrical	Westfield
Plumbing	Whittier High School	Plumbing	Haverhill
Electrical	Whittier High School	Electrical	Haverhill
HVAC	Whittier High School	HVAC	Haverhill
Plumbing	Whittier Technical School	Plumbing	Haverhill
Electricians	Worcester Electrician School	Electrical	Worcester
Electrical and Electronics Engineering (Bachelor's)	Worcester Polytechnic Institute	Engineering	Worcester
Electrical and Electronics Engineering (Doctor's)	Worcester Polytechnic Institute	Engineering	Worcester
Electrical and Electronics Engineering (Master's)	Worcester Polytechnic Institute	Engineering	Worcester
Plumbing	Worcester Tech High School	Plumbing	Worcester
Electrical	Worcester Tech High School	Electrical	Worcester
HVAC	Worcester Tech High School	HVAC	Worcester
Plumbing	Worcester Technical School	Plumbing	Worcester
BPI Energy Auditing	Zack Academy	Energy Auditing	web

Appendix B: Research Methodology

Employer Survey Methodology

The survey sample included a compilation of known energy efficiency firms that had completed surveys for MassCEC's Clean Energy Industry Report in the last 3 years, samples provided by Eversource, and a sample of firms known to employ the relevant industry codes (NAICS) from DatabaseUSA. All samples were ensured to be representative by industry code staffing pattern as determined though EMSI BLS QCEW data.

The survey was administered by telephone and email between November 19 and December 10, 2019 with 277 total completes by firm, accounting for 663 occupations.

Potential Employee Survey Methodology

The survey sample was provided by a third party and included individuals in New England (Massachusetts, New Hampshire, Maine, Vermont, Connecticut, and Rhode Island) between the working ages of 18 and 64. Quotas were used to ensure representation by age and gender. Roughly 38 percent of respondents for the potential employee survey live in Massachusetts.

The survey was administered by telephone and email between November 13 and November 22, 2019 with 593 total completes.

Current Employee Survey Methodology

The survey sample was provided by a third party and included energy efficiency workers in New England (New York, Massachusetts, Connecticut, Maine, New Hampshire, Rhode Island, Vermont). All employees were verified via survey to be energy efficiency workers. Roughly 19 percent of survey respondents for the current employee survey work in Massachusetts.

The survey was administered by telephone and email between November 15 and December 15, 2019 with 289 total completes.

Training Inventory Methodology

The Training Inventory was compiled via internet searches throughout the months of November and December 2019. The list of PA-Funded Training Programs was provided by Massachusetts Program Administrators on November 27, 2019.

Career Profile Methodology

The career profiles were pulled together using data from the supplemental survey of employers and current workers as well as wage data from the 2019 United States Energy and Employment Report. Additional data on knowledge, skills, and tasks was taken from O*NET Online.

Annual Job Openings Methodology

Total occupational employment by county (2019) was gathered from Economic Modeling Specialists, Intl (EMSI). This data is based on the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW). Occupational totals were multiplied by energy efficiency industry-share employment for

Massachusetts counties to extrapolate the total amount of occupations employed in industries relevant to this study. Annual openings were derived by multiplying firms reported annual opening percentages (from the employer survey in this report) for occupations by total county occupational employment within the following industries:

- Electrical power generation, transmission and distribution (NAICS 2211)
- Natural gas distribution (NAICS 2212)
- Residential building construction (NAICS 2361)
- Nonresidential building construction (NAICS 2362)
- Utility system construction (NAICS 2371)
- Foundation, structure, and building exterior contractors (NAICS 2381)
- Building equipment contractors (NAICS 2382)
- Building finishing contractors (NAICS 2383)
- Other specialty trade contractors (NAICS 2389)
- Architectural, engineering, and related services (NAICS 5413)
- Electronic and precision equipment repair and maintenance (NAICS 8112)
- Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance

Executive Interview Methodology

The executive interviews were conducted between December 23rd, 2019 and January 2nd, 2020. The research team interviewed nine individuals from across multiple training spheres, including universities, technical high schools, energy efficiency associations, and community colleges. The research also includes discussion with a best practices working group of independent installation and home performance contractors.

Other Data

Massachusetts unemployment data by demographic was provided by the Economic Policy Institute and the Bureau of Labor Statistics.

Appendix C: Employer Survey Toplines

[bw] RESEARCH PARTNERSHIP

December 2019

Employer Survey

Toplines

n = 663 Occupational

Massachusetts Energy Efficiency Workforce Development Supplemental Employer Survey

Introduction

Hello, my name is _____ and I am calling from BW Research Partnership on behalf of the Sponsors of Mass Save®, a collaboration of Massachusetts Gas and Electric Utilities and energy efficiency service providers. We are conducting a statewide survey to better understand the needs of energy efficiency employers in the state, including specific skills, certification, or educational requirements, the demand for certain occupations, and hiring challenges. The survey is meant to better inform workforce development initiatives in Massachusetts and support energy efficiency employers and workers across the state. May I please speak to the person most knowledgeable about staffing at [organization]?

Is now a convenient time?

This survey uses specific terms to describe various technologies and activities. If you require any definitions for clarification, please ask me at any time.

(If needed): This important survey addresses businesses involved with any activity related to *energy efficiency*. This includes the installation, repair, maintenance, or sales and distribution of energy efficiency technologies, including lighting, heating, cooling, and building envelope as well as thermal or hot water solar. It also includes supporting services such as design and engineering or energy auditing and quality inspections related to energy efficiency.

(If needed): Your individual responses will **not** be published; only aggregated information will be used in reporting the survey results.

(If needed): The survey should take approximately 15-20 minutes of your time. Your participation will help determine how investments of time and money should be made to support the energy efficiency industry and prepare the present and future labor pool.

Section 1 – Screener Questions

A. Is your organization involved, in whole or in part, with any activity related to *energy efficiency*?

100.0% **Yes**

B. Does your organization conduct any energy efficiency work in Massachusetts?

100.0% **Yes**

C. For this survey, please answer the following questions based only on your current business location. What is the zip code of your current location?

Zip codes in excel file

D. Please indicate which of the following occupations are employed at your location. [SELECT ALL THAT APPLY]

46.5%	**Engineers or Project Designers**
40.1%	**Energy Auditors or HERS Raters (including low-income, market rate, commercial, industrial, and residential)**
37.1%	**Heating, Air Conditioning, Hot Water, and Refrigeration Mechanics and Installers**
23.1%	**Electrical Contractors and Installers**
20.7%	**Manufacturer Representatives or Sales and Distribution Representatives (including lighting and HVAC distributors)**
18.7%	**Insulation and Weatherization Installers, Contractors, and Technicians**
17.4%	**Plumbers, Pipefitters, or Steamfitters**
13.0%	**Mechanical Contractors**
5.0%	**Architects**
0.0%	**None of the above**

E. For [INSERT OCCUPATION] employed at your location, please indicate if they spend any amount of time working in the following types of buildings. [SELECT ALL THAT APPLY]

79.2%	**Commercial buildings (offices, hospitals, retail) and/ or industrial facilities (e.g. manufacturing plants)**
46.6%	**Market-rate multi-family residential**
37.4%	**Single-family homes**
32.6%	**Low-income multi-family residential**
1.3%	**None**

Section 2 – Mass Save® Programs

1. Which of the following Mass Save® programs are you aware of? [SELECT ALL THAT APPLY]

71.3%	**Commercial and industrial**
52.7%	**Residential market rate**
38.2%	**Residential low-income or income eligible**
5.7%	**Other (Specify)**
4.1%	**None of the above**
2.4%	**Don't know/ Refused**

2. Which of the following programs does your company participate in? [SELECT ALL THAT APPLY]

[PIPE IN ONLY THOSE SELECTED AT Q1]

67.1%	**Commercial and industrial**
41.9%	**Residential market rate**
20.6%	**Residential low-income or income eligible**
5.8%	**Other (Previously specified)**

5.4% **None of the above**

[IF SELECTED 'A. OR B. OR C. OR D. AT Q1, ASK Q3, OTHERWISE SKIP]

3. Which of the following Program Administrators did you do work with? [SELECT ALL THAT APPLY]

90.6% **National Grid**
86.2% **Eversource**
47.8% **Columbia Gas of Massachusetts**
32.2% **Unitil**
26.4% **Cape Light Compact**
22.8% **Berkshire Gas**
19.9% **Liberty**
3.3% **Other (Specify)**
2.9% **Don't know/ Refused**

Section 3 – Hiring Challenges

4. How many [INSERT OCCUPATION] have you hired over the last 12 months, either for new positions or to replace former workers? **(n=532)**

Total	Growth	Occupation
327	42.9%	Plumbers, Pipefitters, or Steamfitters
297	24.3%	Heating, Air Conditioning, and Refrigeration Mechanics and Installers
234	14.6%	Design Engineers or Project Designers
191	25.6%	Energy Auditors or HERS Raters (including low-income, market rate, commercial, industrial, and residential)
179	29.9%	Electrical Contractors and Installers (including those who work on building automation systems and lighting controls)
166	37.3%	Insulation and Weatherization Installers and Technicians
155	16.3%	Manufacturer Representatives or Sales and Distribution Representatives (including lighting and HVAC distributors)
39	19.5%	Mechanical Contractors
9	22.0%	Architects
1,597	24.5%	All Occupations

5. Thinking of the [INSERT Q4] [INSERT OCCUPATION] workers that you have hired at your location over the last 12 months, please indicate your level of difficulty finding qualified applicants to fill the positions.

41.3% **Very difficult**
44.2% **Somewhat difficult**
7.0% **Not at all difficult**
7.5% **Don't know/ Refused**

[IF SELECTED 'A' OR 'B' AT Q5, ASK Q6 FOR EACH OCCUPATION, OTHERWISE SKIP]

6. What are the two most significant reasons for the reported hiring difficulty for?

[ASK FOR ALL OCCUPATIONS WITH REPORTED HIRING DIFFICULTY]

24.5%	**Lack of experience/ industry-specific knowledge**
20.8%	**Small applicant pool**
15.6%	**Competition with other industries (related to wages and benefits)**
13.6%	**Insufficient non-technical skills (problem-solving, work ethic, critical thinking, communication, teamwork, etc.)**
7.4%	**Insufficient certifications**
5.3%	**High turnover**
4.6%	**Insufficient educational attainment**
3.9%	**Applicants fail substance use test**
2.4%	**Applicants fail background check due to criminal record**
1.0%	**Other (Specify)**
0.9%	**Don't know/ Refused**

Section 4 – Employment Demand & Hiring Sources

7. How many **permanent full-time** [INSERT OCCUPATION] work at or from your current location? **(n=532)**

Total	Share of All Occupations	Occupation
1,608	**24.5%**	**Engineers or Project Designers**
1,221	**18.6%**	**Heating, Air Conditioning, and Refrigeration Mechanics, Contractors, and Installers**
950	**14.5%**	**Manufacturer Representatives or Sales and Distribution Representatives (including lighting and HVAC distributors)**
763	**11.6%**	**Plumbers, Pipefitters, or Steamfitters**
746	**11.3%**	**Energy Auditors or HERS Raters (including low-income, market rate, commercial, industrial, and residential)**
599	**9.1%**	**Electrical Contractors and Installers (including those who work on building automation systems and lighting controls)**
445	**6.8%**	**Insulation and Weatherization Installers, Contractors, and Technicians**
200	**3.0%**	**Mechanical Contractors (including installers of compressed air and kitchen equipment such as broilers, fryers, and other non-refrigeration equipment)**
41	**0.6%**	**Architects**
6,573	**100.0%**	**All Occupations**

8. Based on your [INSERT Q7 RESPONSE] permanent full-time [INSERT OCCUPATION] that work at or from your current location, how many [INSERT OCCUPATION] do you expect to have at your location 12 months from now? **(n=532)**

Total	Share of All Occupations	Projected Growth	Occupation
1,694	24.2%	5.3%	Engineers or Project Designers
1,376	19.6%	12.7%	Heating, Air Conditioning, and Refrigeration Mechanics, Contractors, and Installers
940	13.4%	-1.1%	Manufacturer Representatives or Sales and Distribution Representatives (including lighting and HVAC distributors)
828	11.8%	11.0%	Energy Auditors or HERS Raters (including low-income, market rate, commercial, industrial, and residential)
750	10.7%	25.2%	Electrical Contractors and Installers (including those who work on building automation systems and lighting controls)
686	9.8%	-10.1%	Plumbers, Pipefitters, or Steamfitters
412	5.9%	-7.4%	Insulation and Weatherization Installers, Contractors, and Technicians
271	3.9%	35.5%	Mechanical Contractors (including installers of compressed air and kitchen equipment such as broilers, fryers, and other non-refrigeration equipment)
48	0.7%	17.1%	Architects
7,005	100.0%	6.6%	All Occupations

[IF SELECTED "A. Energy Auditors" at Screener D, ASK Q9, OTHERWISE SKIP]

9. Thinking of the [INSERT # FROM Q7 TOTAL FOR SD.A] Energy Auditors or HERS Raters at your current location, please assign them to the categories below based on where they spend most of their labor hours. [NOTE: Responses must sum up to total from Q7 SD.A]

38.9%	**Commercial and industrial auditor**
20.5%	**Other single-family home auditor**
16.4%	**HERS Rater**
9.5%	**Market-rate multi-family housing auditor**
8.5%	**Other multi-family housing auditor**
6.3%	**Low-income multi-family housing auditor**

[IF SELECTED "F. HVAC Mechanics and Installers" at Screener D, ASK Q10, OTHERWISE SKIP]

10. Thinking of the [INSERT # FROM Q7 TOTAL FOR SD.F] Heating, Air Conditioning, Hot Water, and Refrigeration Mechanics, Contractors, and Installers at your current location, please assign them to the categories below based on where they spend most of their labor hours. [NOTE: Responses must sum up to total from Q7 SD.F]

42.5%	**Single-family homes**
25.1%	**Commercial and industrial buildings**
16.4%	**Market-rate multi-family housing**
10.8%	**Other multi-family housing**
5.2%	**Low-income multi-family housing**

11. Where do you usually look for qualified candidates when hiring new *energy efficiency* workers at your current location?

57.8%	**Word of mouth, ask current employees to recruit**
54.3%	**General Online Job Sites (such as Indeed, Monster or CareerBuilder)**
39.1%	**LinkedIn**
22.3%	**College recruitment**
16.8%	**Facebook**
15.6%	**Craigslist**
6.6%	**Massachusetts Clean Energy Center (MassCEC) online job board**
5.1%	**Newspaper**
5.1%	**Specific training providers/ partners (Specify)**
1.2%	**Instagram**
0.8%	**Twitter**
12.1%	**Other (Specify)**
10.2%	**Don't know/ Refused**

12. At your organization do you typically promote individuals from within for [INSERT OCCUPATION], or do you primarily find people from outside your organization?

43.8%	**Both, promote from within and recruit from outside the organization**
23.9%	**Promote from within**
19.1%	**Recruit from outside the organization**
13.2%	**Don't know/ Refused**

13. What is the next position or occupational title that [INSERT OCCUPATION] typically move up to, in your organization? [IF NEEDED: In your organization, what is the primary position(s) that people move up to after working as a [INSERT OCCUPATION]?]

    [SHOW ALL OCCUPATIONS SELECTED AT SCREENER D]

Verbatim responses may be available on request.

Section 5 – Skills & Certifications

14. Please indicate the *required* highest level of education you expect qualified [INSERT OCCUPATION] applicants to possess?

27.1% **High school diploma or less**
18.4% **Certification (Specify)**
8.6% **Associate degree**
31.4% **Bachelor's degree**
4.1% **Master's degree or higher**
10.4% **Don't know/ Refused**

15. Please indicate the *required* level of work experience you expect qualified [INSERT OCCUPATION] applicants to possess?

13.3% **No formal work experience in comparable positions required**
20.4% **Up to 12 months in a comparable position**
28.7% **One to three years in a comparable position**
17.4% **More than three years in a comparable position**
10.3% **More than five years in a comparable position**
9.9% **Don't know/ Refused**

16. Are your [INSERT OCCUPATION] required to have any certifications or licenses for working with Zero Net Energy or Passive House buildings?

81.3% **No**
18.7% **Yes (Specify)**

17. Are there certificates, technical certifications, or other specific educational degrees or training programs that are valuable to you when looking to hire [INSERT OCCUPATION]?

39.5% **OSHA 10 Hour**
31.5% **Certified Energy Manager**
18.3% **OSHA Confined Spaces Training**
9.9% **Manual J (system sizing)**
8.1% **Weatherization Crew Chief Certification**
6.2% **BPI Energy Auditor**
6.2% **Manual D (duct design)**
5.9% **Manufacturer-specific certifications (Specify)**
5.1% **Manual S (equipment selection)**
2.7% **HERS Rater certification through RESNET**
2.7% **Lead Safe Supervisor Initial (RRP)**
2.7% **BPI Quality Control Inspector**
2.2% **DOE Weatherization Assistance Program**
1.9% **DHCD MA Energy Auditor Exam**
1.9% **Specialty CSL Insulation license**
0.5% **Thermography Certification (Specify)**
18.8% **Other (Specify)**

41.9% **Don't know/ Refused**

18. Are there any other specific certifications or licenses required of your [INSERT OCCUPATION] that work with [INSERT SCREENER E SELECTION] applications?

	Yes (Specify)	No	Don't know/ Refused
Low-income multi-family	10.9%	67.3%	21.8%
Market-rate multi-family	6.0%	58.8%	35.2%
Single-family home	18.3%	53.8%	27.8%
Commercial building	11.0%	55.5%	33.5%

Verbatim responses may be available on request.

19. Is this [INSERT Q18A RESPONSE] required or preferred?

	Required	Preferred	Don't know/ Refused
Low-income multi-family	68.8%	31.2%	0.0%
Market-rate multi-family	61.5%	38.5%	0.0%
Single-family home	58.1%	41.9%	0.0%
Commercial building	56.4%	43.6%	0.0%

Verbatim responses may be available on request.

20. Are there any additional skills not covered by certifications or licenses that are required of your [INSERT OCCUPATION] that work with [INSERT SCREENER E SELECTION] applications?

	Yes (Specify)	No	Don't know/ Refused
Low-income multi-family	6.8%	67.3%	25.9%
Market-rate multi-family	5.6%	56.1%	38.3%
Single-family home	13.0%	57.4%	29.6%
Commercial building	9.6%	53.5%	36.8%

Verbatim responses may be available on request.

Section 6 – Closing & Demographics

21. Does your company have any formal mentorship programs or work with an existing one?

61.5% **No**

17.9% **Yes, we have a formal mentorship program**

7.3% **Yes, we work with an existing mentorship program**
13.3% **Don't know/ Refused**

22. Does your company have any formal diversity and inclusion or affirmative action programs?

45.4% **No**
25.2% **Yes**
29.4% **Don't know/ Refused**

23. Does your company conduct substance use testing for potential applicants?

56.2% **Yes**
27.6% **No**
16.1% **Don't know/ Refused**

24. Has your company had any issues with substance use in current or past employees?

63.0% **No**
13.0% **Yes (Specify)**
24.1% **Don't know/ Refused**

25. Does your company conduct a criminal background check for potential applicants?

67.6% **Yes**
14.4% **No**
18.1% **Don't know/ Refused**

26. Thinking of your [INSERT Q7] [INSERT OCCUPATION] at your current Massachusetts location, please assign them to the categories below. [NOTE: Responses must sum up to total from Q7]

86.7% **Male**
12.9% **Female**
0.3% **Gender Non-Binary**

27. Thinking of your [INSERT Q7] [INSERT OCCUPATION] at your current Massachusetts location, please assign them to the categories below based on their primary language spoken. [NOTE: Responses must sum up to total from Q7]

90.4% **English**
5.4% **Spanish**
1.5% **Portuguese**
0.4% **Vietnamese**
0.1% **Haitian**
0.0% **Creole**
2.2% **Other**

28. Thinking of your [INSERT Q7] [INSERT OCCUPATION] at your current Massachusetts location, please assign them to the categories below. [NOTE: Responses must sum up to total from Q7]

78.7%	**Caucasian**
3.6%	**African American**
1.8%	**American Indian or Alaskan Native**
0.7%	**South Asian**
0.4%	**East/ Southeast Asian**
0.4%	**Middle Eastern**
0.1%	**Native Hawaiian or other Pacific Islander**
6.3%	**More than one of the above (please specify)**
8.0%	**Other (please specify)**

29. Thinking of your [INSERT Q7] [INSERT OCCUPATION] at your current Massachusetts location, please assign them to the categories below. [NOTE: Responses must sum up to total from Q7]

84.5%	**Not Hispanic or Latinx**
15.5%	**Hispanic or Latinx**

30. Thinking of your [INSERT Q7] [INSERT OCCUPATION] at your current Massachusetts location, please assign them to the categories below. [NOTE: Responses must sum up to total from Q7]

1.1%	**15 to 19 years old**
37.0%	**20 to 34 years old**
29.4%	**35 to 44 years old**
21.2%	**45 to 54 years old**
9.6%	**55 to 64 years old**
1.7%	**65 years and over**

31. On average, over the last 12 months how much of your business revenue is a result of participation in Mass Save® programs?

7.4%	**All of it (100%)**
25.3%	**Half to most of it (50% to 99%)**
21.6%	**A quarter to almost half of it (25% to 49%)**
36.3%	**Less than a quarter (1% to 24%)**
9.5%	**Don't know/ refused**

Appendix D: Current Worker Survey Toplines

[bw] RESEARCH PARTNERSHIP

December 2019

Current Worker Survey Toplines

n=289

Energy Efficiency Workforce Development

Current Worker Survey

Introduction

This survey is being conducted on behalf of the Sponsors of MassSave®, a collaboration of Massachusetts Gas and Electric Utilities and energy efficiency service providers. We are conducting a statewide survey to understand jobs in energy efficiency.

This survey uses specific terms to describe various technologies and activities. If you require any definitions for clarification, please ask me at any time.

(If needed): Your individual responses will **not** be published; only aggregated information will be used in reporting the survey results.

(If needed): The survey should take approximately 15-30 minutes of your time. Your participation will help determine how investments of time and money should be made to support the industry and prepare the present and future labor pool.

Section 1 – Screener Questions

1. Do you currently work?

87.9% **Yes, full-time**

12.1% **Yes, part-time**

2. Which state do you currently work in? [RANDOMIZE]

60.6% **New York**

19.4% **Massachusetts**

10.0% **Connecticut**

3.8% **Maine**

3.5% **New Hampshire**

2.1% **Rhode Island**

0.7% **Vermont**

3. Do you have a job that is, in whole or in part, related to *energy efficiency*? We define this as being directly involved in the installation, repair, maintenance, or sales and distribution of goods and/ or services related to Energy Efficiency technologies, including lighting, heating, cooling, and building envelope as well as thermal or hot water solar. This also includes supporting services such as design and engineering or energy auditing and quality inspections related to energy efficiency.

100.0% **Yes**

4. In what year did you begin working in the *energy efficiency* field? (n=288)

2.8% **1980 - 1989**

2.1% **1990 - 1994**

4.9% **1995 - 1999**

10.1% **2000 - 2004**

18.1% **2005 - 2009**

27.8% **2010 - 2014**

34.4% **2015 - 2019**

5. Do you have permanent employment or is the work temporary or seasonal?

80.3% **Permanent full-time position**

10.7% **Permanent part-time position**

9.0% **Non-permanent, temporary, seasonal, or project to project employment (part-time or full-time)**

0.0% **Don't know/ Refused**

6. Which of the following most closely describes your title, position, or job function in the *energy efficiency* industry?

24.2% **Insulation and weatherization installer, contractor, or technician**

19.0% **Electrical contractor or installer (including those who work on building automation systems, lighting, and lighting controls)**

15.9% **Engineer or project designer**

14.2% **Heating, air conditioning, hot water and refrigeration mechanic, contractor, and installer**

9.3% **Plumber, pipefitter, or steamfitter**

9.0% **Mechanical contractor (including installers of compressed air and kitchen equipment such as broilers, fryers, and other non-refrigeration equipment)**

8.3% **Energy auditor or HERS rater (including low-income, market rate, commercial, industrial, and residential)**

7. Which of the following energy efficiency projects do you work on? [SELECT ALL THAT APPLY]

60.2% **Commercial buildings (offices, hospitals, retail) and/ or industrial facilities (e.g. manufacturing plants)**

54.0% **Single-family homes**

37.0% **Low-income multi-family residential**

35.6% **Market-rate (non-subsidized) multi-family residential**

Section 2 – Education & Skills Profile

8. What is your highest level of education?

26.3% **High school diploma or less**

7.3% **Certification (Specify)**

20.8% **Associates degree**

31.1% **Bachelor's degree**

14.5% **Master's degree**

9. Does your *energy efficiency* job require a specific license or certification?

64.4% **No**

35.6% Yes (Specify)

Verbatim responses may be available on request.

10. Do you have any other specific certifications or credentials for your *energy efficiency* occupation, such as manufacturer's certifications?

72.3% No

27.7% Yes (Specify)

Verbatim responses may be available on request.

11. Have you completed any other training or education courses that you feel have either helped you get a job or increase your pay in the *energy efficiency* field?

61.9% No

38.1% Yes (Specify)

Verbatim responses may be available on request.

12. Did you participate in any formal apprenticeship, internship, or mentorship programs? [SELECT ALL THAT APPLY]

25.3% Yes, an apprenticeship program (Specify)

10.4% Yes, an internship program (Specify)

8.7% Yes, a mentorship program (Specify)

63.0% None of the above

Verbatim responses may be available on request.

[IF SELECTED 'A, B, OR C' AT Q12, ASK Q13, OTHERWISE SKIP]

13. Do you feel that participating in these programs either improved your job prospects or your success at your current job?

89.7% **Yes (Please explain)**

10.3% **No**

Verbatim responses may be available on request.

14. In every survey, it's important that we know that people are really paying attention. To let us know you are, please select Hockey below, regardless of which sport you like most.

100.0% **Hockey**

15. Please select any of the following that you believe have been important in your successful career navigation in the *energy efficiency* field (i.e., your ability to successfully advance to new jobs with increased pay and responsibilities in the *energy efficiency* field). [SELECT ALL THAT APPLY]

52.6% **On-the-job training at current employer**

41.5% **Previous work experience**

34.9% **Self-guided learning and experimenting**

34.6% **Business networks and connections (i.e. relationships in the EE field that have led to jobs or promotions)**

32.2% **Technical certifications**

31.1% **In-person networking**

27.0% **Bachelor's degree**

27.0% **Family/friends support and guidance**

24.2% **Online learning communities of industry professionals**

22.5% **Websites**

21.5% **Formal mentorship**

16.6% **Informal mentorship**

15.6% **K-12 education**

15.2% **Associates degree**

14.2% **Master's degree**

12.1% **LinkedIn**

12.1% **Job boards such as Monster and Career Builder**

4.8% **PhD**

1.0% **Other (Specify)**

1.0% **Don't know/ Refused**

Section 3 – Compensation & Benefits

16. What was your starting wage or salary? (n=288)

$12.00 or less	**12.5%**
$12.01 - $15.00	**13.9%**
$15.01 - $20.00	**26.4%**
$20.01 - $30.00	**24.0%**
$30.01 - $40.00	**9.4%**
$40.01 -$50.00	**6.9%**
$50.01 or more	**6.9%**

17. What is your current wage or salary? (n=282)

$12.00 or less	**5.3%**
$12.01 - $15.00	**5.3%**
$15.01 - $20.00	**14.9%**
$20.01 - $30.00	**29.8%**
$30.01 - $40.00	**19.5%**
$40.01 -$50.00	**10.6%**
$50.01 or more	**14.5%**

18. Does your employer pay healthcare benefits through work?

52.9% **Yes, my company pays for all my health insurance**

23.9% **Yes, my company pays for part of my health insurance**

23.2% **No, my employer does not contribute to my health insurance**

19. Do you receive any retirement benefits through work?

69.6% **Yes**

30.4% **No**

20. Do you get paid vacation from work?

75.4% Yes

24.6% No

21. Does your employer provide any of the following additional benefits? [SELECT ALL THAT APPLY]

42.6% Flexible work schedule/ hours (including the ability to work from home)

40.1% Company vehicle

28.4% Tuition support (paying for continued education or student loans)

27.0% Transportation stipend

1.4% Other (Specify)

19.7% None of the above

Section 4 – Career Satisfaction & Advancement

22. How satisfied are you currently with your *energy efficiency* career?

61.9% Very satisfied

26.6% Somewhat satisfied

10.7% Indifferent

0.7% Somewhat unsatisfied (Specify why?)

0.0% Very unsatisfied (Specify why?)

Verbatim responses may be available on request.

23. What job(s) did you have before your current or latest job? Please provide titles (such as electrician, engineer, etc.) and wages for up to 3 previous jobs.

Verbatim responses may be available on request.

24. Is your current job a promotion than your last job?

80.3% **Yes**

19.7% **No**

25. What is the next step or promotion that you see for your current *energy efficiency* career?

72.7% **Advancing within your company**

16.6% **Advancing at another company in the same industry**

6.6% **No advancement (Explain)**

3.1% **Advancing in another industry/ field (Specify)**

1.0% **Remaining in my current position but moving to another industry/ field (Specify)**

[IF SELECTED 'A OR B' AT Q25, ASK Q26 and Q27, OTHERWISE SKIP]

26. Please provide the occupation title of the job you are seeking to be promoted to within the *energy efficiency* industry.

Verbatim responses may be available on request.

27. Will you need to do anything specific to be competitive for that promotion?

52.3% **More experience**

14.5% **Additional education (Specify)**

7.4% **Certification or license (Specify)**

7.0% **Change in geographic location**

1.2% **Other (Specify)**

30.1% **No**

[IF SELECTED 'C' AT Q25, ASK 28, OTHERWISE SKIP]

28. Please provide the occupation title of the job you are seeking to be promoted to that is in another industry or field?

Verbatim responses may be available on request.

29. Do you foresee any obstacles to promotion in the *energy efficiency* field?

34.6% **Lack of opportunities or open positions**

13.1% **Lack of career guidance/ mentorship**

12.1% **Lack of networking**

8.7% **Lack of credentials**

1.7% **Education (Specify)**

1.4% **Other (Specify)**

45.7% **None**

30. For each of the following, please rate using the following scale: *Strongly Agree, Agree, Neither, Disagree, Strongly Disagree, or Does Not Apply/ Don't know/ Refused.*

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Does not apply/ Don't know/ Refused
I have access to the training and education needed to support my successful career advancement	34.6%	39.1%	15.6%	5.9%	2.8%	2.1%
I can afford the training and education needed to support my successful career advancement	29.4%	34.3%	18.0%	9.3%	7.6%	1.4%
There are language barriers preventing me from accessing the training and education necessary to support my successful career advancement	9.7%	9.0%	12.8%	26.6%	35.6%	6.2%
I do not have the time to pursue additional training or education to support my career advancement	11.8%	17.0%	21.8%	31.5%	15.6%	2.4%
Training and education providers are too far away from my home, and I do not have the appropriate transportation resources	12.1%	13.8%	17.3%	31.5%	22.1%	3.1%

31. When you are searching for a new job, which of the following do you utilize?

64.4% **Job sites (such as Indeed, Monster or CareerBuilder)**

41.9% **LinkedIn**

33.6% **Facebook**

28.0% **Newspaper**

20.4% **Instagram**

16.3% **Twitter**

9.0% **MassCEC online job board**

0.7% **Specific training schools/ providers (Specify)**

9.0% **Other (Specify)**

32. Please provide three short pieces of career advice that you would give to someone entering a career in the *energy efficiency* field.

Verbatim responses may be available on request.

Section 5 – Demographics

A. In what year were you born? 19_ _ **(n=288)**

2.1% **1959 or later (60+)**

6.3% **1960 – 1964 (55-59)**

5.6% **1965 – 1969 (50-54)**

6.9% **1970 – 1974 (45-49)**

14.2% **1975 – 1979 (40-44)**

16.3% **1980 – 1984 (35-39)**

21.5% **1985 – 1989 (30-34)**

17.4% **1990 – 1994 (25-29)**

9.7% **1995 – 2001 (18-24)**

B. Your gender:

71.3% **Male**

28.0% **Female**

0.0% **Gender Non-Binary**

0.0% **Something Else (Specify)**

0.7% **I would prefer not to answer**

C. Which of the following would best describe your race?

72.7% **Caucasian**

15.2% **African American**

2.8% **East/ Southeast Asian**

2.1% **American Indian or Alaskan Native**

2.1% **South Asian**

1.0% **Middle Eastern**

0.3% **Native Hawaiian or other Pacific Islander**

1.4% **More than one of the above (Specify)**

2.4% **Other (Specify)**

D. Are you Hispanic or Latino?

77.2% **No**

22.5% **Yes**

0.3% **Not sure**

E. What is your primary language?

95.2% **English**

3.5% **Spanish**

0.7% **Portuguese**

0.3% **Vietnamese**

0.3% **Creole**

0.0% **Haitian**

0.0% **Other (Specify)**

F. Are you a Veteran of the U.S. Armed Forces?

92.7% **No**

6.9% **Yes**

0.3% **Not sure**

G. Please tell us in which Zip Code you reside _____

Verbatim responses may be available on request.

H. Do you live in:

47.8% **The city/urban area**

39.4% **A suburban area/outside a city**

12.8% **The country/rural area**

Appendix E: Potential Worker Survey Toplines

[bw] RESEARCH PARTNERSHIP

Eversource Workforce Development

December 2019

Supply-Side Survey Toplines

n=593

Eversource Energy Efficiency Workforce Development

Supply-Side Survey

Introduction

This survey is being conducted on behalf of MassSave®, a collaboration of Massachusetts Gas and Electric Utilities. We are conducting a statewide survey to understand preferences of the Massachusetts Workforce.

(If needed): Your individual responses will **not** be published; only aggregated information will be used in reporting the survey results.

(If needed): The survey should take approximately 15-30 minutes of your time. Your participation will help determine how investments of time and money should be made to support the industry and prepare the present and future labor pool.

Section 1 – Screener Questions

1. Do you live in New England?

37.7%	**Massachusetts**
32.1%	**Connecticut**
10.2%	**Maine**
9.0%	**Rhode Island**
7.8%	**New Hampshire**
3.2%	**Vermont**

2. Do you currently work?

41.7%	**Yes, full-time**
40.6%	**No, I do not currently work**
17.6%	**Yes, part-time**

3. Are you currently working at more than one job for pay? Please include any part-time, on-call, or gig jobs.

77.9%	**No**
22.1%	**Yes**

4. Are you currently looking for a job?

68.5%	**No**
31.5%	**Yes**

[IF SELECTED 'A. YES' AT Q4, ASK 5, OTHERWISE SKIP]

5. In an average week, how many jobs do you apply for?

55.7%	**1-3 Jobs**
30.1%	**4-9 Jobs**
8.5%	**10-15 Jobs**
5.7%	**16+ Jobs**

6. What industry, field, or type of company are you currently working in?

   Verbatim responses may be available on request.

7. What is your current job title(s)/ position(s)?

   Verbatim responses may be available on request.

Section 2 – Professional Development & Employment Preferences

8. Are you currently taking any classes?

86.7%	**No**
13.3%	**Yes**

[IF SELECTED 'A. YES' AT Q8, ASK Q9, OTHERWISE SKIP]

9. Where are you taking classes?

5.7%	**Still in high school**
15.0%	**Trade or technical school**
23.6%	**Community college**
35.7%	**4-year university**
19.9%	**Graduate school**

Next, let's get your ideas on where you'd like to work and what's important to you. If you're working now, this could be a job in the future. If you're not working or you've never had a job, think about where you might see yourself.

10. What is the field, industry, or type of company you would most like to work in?

Verbatim responses may be available on request.

11. Are you currently working in that field, think you will in the future, or don't think you will?

30.2%	**Yes, I expect to be working in that field in the future**
28.9%	**Yes, I am currently working in that field**
21.4%	**Not sure if I will be working in that field in the future**
19.5%	**No, I am not working in that field and do not expect to in the future**

[IF SELECTED 'C. NO OR D. NOT SURE' AT Q11, ASK Q12, OTHERWISE SKIP]

12. Please explain why you do not expect to or are not sure you'll be working in that field in the future.

Verbatim responses may be available on request.

13. For each of the following, please rate using the following scale: *Strongly Agree, Agree, Neither, Disagree, Strongly Disagree, or Does Not Apply/ Don't know/ Refused.*

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Does not apply/ Don't know/ Refused
I have access to the training and education needed to support my successful career advancement	16.7%	29.6%	22.4%	12.5%	8.6%	10.2%
I can afford the training and education needed to support my successful career advancement	14.2%	18.1%	22.9%	16.7%	21.1%	7.0%
There are language barriers preventing me from accessing the training and education necessary to support my successful career advancement	5.6%	6.4%	11.3%	18.5%	43.6%	14.6%
I do not have the time to pursue additional training or education to support my career advancement	12.5%	19.3%	26.0%	18.2%	13.4%	10.6%
Training and education providers are too far away from my home, and I do not have the appropriate transportation resources	11.0%	12.9%	24.2%	20.4%	20.4%	11.1%

14. How important are each of the following to you when deciding to work for a certain company? Even if you're still in school and never had a job, think about what might be important to you in choosing a place to work.

	Very important	Important	Somewhat important	Not important	Don't know
What I'm going to get paid	54.6%	30.3%	9.1%	3.2%	2.7%
Flexible work hours/schedule	43.8%	31.4%	16.9%	4.6%	3.3%

The type of work I'll be doing (i.e. meaningful/ fulfilling)	48.0%	33.8%	12.5%	2.9%	2.9%
A company that's socially responsible – has a positive impact on people/ the world	31.8%	32.7%	22.5%	9.2%	3.8%
It's a popular company or brand	14.3%	21.1%	22.0%	37.1%	5.5%
Makes products/ has services I like or use	21.0%	31.1%	24.0%	18.6%	5.3%
Benefits like paying part of my tuition	24.7%	29.1%	22.9%	17.5%	5.8%
Benefits like healthcare and paid vacation	53.3%	27.7%	9.7%	5.7%	3.6%
Known for treating employees fairly	57.2%	27.3%	10.3%	1.8%	3.4%
Opportunity to gain new skills	44.0%	33.0%	15.5%	4.0%	3.4%
Opportunity for career growth	44.5%	33.0%	14.1%	5.0%	3.5%
Opportunity to connect with and meet new people	24.4%	32.7%	25.6%	14.2%	3.1%
Opportunity to travel for work	16.6%	15.0%	20.2%	43.1%	5.1%
Close to home	39.6%	32.6%	20.2%	5.0%	2.6%
I'll get discounts/free products or services	16.9%	19.3%	26.9%	31.4%	5.5%
I know other people who work/worked there	12.4%	18.8%	26.6%	37.3%	4.9%

15. Are there any other important factors we missed that are important to you when deciding to work for a company?

85.6% **No**

14.4% **Yes (Specify)**

Verbatim responses may be available on request.

[RESTORE ALL "VERY IMPORTANT" IN Q13]

16. Of the factors you rated as "very important", which is the most important to you when thinking about a job or a career? [SELECT ONLY ONE]

28.9% **What I'm going to get paid**

15.2% **Flexible work hours/schedule**

14.3% **The type of work I'll be doing (i.e. meaningful/ fulfilling)**

10.0% **Benefits like healthcare and paid vacation**

9.3% **Opportunity for career growth**

7.6% **Known for treating employees fairly**

6.2% **Close to home**

3.3% **A company that's socially responsible – has a positive impact on people/ the world**

2.4% **Opportunity to gain new skills**

1.1% **Benefits like paying part of my tuition**

0.5% **Makes products/ has services I like or use**

0.4% **I know other people who work/worked there**

0.4% **Opportunity to connect with and meet new people**

0.3% **It's a popular company or brand**

0.3% **I'll get discounts/free products or services**

0.0% **Opportunity to travel for work**

[RESTORE ALL "NOT IMPORTANT" IN Q13]

17. Of the factors you rated as "not important", which is the least important to you when thinking about a job or a career? [SELECT ONLY ONE]

22.8% **Opportunity to travel for work**

22.3% **It's a popular company or brand**

21.0% **I know other people who work/worked there**

12.9% **I'll get discounts/free products or services**

5.9% **Benefits like paying part of my tuition**

4.5% **Makes products/ has services I like or use**

3.1% **Opportunity to connect with and meet new people**

2.7% **A company that's socially responsible – has a positive impact on people/ the world**

0.9% **Benefits like healthcare and paid vacation**

0.9% **Flexible work hours/schedule**

0.8% **Close to home**

0.6% **What I'm going to get paid**

0.5% **Opportunity to gain new skills**

0.4% **The type of work I'll be doing (i.e. meaningful/ fulfilling)**

0.3% **Known for treating employees fairly**

0.3% **Opportunity for career growth**

18. If you could choose, what would be your dream job (job title + company)?

Verbatim responses may be available on request.

19. Describe your dream company to work for in 1 sentence.

Verbatim responses may be available on request.

20. Please rate how important you believe the following activities are for your own personal career advancement:

	Very important	Somewhat important	Not at all important
Networking (including formal and informal activities to meet people and expand professional connections	44.3%	44.3%	11.4%
Organizational Reading (including understanding company culture, workplace relationships, industry trends, and other organizational behaviors)	48.4%	41.2%	10.4%
Self-Awareness (including taking formal assessments, taking a step back and evaluating your own career pathway, and determining your own strengths and desires)	60.0%	32.1%	7.9%
Relationship Management (including maintaining personal connections, taking notes on contacts, demonstrating value in professional conversations, and being a good listener)	56.3%	36.5%	7.2%
Mentorship (including formal and informal mentorship)	45.1%	42.2%	12.8%

Section 3 – Perception of Industry

21. What is the first word or thought that comes to mind when you think of each of these trades or industries?

Verbatim responses may be available on request.

22. How interested would you be in working in any of the following industries?

	Very interested	Interested	Somewhat interested	Not interested	Don't know
Construction or building trades	12.2%	10.9%	16.1%	57.3%	3.6%
Energy efficiency	12.6%	15.6%	21.6%	46.7%	3.5%
Installation, repair, and maintenance	11.8%	10.0%	16.4%	57.9%	3.9%
Electrical work	9.7%	10.4%	16.5%	58.9%	4.4%

23. In every survey, it's important that we know that people are really paying attention. To let us know you are, please select Hockey below, regardless of which sport you like most.

100.0% **Hockey**

24. Please indicate how much you agree or disagree with each of the following statements regarding careers in Construction and Building Trades? You can base your opinion on what you know, what you've heard from other people, or just impressions you may have.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
Offers good salary	22.9%	37.3%	18.4%	5.1%	2.5%	13.8%
Offers good benefits & perks	17.3%	24.2%	24.9%	8.9%	3.9%	20.8%
Doesn't offer the kind of jobs I want to do	22.2%	24.0%	21.8%	12.1%	7.9%	12.0%
Has flexible working hours/schedule	12.7%	18.1%	25.9%	14.9%	8.2%	20.1%
Doesn't provide good opportunities for career advancement	10.1%	19.6%	21.1%	18.5%	10.4%	20.5%
Doesn't have good diversity in the workplace	9.8%	15.4%	24.3%	18.5%	12.1%	19.9%
Has companies that are known to be socially responsible	13.7%	24.9%	27.5%	7.4%	4.6%	21.9%

Is a career I would be proud of	18.8%	25.9%	28.5%	7.1%	8.5%	11.2%
Is for someone like me	12.1%	14.8%	20.2%	18.3%	24.5%	10.1%
The companies or brands in this industry are not popular	7.3%	10.2%	30.6%	21.0%	10.6%	20.2%
Offers products/services I like or use	13.5%	28.0%	29.0%	6.9%	5.7%	17.0%
Doesn't offer jobs near where I live	7.6%	11.5%	23.0%	22.1%	19.0%	16.8%
I'll get discounts/free products or services	8.3%	12.8%	27.6%	15.3%	9.8%	26.2%
I know other people who work in this industry	20.3%	30.0%	18.6%	10.5%	8.6%	12.0%
Offers travel and relocation opportunities	11.7%	21.0%	23.7%	12.9%	7.4%	23.2%
Is known to have issues with gender equality	13.6%	24.5%	21.8%	11.2%	9.8%	19.1%

25. Please indicate how much you agree or disagree with each of the following statements regarding careers in Energy Efficiency?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
Offers good salary	17.2%	30.7%	24.3%	2.7%	1.3%	23.7%
Offers good benefits & perks	15.6%	26.2%	26.0%	4.1%	2.0%	26.2%
Doesn't offer the kind of jobs I want to do	14.3%	23.4%	21.9%	13.7%	9.8%	16.9%
Has flexible working hours/schedule	13.3%	20.9%	26.9%	8.1%	2.1%	28.7%
Doesn't provide good opportunities for career advancement	7.0%	9.9%	24.9%	21.1%	10.5%	26.6%
Doesn't have good diversity in the workplace	6.7%	9.4%	28.2%	15.9%	10.5%	29.3%
Has companies that are known to be socially responsible	17.5%	28.2%	25.4%	4.1%	2.7%	22.1%
Is a career I would be proud of	17.1%	29.4%	26.1%	7.9%	7.4%	12.1%
Is for someone like me	11.7%	19.8%	24.1%	13.9%	16.7%	13.8%
The companies or brands in this industry are not popular	6.6%	14.7%	27.4%	20.1%	10.0%	21.2%
Offers products/services I like or use	15.9%	32.8%	24.6%	6.8%	4.7%	15.2%
Doesn't offer jobs near where I live	8.1%	13.7%	25.4%	16.7%	9.9%	26.2%

I'll get discounts/free products or services	8.3%	14.6%	32.1%	7.9%	6.3%	30.8%
I know other people who work in this industry	8.4%	17.0%	22.3%	20.2%	17.3%	14.9%
Offers travel and relocation opportunities	9.3%	21.2%	27.2%	7.0%	3.7%	31.6%
Is known to have issues with gender equality	6.9%	10.4%	25.9%	16.1%	9.6%	31.1%

26. When you think of the Energy Efficiency industry, what jobs/job titles come to mind? (List them)

Verbatim responses may be available on request.

Section 4 – Behavior

27. Where do you look for jobs/ tune in to find out who's hiring? [SELECT ALL THAT APPLY]

61.5% **Job sites (e.g. Indeed, Monster, CareerBuilder, etc.)**
38.4% **Family and friends**
31.0% **Job fairs**
30.0% **Viewing companies' websites**
28.8% **LinkedIn**
20.7% **Facebook**
14.6% **Work with a recruiter**
13.7% **Somewhere else (Specify)**
8.1% **"Gig" sites (e.g. UBER, Lyft, Takl, TaskRabbit, UpWork, BackDoorJobs, etc.)**
7.1% **TV**
7.0% **School counseling or career services office**
4.3% **Radio**
3.9% **Instagram**
3.3% **Youtube**
2.5% **Twitter**
1.8% **Snapchat**
1.7% **Hcareers**

28. How would you like a company you are working for or considering working for to communicate with you? [SELECT ALL THAT APPLY]

71.7% **Email**

62.0% **Phone**

30.0% **Text**

8.4% **Social media**

4.0% **WhatsApp or other messaging platform**

2.7% **Some other way (Specify)**

29. How often do you look at or check each of the following?

Row %	Several times a day	Once a day	Once to a few times a week	Less than once a week	Don't know/ Don't have an account
Facebook	49.0%	15.7%	8.8%	9.1%	17.4%
Twitter	13.8%	8.2%	10.9%	14.2%	52.9%
Instagram	25.2%	11.3%	11.3%	9.6%	42.7%
YouTube	34.7%	14.7%	17.1%	18.9%	14.6%
Snapchat	16.1%	8.6%	7.1%	11.8%	56.4%
LinkedIn	7.1%	7.5%	10.5%	21.2%	53.7%
Your email	70.8%	16.9%	7.1%	3.0%	2.2%
Text/WhatsApp/iMessage/viber	42.5%	12.0%	9.8%	5.2%	30.4%

30. Where and how do you keep up to date with news and other information?

61.7% **Television**

47.2% **Facebook**

38.9% **Online news sites like CNN, MSNBC, etc.**

32.0% **Radio**

28.6% **YouTube**

26.5% **Print newspapers or magazines**

15.5% **Instagram**

15.3% **Twitter**

15.1% **Online information sites like TMZ, People, PerezHilton, E!News, PopSugar, etc.**

9.7% **Snapchat**

9.5% **Podcasts**

7.0% **Blogs**

3.2% **Other online apps (Specify)**

1.7% **Something else (Specify)**

3.5% **I don't have time to keep up with the news**

Section 5 – Demographics

31. What is the last grade you completed in school?

3.8% **Less than high school**

29.6% **High school diploma or GED**

24.9% **Some college**

9.7% **Post high school certificate or Associate Degree**

18.7% **Four-year Bachelor's Degree**

5.5% **Trade/Technical school**

7.8% **Graduate school**

32. In what year were you born? 19_ _

13.4% **18 to 24 years old**

11.2% **25 to 29 years old**

10.5% **30 to 34 years old**

10.1% **35 to 39 years old**

9.3% **40 to 44 years old**

10.8% **45 to 49 years old**

11.7% **50 to 54 years old**

12.0% **55 to 59 years old**

11.0% **60 to 64 years old**

33. Your gender:

49.0%	**Male**
50.3%	**Female**
0.3%	**Gender Non-Binary**
0.2%	**Something Else (Specify)**
0.2%	**I would prefer not to answer**

34. Which of the following would best describe your race?

76.4%	**Caucasian**
7.3%	**African American**
3.4%	**American Indian or Alaskan Native**
2.4%	**South Asian**
2.3%	**East/ Southeast Asian**
1.0%	**Native Hawaiian or other Pacific Islander**
0.2%	**Middle Eastern**
1.3%	**More than one of the above (Specify)**
5.9%	**Other (Specify)**

35. Are you Hispanic or Latino?

87.2%	**No**
12.1%	**Yes**
0.7%	**Not sure**

36. Are you a Veteran of the U.S. Armed Forces?

94.8%	**No**
5.2%	**Yes**

37. Please tell us in which Zip Code you reside _____

38. Do you live in:

46.6% **A suburban area/outside a city**

32.6% **The city/urban area**

20.8% **The country/rural area**

Appendix F: Executive Interview Discussion Guide

[bw] RESEARCH PARTNERSHIP

Executive Interview Discussion Guide

November 2019

Draft 2.0

Section 1. Introduction & Course Background

1. Please provide a little bit of background on the energy efficiency-related programs or certifications that are offered by your organization. *[IF NEEDED] These could include HVAC, building science, electrical, architecture and engineering, installation and repair, or other energy efficiency-related technical training.*

    a. Are energy efficiency courses or programs typically full or at capacity? Do the classes fill up quickly each semester?
        i. [IF YES] How many are turned away? Where are they referred?
    b. What is the typical student completion rate for these programs? What about the dropout rate? Transfer rate?
    c. [IF THERE IS A DROP OUT RATE] What, if any, reasons are given for drop out? Do you make accommodations to help students with special circumstances stay enrolled in your course? *[IF NEEDED] These circumstances could include family illness, death of a family member, etc.*

2. Are your energy efficiency-related courses also offered online? [IF YES] Are online courses popular? [IF NO] Do you intend to offer any of these courses online in the future?

3. Have you had students request any specific energy efficiency-related training? If yes, please specify.

4. Does your institution offer additional specific training or certifications for individuals who work on the following:

    a. Low-income or subsidized housing units?
    b. Market rate (unsubsidized) housing?
    c. Residential buildings vs. commercial and industrial buildings?

5. Are there any additional areas other than training or education that your organization does to support workforce development for energy efficiency workers?

Section 2. Student Demographics, Access to Training, & Barriers to Entry

6. Do you collect information on why students choose to enroll in energy efficiency programs? [IF YES] What are the typical reasons given?

7. Can you tell me a little bit about the type of students that typically sign up for energy efficiency courses or programs?

    a. Are your students mostly male or female?
    b. What is the typical age range of applicants for your energy efficiency programs? Under 25, 25 to 35, etc.?
    c. What is the typical level of educational attainment for your students (high school, some college, college graduate)?
    d. Are your students typically English speakers? If not, what is the primary language of most of your students?
    e. What is the typical racial and ethnic breakdown of your students?

8. What, if any, accommodations do you provide for students that do not speak English as their first language? *[IF NEEDED] These could include offering the course in another language, providing language assistance, or job placement in bilingual firms.*

9. Can you tell me a little about how students typically get to your institution? Are you located near public transportation? Do most students walk, bike, or drive?

10. What, if any, barriers or difficulties do your students have in attending courses at your institution and completing their course once they enroll? *[IF NEEDED] These could be anything from location, language, or financial barriers.*

Section 3. Skills, Talent Pipeline, & Partnerships

11. What skillsets do students in your energy efficiency courses or programs typically graduate with? *[IF NEEDED] These could be technical skills directly related to the trade such as electrical work, manual dexterity, etc. or non-technical skills such as teamwork, communication, critical thinking, etc.*

12. What are the most common occupations that students who complete energy efficiency-related training and education at your organization typically apply for?

13. Do you track your students' employment outcomes following graduation? If yes, what metrics do you track?

14. Do you offer or require internship placement for students?

    a. [IF YES] Please specify what types of programs and with what organizations or employers.
    b. [IF NOT] Why not?

15. Do you participate in any employer recruitment programs or employer partnerships to assist your graduates as they transition into the workforce? If so, which ones?

16. [IF YES AT Q15] Do you find these employer partnerships are helpful for:

    a. Your students, in terms of landing a job and understanding what is desired from employers in the field?
    b. Your organization, in terms of understanding employer needs to assist in curriculum development?

Section 4. Resource & Training Needs

17. What are some of the challenges your organization faces in providing the necessary energy efficiency-related training? *[IF NEEDED] This could be anything from resource needs, information and data needs, partnerships, etc.*

18. Do you feel there is sufficient awareness of your organization's energy efficiency-related program or certification offerings? Why or why not?

19. How do students typically find information on your program offerings?

20. Do you have any partnerships with other organizations?

Section 5. Closing & Awareness

21. Is your organization aware of Mass Save®? If yes, does your organization partner with Mass Save® in any way?

    a. Is your organization aware of any community action programs, such as LEAN? If yes, what are they? Does your organization partner with these programs in any way?

22. Is there any other information or advice you think would be important to consider for stakeholders and decisionmakers as they determine areas of focus and investment for energy efficiency workforce development in Massachusetts?

Thank you very much for your time and expertise in this discussion.

If you have any interest in seeing the findings of this research, please let us know and when it is completed we will make sure you get a copy.