2023

Rhode Island Energy Workforce Development

[bw] RESEARCH PARTNERSHIP

Contents

Introduction

Having built a sustainable and growing state-wide energy efficiency sector, the state of Rhode Island and Rhode Island Energy (RI Energy) are well positioned to take advantage of a dramatic expansion in government incentives and programs at both the state and federal levels. The accompanying deployment of and innovation in energy efficiency technologies will boost economic growth and drive job growth in the state. At the same time, this evolving energy efficiency landscape brings a host of new challenges requiring a separate set of strategies and approaches. One opportunity, and challenge, is to build and sustain an energy efficiency workforce in the state that can both foster that ongoing growth and contribute to increased access to and equity in the jobs, investment, and savings that energy efficiency brings.

To help prepare for a changing energy efficiency marketplace, RI Energy tasked BW Research with completing a workforce needs assessment for Rhode Island's energy efficiency industry in order to meet four objectives:

1) Quantify the current energy efficiency workforce in Rhode Island.
2) Uncover the needs of and opportunities for energy efficiency businesses and workers as well as potential energy efficiency workers.
3) Highlight workforce development gaps and potential solutions in the state.
4) Identify potential roles for RI Energy in supporting energy efficiency workforce development in the state.

To support RI Energy in developing a workforce assessment that undergirds and bolsters the state's energy efficiency sector, BW Research used a number of research techniques:

1) Primary data collection
    a. Data assessment of RI energy efficiency workforce
    b. Surveys (employer, current worker, and potential worker)
    c. Executive interviews (trainers, schools and colleges, businesses, community organizations, labor-affiliated groups, and state programs)
2) Inventory of workforce training and assets inventory (including wraparound services, funding sources, and career development programs)
3) Literature review of previous and current clean energy workforce research focused on the state

This report begins by quantifying the existing energy efficiency workforce. Then, using surveys and interviews, it uncovers areas of growth and weakness in the labor supply; important roles, skills, and certifications needed by the workforce; and takeaways from surveys of the current and potential energy efficiency workforce and energy efficiency employers. This report next explores the workforce development ecosystem and training landscape to detail the current state of Rhode Island's workforce ecosystem assets and compares these findings to anticipated needs. The subsequent section captures the key takeaways from this body of research and provides a number of next-step recommendations. This report concludes by offering six in-depth career profiles useful to those recruiting or being recruited into the energy efficiency sector.

Executive Summary

The Rhode Island energy efficiency workforce is diversified by technology but not by demography, and employment levels are recovering from COVID-19 impacts but stabilizing at 2016 levels. Rhode Island's energy efficiency economy employs about 8,000 workers and is still recovering from the impacts of COVID-19, with 19 percent fewer workers than at its 2020 peak. While this is a weaker recovery than seen in Connecticut, Massachusetts, and the US overall, the size of the Rhode Island energy efficiency workforce has stabilized and is 50 percent larger than it was six years ago. It is unclear why Rhode Island is recovering more slowly. The Rhode Island energy efficiency workforce is diversified by sub-technology and is recovering staffing levels across all sectors. The efficient lighting sector is maturing, but this has not translated to workforce reductions. Energy efficiency workers trend white and male, which aligns with race and gender demographics in other state energy efficiency workforces.

> *Energy efficiency work isn't obvious. Is it installing insulation? Is it engineering? Is it planning a home renovation? Am I managing a building?"*
> **- Training Provider**

Energy efficiency businesses in Rhode Island have been hiring and expect to hire more workers with different skills sets to grow their businesses. Nearly three-quarters (71 percent) of surveyed Rhode Island energy employers have hired energy efficiency workers in the past year, although most businesses have hired fewer than five workers in that period. Over the next 12 months, 40 percent of these businesses expect to expand their capacity by hiring new workers with different energy efficiency skills and experience. New and expanded federal policies will drive significant investment in energy efficiency, likely increasing demand for energy efficiency workers in Rhode Island. These jobs will be mostly high-quality, family-sustaining jobs with strong benefits. Nearly all energy efficiency workers (95 percent) like their job and the benefits on offer, and few see obstacles to career advancement.

> *You're going to need thousands of people to do this right."*
> **- Contractor**

Employers expect hiring to be difficult, at least in the near term, as it is taking place in a tight labor market with high competition for these workers. Over 90 percent of businesses report difficulty in hiring energy efficiency workers generally, with extremely high numbers reporting significant difficulty in hiring heating, ventilation, and air conditioning (HVAC) technicians and heat pump installers. This is expanding the length of time it takes to hire a new worker, now anywhere from one to three months for HVAC technicians and heat pump installers. Two primary reasons given by employers for this difficulty are (1) a lack of labor supply overall and (2) a lack of prospective workers with the experience to immediately perform the job upon hire.

> *We don't have a pipeline – we will take anybody with a vague interest."*
> **- Contractor**

At present, there is not significant interest among future workers in filling energy efficiency job openings. Only 15 percent of surveyed prospective workers (defined as unemployed or interested in moving jobs) had heard of "energy efficiency jobs". Just six percent were very likely to apply for an energy efficiency job, and only two percent were aware of training programs. There could be significant overlap between the types of jobs and benefits that potential workers are looking for and how current efficiency workers describe their jobs, but this needs to be communicated across multiple platforms and stakeholders.

> *Energy efficiency jobs are currently not a high priority for folks in the community, but they would be interested in learning more if they learned what energy efficiency jobs can offer."*
> **- Community Advocate**

Rhode Island may struggle to meet its energy efficiency workforce needs due to a lack of focus from key stakeholders and a need for greater coordination across the state's energy efficiency workforce ecosystem. According to the state leaders and experts who participated in interviews, Rhode Island is behind the curve in expanding its energy efficiency workforce to accommodate future growth. Stakeholders do not generally collaborate, and there is an overall lack of awareness about energy efficiency job opportunities. The state would benefit from stronger leadership, perhaps from a single entity that can bring stakeholders together. Educational institutions face similar challenges around meeting future energy efficiency workforce needs. Several interview participants highlighted specific groups as candidates for leadership, including the Governor's Workforce Board and RI Energy.

> *There's no collaboration or established meetings between policymakers and educators or training directors. There's nobody who's actually in charge of ensuring that these trainings take place."*
> **- Educator**

The state has positive attributes that will be helpful in creating well-functioning energy efficiency workforce development programs. There is a breadth of funding options, which organizations typically stack to develop and fund programs. Funding gaps are primarily focused on issues connected to equity, such as pre-weatherization funding, wraparound services, and recruitment. Over two hundred training programs are available to workers, one-third of which are located physically in-state. Most are concentrated in Providence, leaving gaps in the western and southern parts of the state. Many training programs focus on occupational areas of need, such as HVAC workers, although some occupations would benefit from more direct targeting.

> *The training components are already out there; we just need more urgency and improved awareness of those jobs and trainings."*
> **- Union Representative**

Based on the findings of this workforce assessment, **this report offers the following recommendations for advocates and practitioners operating at the intersection of energy efficiency and workforce issues:**

1) Prioritize increasing the pipeline of future energy efficiency workers through education, communications, and information sharing**.**

2) Pursue a comprehensive approach that balances education, training, and certifications, while getting new workers the foundational, in-the-field experience they lack.

3) Actively support efforts to secure initial energy efficiency employment, working with employers and educators.

> *I have not seen any energy efficiency-related job opportunity at any career day I've been to."*
> **- Educator**

4) Strengthen educational institutions' emphasis on energy efficiency.

5) Embark on equity-related actions to further increase the pipeline of workers and bring higher-quality job opportunities to underserved communities through expanded alternative pathways, language and wraparound support, and community partnerships.

> *Not having language options for trainings is keeping those non-English speaking contractors at the bottom of the pile."*
> **- Contractor**

6) Encourage leadership and collaboration across the Rhode Island energy efficiency workforce development ecosystem**.**

7) Leverage and scale programs and success stories that already exist in the state.

RI Energy is an important stakeholder in developing Rhode Island's energy efficiency workforce, and by working in partnership with many others, it can have considerable impact. Near-term actions to address energy efficiency workforce needs include the following:

1) *Encourage workforce ecosystem coordination and leadership* by advocating for increased emphasis on energy efficiency and workforce development within relevant state-wide entities and supporting emerging leadership efforts in the state around energy efficiency workforce development.

2) *Support marketing efforts and pipeline building* by further leveraging RI Energy's marketing and communications capacity with credible information resources and campaigns and by partnering with groups, especially those serving underserved communities, to raise awareness about the value and opportunities of energy efficiency jobs.

3) *Champion energy efficiency-related programs at all levels of education* by increasing support for specific programs in high schools and vocational-technical schools, including curriculum development, instructor recruitment, internships, and equipment needs.

4) *Partner with contractors* to expand worker recruitment by communicating the benefits of energy efficiency careers, funding career navigators and wraparound supports, and educating contractors about the opportunities in energy efficiency.

> *It's about creating equal opportunity to participate in this industry. The results come over time with consistency and persistence."*
> **- Community Advocate**

Rhode Island Energy Efficiency Employment

Rhode Island's energy efficiency employment is stable, having recovered from a significant drop owing to the COVID-19 pandemic, with jobs found across different energy efficiency sub-technologies. Demand for energy efficiency workers is expected to increase dramatically over the coming decade, but tight overall labor market conditions will continue in the near term.

Total Energy Efficiency Employment

The state of Rhode Island defines energy efficiency as the following six sub-technologies: advanced building materials and other[1] efficient lighting, ENERGY STAR appliances, microgrid, storage, and smart grid. While microgrid, storage, and smart grid jobs are typically included within the transmission and distribution or clean grid and storage sectors in the USEER and other clean energy industry reports, they are included in the energy efficiency sector for this report, per Rhode Island's clean energy technology definition of energy efficiency, which can be found in the in the 2021 Rhode Island Clean Energy Jobs Report, available at https://energy.ri.gov/climate-change/clean-energy-jobs.

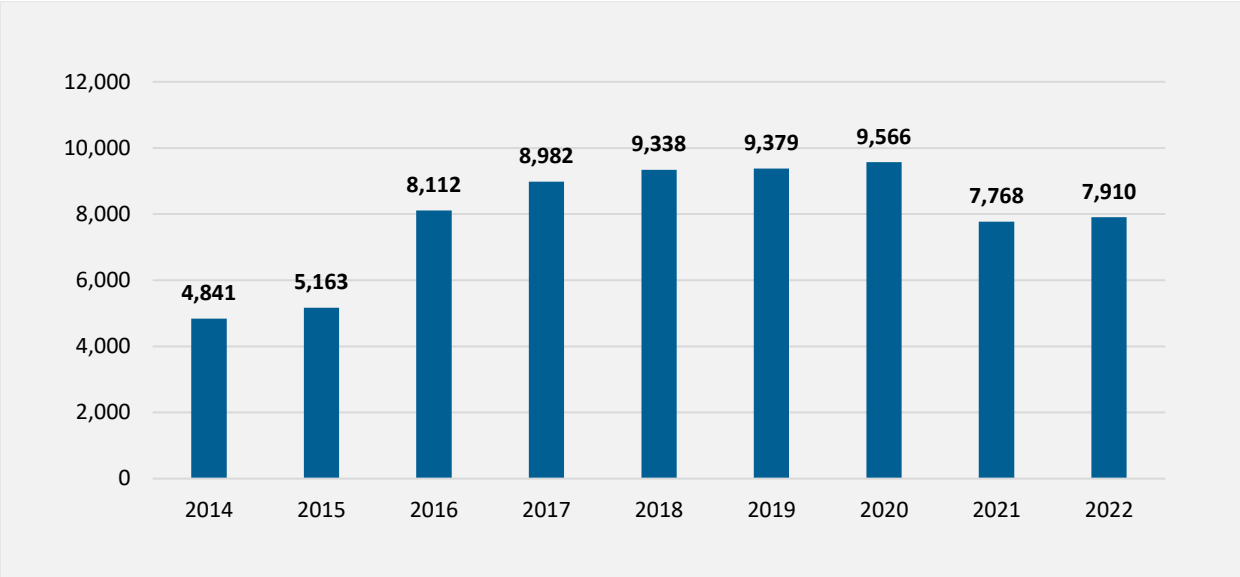
Prior to the COVID-19 pandemic, the energy efficiency industry had grown every year since 2014.[2] From 2014 through 2020, energy efficiency jobs rose from 4,841 to 9,566, an increase of 98 percent. However, in 2021 energy efficiency jobs decreased to 7,768, due to the COVID-19 pandemic, and only increased two percent in 2022 to 7,910 jobs.[3]

[1] "Other" energy efficiency includes variable speed pumps, other design service, software, energy auditing, rating, monitoring, metering, leak detection, policy or non-profit work, and consulting that cannot be specific to a detailed sub-technology.

[2] BW Research has supported Rhode Island in measuring the state's clean energy employment since 2014, publishing annual Clean Energy Industry Reports through the Rhode Island Office of Energy Resources. This assessment of the energy efficiency employment landscape draws on those official state statistics and the long-standing US Energy and Employment Report (USEER) and accompanying Energy Employment by State reports, published annually by the US Department of Energy (DOE), with research conducted by BW Research since 2014. For more information on the Rhode Island Clean Energy Industry Reports, visit https://energy.ri.gov/climate-change/clean-energy-jobs. For more information on the USEER, visit https://www.energy.gov/policy/us-energy-employment-jobs-report-useer.

[3] The employment data in this report represent the prior year's employment number per the precedent set by the Rhode Island Office of Energy Resources reporting in the Rhode Island Clean Energy Industry Report. https://energy.ri.gov/climate-change/clean-energy-jobs

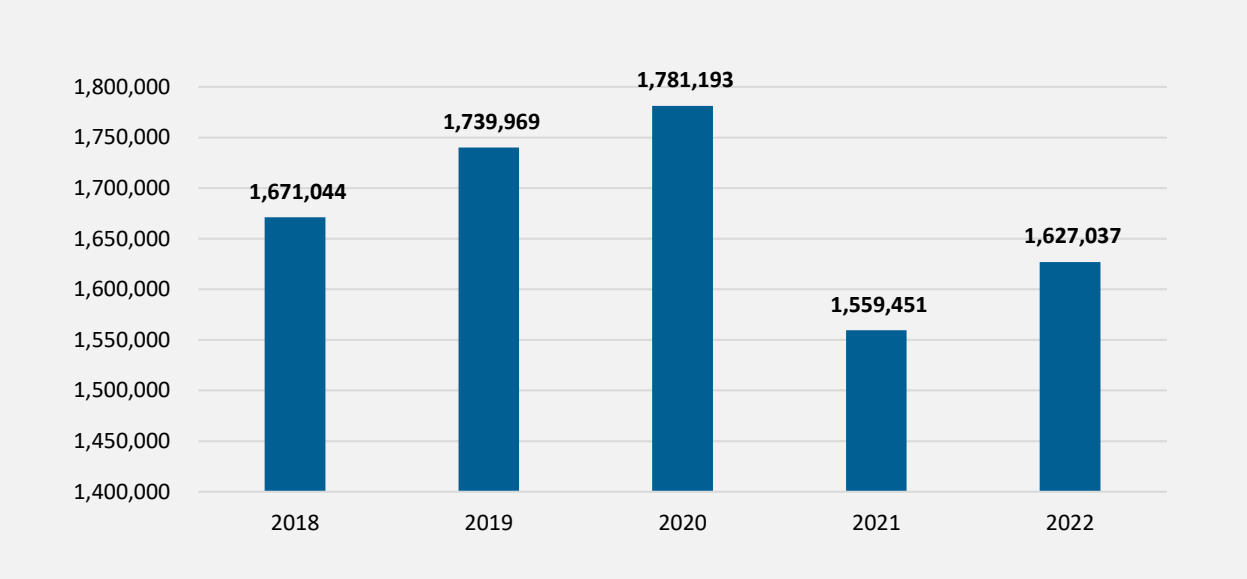
Figure 1. Total Rhode Island Energy Efficiency Employment, 2014-2022[4]



The COVID-induced decrease of 19 percent in energy efficiency employment from 2020 to 2021 was steeper than the 12 percent fall seen nationally, and state energy efficiency employment has been slower to recover than neighboring states Connecticut and Massachusetts.

[4] Figures 1 through 3 are based on data collected by BW Research for the USEER and accompanying Energy Employment by State reports for the years 2014-2022 (see note 2). The employment numbers given in these figures, however, differ from those published in the USEER reports because they have been calculated in line with Rhode Island's definition of "clean energy technology," which differs from the definition used by the DOE. Rhode Island's clean energy technology definition can be found in the 2021 Rhode Island Clean Energy Jobs Report, available at https://energy.ri.gov/climate-change/clean-energy-jobs. For more discussion of how these numbers were calculated, see Appendix A: Methodology. Employment extrapolations are based off BLS QCEW and survey data, resulting in totals that carry precise decimal values. As a result, some employment totals for tables in the report will sum differently due to rounding.

Figure 2. Total National Energy Efficiency Jobs, 2018-2022[5]



Energy Efficiency Employment by Technology

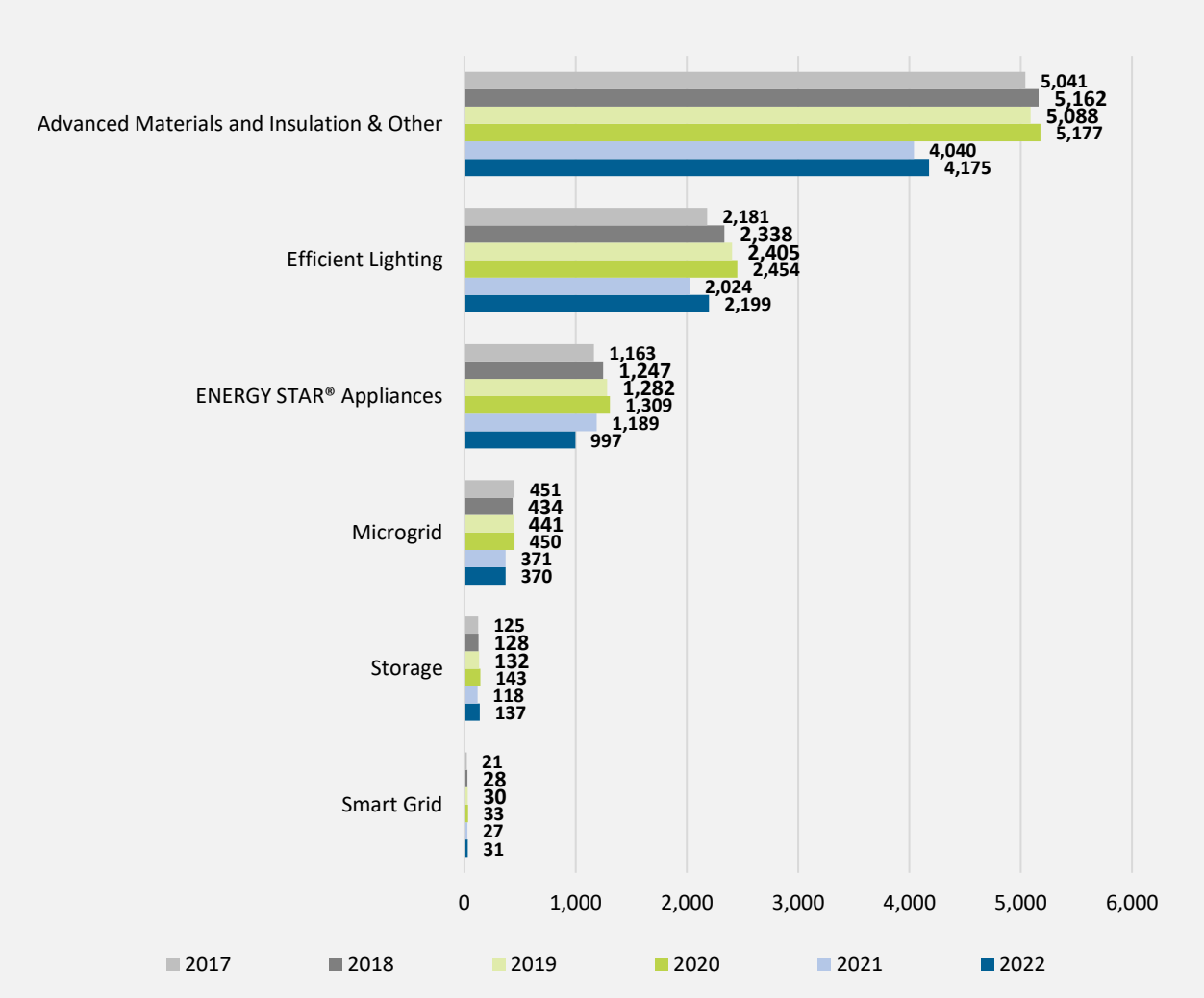
The Rhode Island energy efficiency sector employs workers across a number of technologies, including advanced materials and insulation, efficient lighting, ENERGY STAR appliances, microgrid, storage, and smart grid.[6] The energy efficiency sector includes jobs in the production and installation of products that increase energy efficiency and the provision of services that reduce energy consumption across homes and businesses. These jobs include building design and contracting services that provide insulation, improve natural lighting, and otherwise reduce energy consumption in residential and commercial areas. Additionally, this sector includes employment in the manufacturing of ENERGY STAR-labeled products. Job estimates for the energy efficiency sector do not include retail employment.

Advanced materials & insulation and other is the largest of the sub-technologies, employing 4,175 workers in 2022 (53 percent of energy efficiency jobs in Rhode Island). Efficient lighting follows, with 2,199 jobs in 2022 and 28 percent of the energy efficiency workforce. While the energy efficiency lighting sector may be reaching maturity in Rhode Island, job creation in this sub-technology remains relatively stable, especially in comparison to the advanced materials & insulation and ENERGY STAR appliances workforces. Storage and smart grid remain a post-COVID bright spot, albeit off a low base.

[5] Figure 2 based on data collected by BW Research for the USEER 2018-2022 (see note 2). The employment numbers given in these figures, however, differ from those published in the USEER reports because they have been calculated in line with Rhode Island's definition of "energy efficiency" which differs from the definition used by the DOE. Rhode Island's energy efficiency definition and can be found in the in the 2021 Rhode Island Clean Energy Jobs Report, available at https://energy.ri.gov/climate-change/clean-energy-jobs. For more discussion of how these numbers were calculated, see Appendix A: Methodology

[6] While microgrid, storage, and smart grid jobs are typically included within the transmission and distribution or clean grid and storage sectors in the USEER and other clean energy industry reports, they are included in the energy efficiency sector for this report, per Rhode Island's energy efficiency technology definition, which can be found in the in the 2021 Rhode Island Clean Energy Jobs Report, available at https://energy.ri.gov/climate-change/clean-energy-jobs.

Figure 3. Rhode Island Energy Efficiency Employment by Sub-Technology, 2017-2022[7]

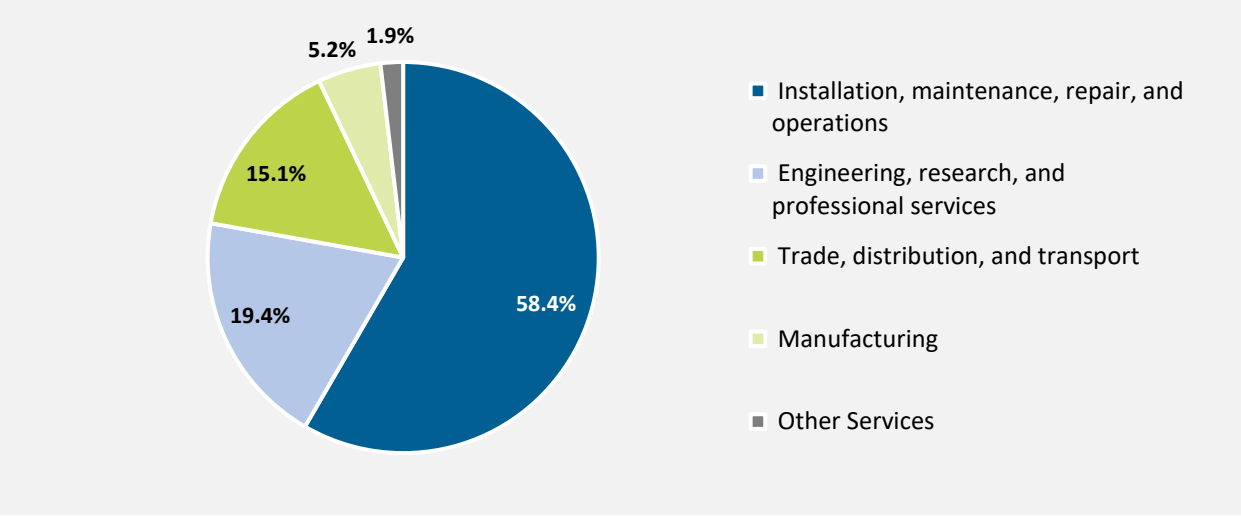


Employment by Value Chain

Installation, maintenance, repair, and operations jobs accounted for 58 percent of Rhode Island energy efficiency jobs in 2022. Engineering, research, and professional services was the second-largest segment, accounting for 19 percent of jobs, followed by trade, distribution, and transport at 15 percent.

[7]Data adapted from the US Department of Energy, Energy Employment by State reports for the years 2017-2022. While microgrid, storage, and smart grid jobs are typically included in the "transmission, distribution, and storage" or "clean grid and storage" sectors for the DOE employment reports and other clean energy industry reports, they are included in the energy efficiency sector for this report per Rhode Island's clean energy technology definition. In addition, in the DOE reports, microgrid jobs are reported within a category of "microgrid and other," but the microgrid jobs have been split out here. Likewise, job numbers for "Advanced Materials & Insulation" and "Other" energy efficiency jobs are listed separately in the DOE reports, but they are combined into the Advanced Materials and Insulation & Other" category here. In this category, "Other" includes jobs relating to variable speed pumps, other design service, software, energy auditing, rating, monitoring, metering, leak detection, policy or non-profit work, and consulting that cannot be specific to a detailed sub-technology.

Figure 4. Rhode Island Energy Efficiency Employment by Value Chain, 2022[8]



Within the five Rhode Island counties, Providence County had 4,425 jobs across the five-energy efficiency sub-technologies in 2021. It is the largest of all counties by population and accounts for 56 percent of all energy efficiency jobs across the state. Kent County followed with just under 1,600 energy efficiency jobs. Relative to overall population, Kent County has the highest share of energy efficiency workers as a share of overall county-wide employment across all technologies, with Providence County having the most workers overall. Generally, total energy efficiency jobs represent about one percent to two percent of all jobs in each county by working population.

Table 1. Rhode Island Energy Efficiency Jobs by County, 2021[9]

	Total Workforce (2021)	Smart Grid	Storage	Microgrid	ENERGY STAR & Efficient Lighting	Advanced Materials & Insulation and Other
Bristol County	14,635	< 10	< 10	< 10	75	102
Kent County	74,762	< 10	30	74	764	741
Newport County	43,044	< 10	< 10	16	274	377
Providence County	283,748	20	80	269	1,656	2,400
Washington County	58,256	< 10	13	40	350	443
Undefined Counties	14,175	< 10	< 10	16	77	122

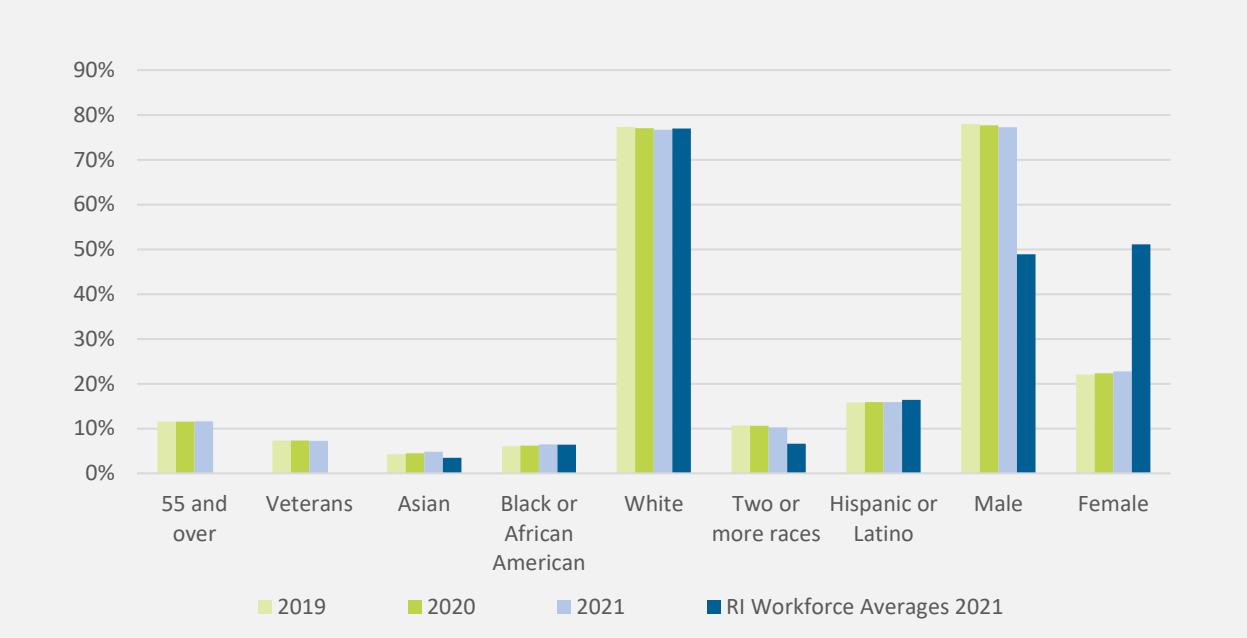
[8] Rhode Island Clean Energy Industry Report 2022, available at: https://energy.ri.gov/climate-change/clean-energy-jobs.

[9] US Department of Energy, USEER County-level Data 2021, accessed 06, 2023. https://www.energy.gov/media/286852. Total employment per county sourced from US Bureau of Labor Statistics, County Employment and Wages in Rhode Island—Second Quarter 2022, available at: https://www.bls.gov/regions/new-england/news-release/countyemploymentandwages_rhodeisland.htm.

Diversity and Environmental Justice in Energy Efficiency Jobs

Rhode Island's energy efficiency workforce lacks diversity, primarily among gender. In terms of race, it generally matches Rhode Island's overall workforce average. This demographic make-up is similar to other construction-heavy renewable technologies.

Figure 5. Rhode Island Energy Efficiency Workforce and State Workforce Average Demographics, 2019-2021[10]



[10] E4TheFuture's "Energy Efficiency Jobs in America – Rhode Island" reports, 2020-2022, where report publication year represents the previous year's data, accessible at https://e4thefuture.org/download/rhode-island-resources/

Rhode Island Energy Efficiency Business and Workforce Surveys

To better understand the energy efficiency businesses' perspective on workforce issues, BW Research conducted a survey of energy efficiency employers throughout Rhode Island.[11] The results of this survey are provided below. In addition, BW Research conducted an occupational workforce survey of current Rhode Island energy efficiency workers to explore their experiences of and attitudes toward energy efficiency jobs, such as their educational attainment, compensation and benefits, important areas of knowledge or experience, career satisfaction, and challenges to career advancement. BW Research also conducted a survey of workers who are either out of work or interested in new employment opportunities to gauge awareness of energy efficiency job opportunities and worker preferences regarding job benefits, working conditions, and recruiting sources. The results of both worker surveys are reported in subsequent sections of this report.

Energy Efficiency Businesses

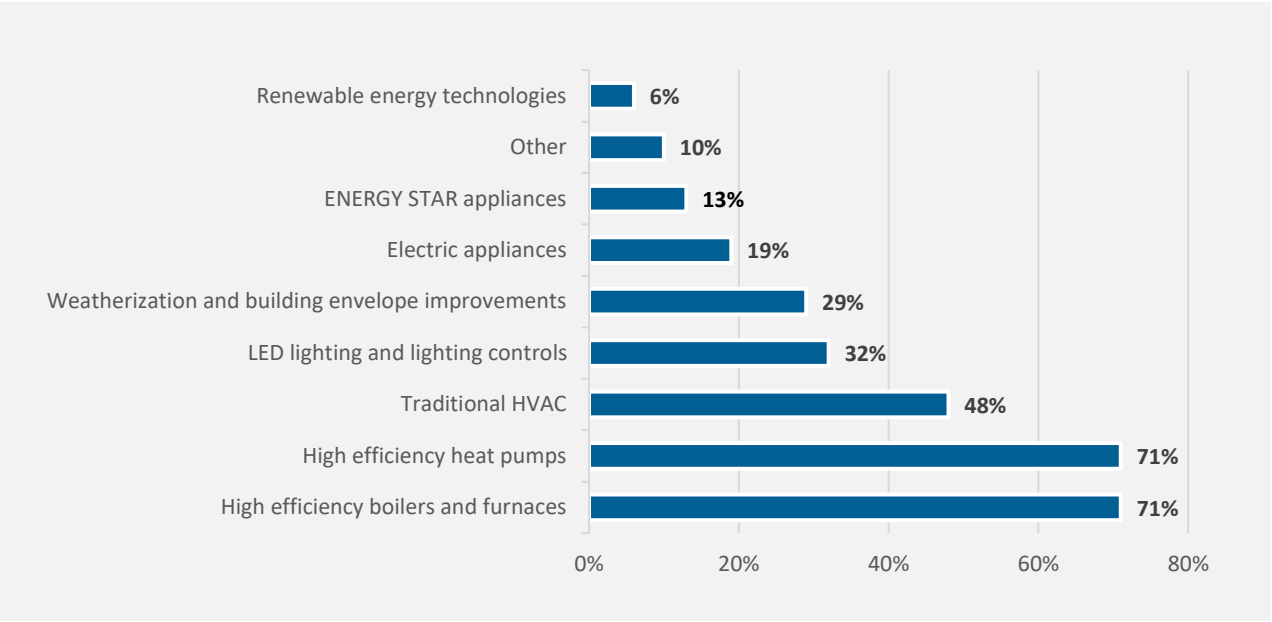
Firm and Employment Profiles

Rhode Island energy efficiency firms work across a range of different technologies. Among surveyed energy efficiency firms,[12] seven in ten support the installation of high efficiency heat pumps and high efficiency boilers. Traditional HVAC technologies are a focus of half (48 percent) of surveyed energy efficiency businesses. About a third support LED and lighting controls, and three in ten conduct weatherization and building envelope improvements.

[11] Detail on survey methods can be found in Appendix A: Methodology. There are limitations with any survey, and in this instance, one limitation is the relatively small number of Rhode Island businesses that completed the survey (see Methodology for details). The results, however, align with similar surveys fielded in other states and executive interviews conducted with a range of energy efficiency business leaders in Rhode Island and other states, lending confidence to the results.

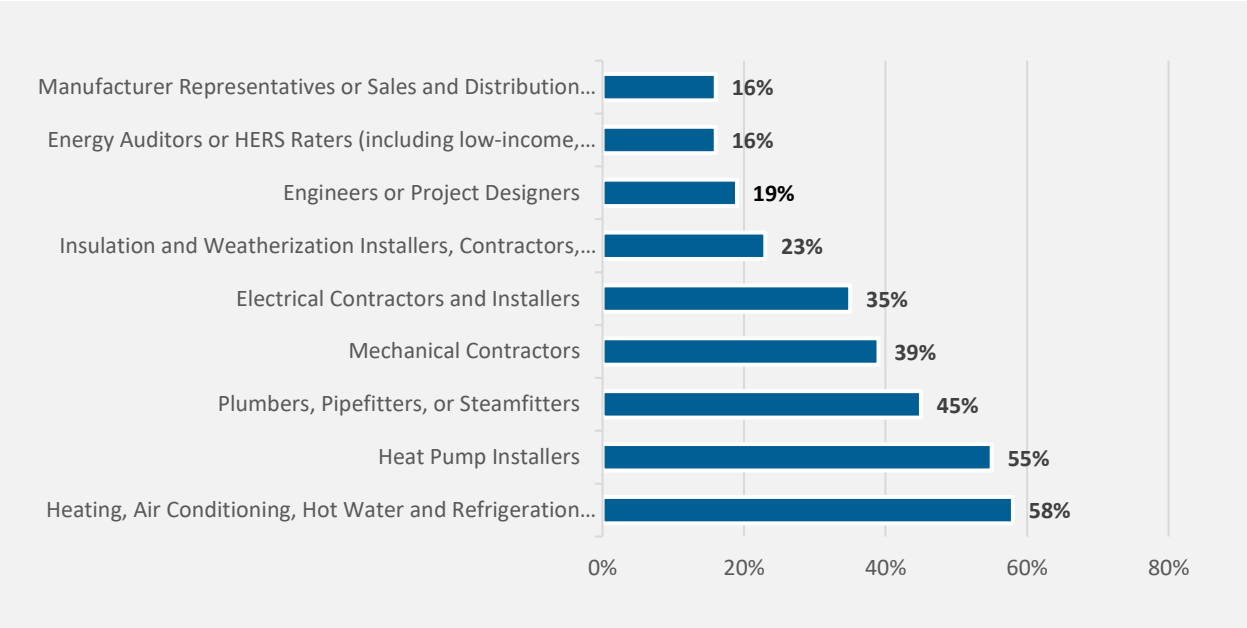
[12] Only installation, maintenance, and repair or construction firms engaged with energy efficiency technologies qualified for the employer survey. Other supply chain segments are not represented here.

Figure 6. Technologies in Which Surveyed Energy Efficiency Firms Work[13]



These firms employ a wide range of energy efficiency workers, predominantly focused on construction-related occupations. The most common occupation within firms was HVAC technician (58 percent of respondents employ at least one HVAC technician) followed by heat pump installers (55 percent) and plumbers, pipefitters, or steamfitters (45 percent). Other occupations employed include mechanical contractors (39 percent), electricians (35 percent), and weatherization technicians (23 percent).

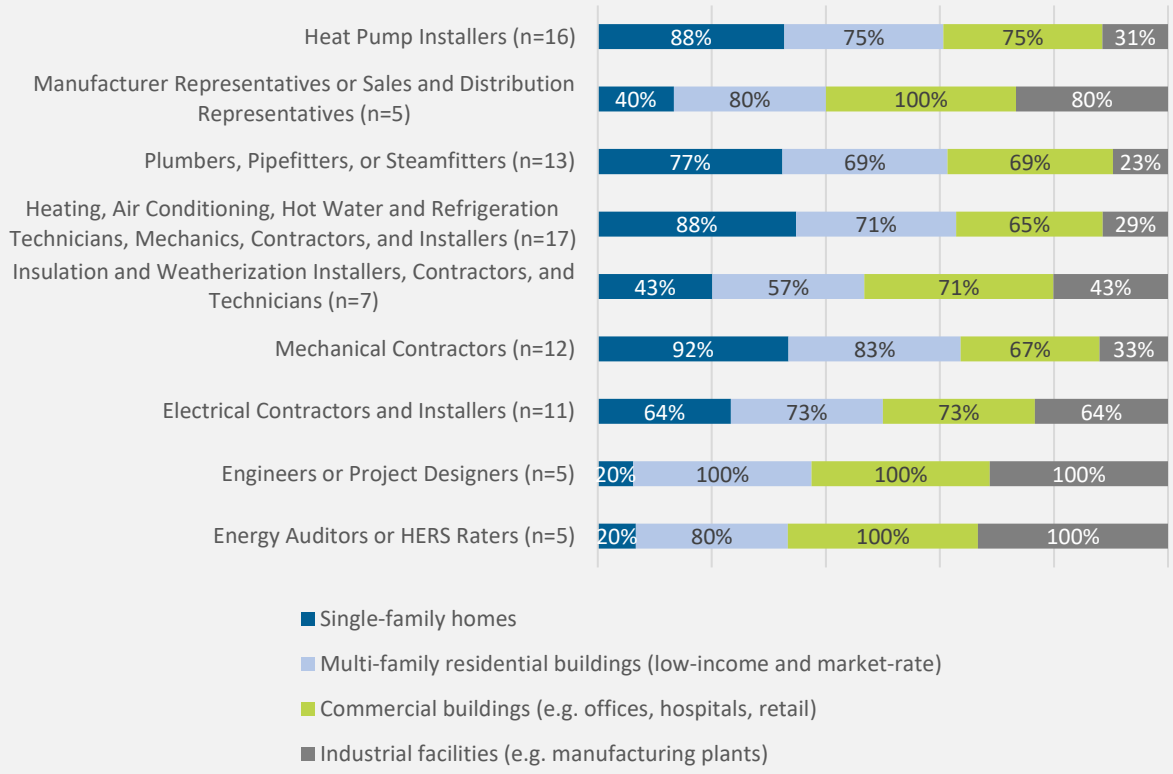
Figure 7. Occupations That Surveyed Energy Efficiency Firms Employ



[13] Three firms selected "Other," specifying Building Automation and Temperature Controls, HVAC and Plumbing Insulation, and Electric Vehicle Charging Stations.

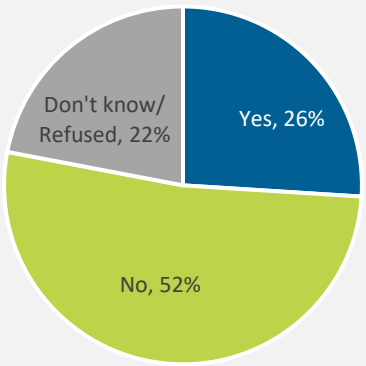
Surveyed businesses work across all building types, though single-family homes (46 percent) and commercial buildings (46 percent) are their most frequent focus.

Figure 8. Business Segments in Which Workers of Surveyed Energy Efficiency Firms Fall



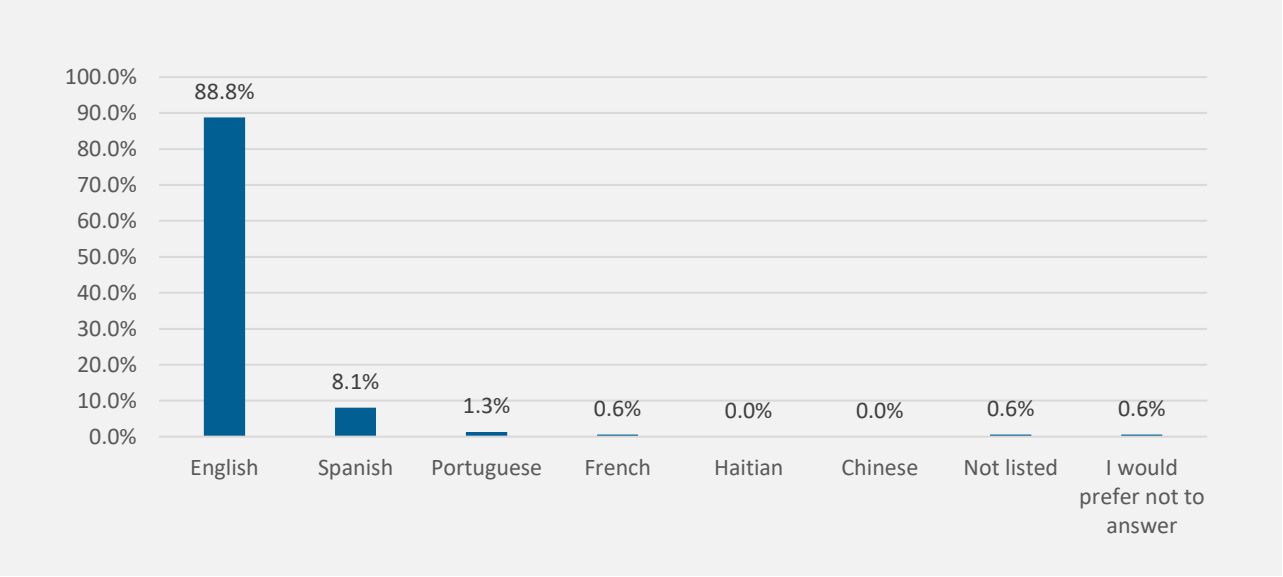
Few energy efficiency employers have a formal diversity, equity, and inclusion (DEI) or Affirmative Action (AA) program in their organization, with one-quarter (26 percent) responding that they do.

Figure 9. Does Your Firm Have Formal Diversity, Equity, and Inclusion or Affirmative Action Programs?



While English is the predominant language spoken among current workers in energy efficiency firms (89 percent), a few other languages are spoken, including Spanish, Portuguese, and French.

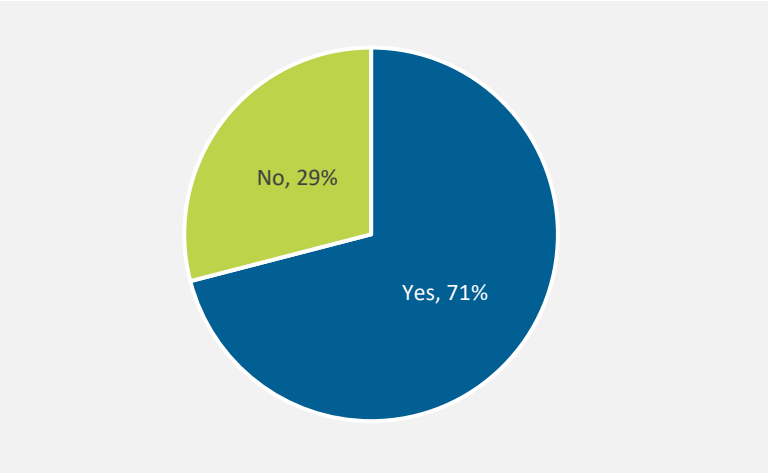
Figure 10. Primary Language of Current Energy Efficiency Workers



Hiring Landscape

Seven in ten (71 percent) energy efficiency businesses report that they have hired at least one additional energy efficiency worker in the last year, compared to three in ten (29 percent) that did not.

Figure 11. Has Your Business Hired At Least One Energy Efficiency Worker During the Last 12 Months?



While most businesses were in hiring mode, most report hiring five or fewer employees in 2021. This reflects both the small size of most Rhode Island energy efficiency businesses and the overall stability of the market (despite the lack of recovery to 2019 job levels) as illustrated in Figures 1 and 3, above.

Figure 12. Number of Employees Hired per Business, by Job Type, Over the Last 12 Months

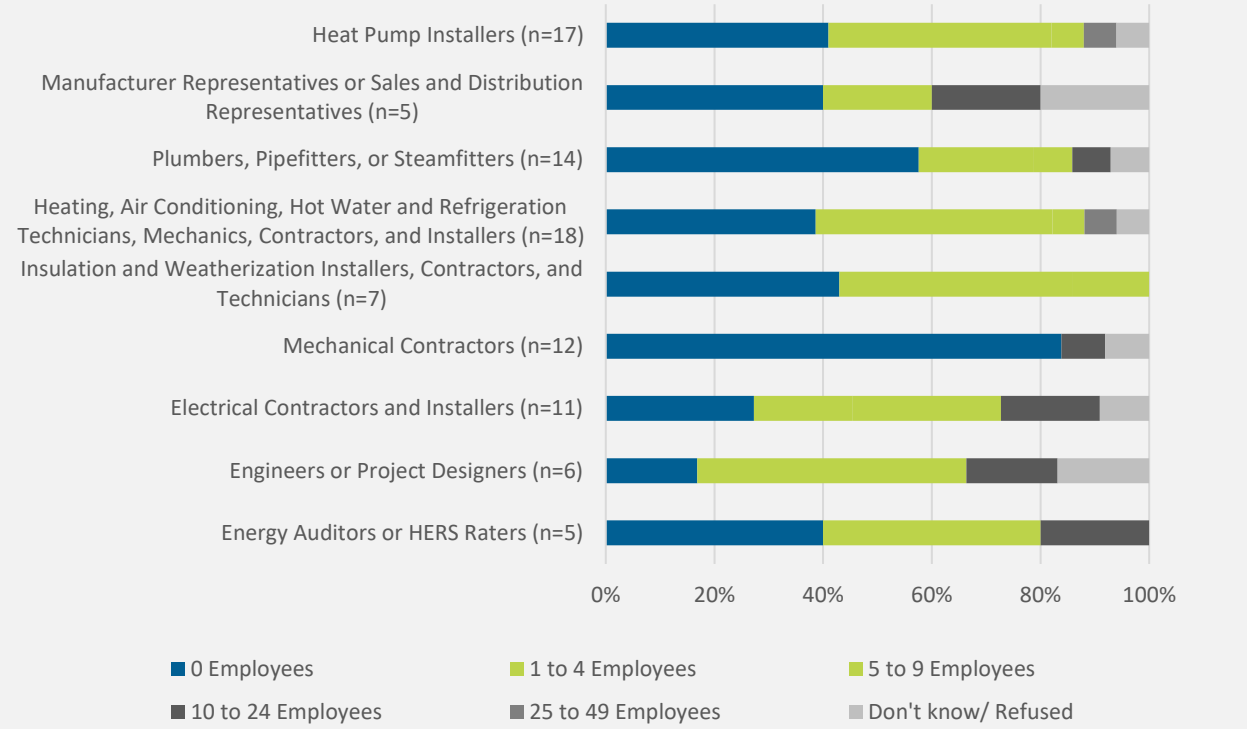
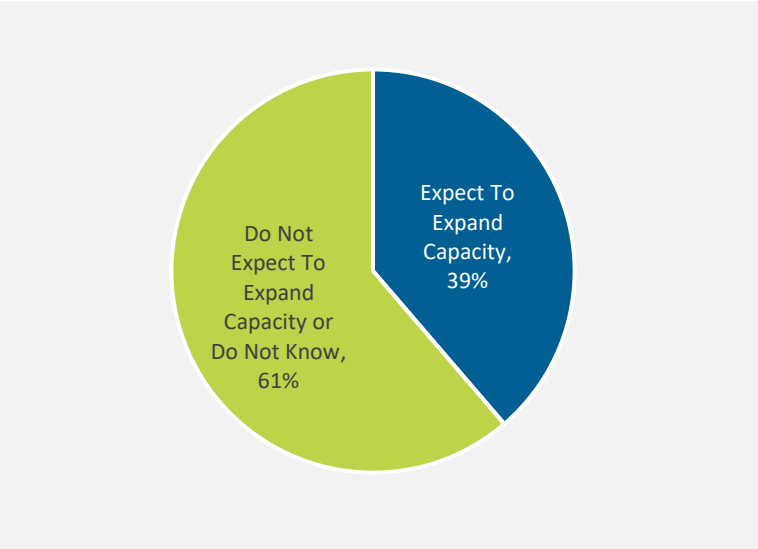


Figure 13. Share of Employers Saying They Will Expand Capacity by Hiring for New Types of Energy Efficiency Roles in the Future

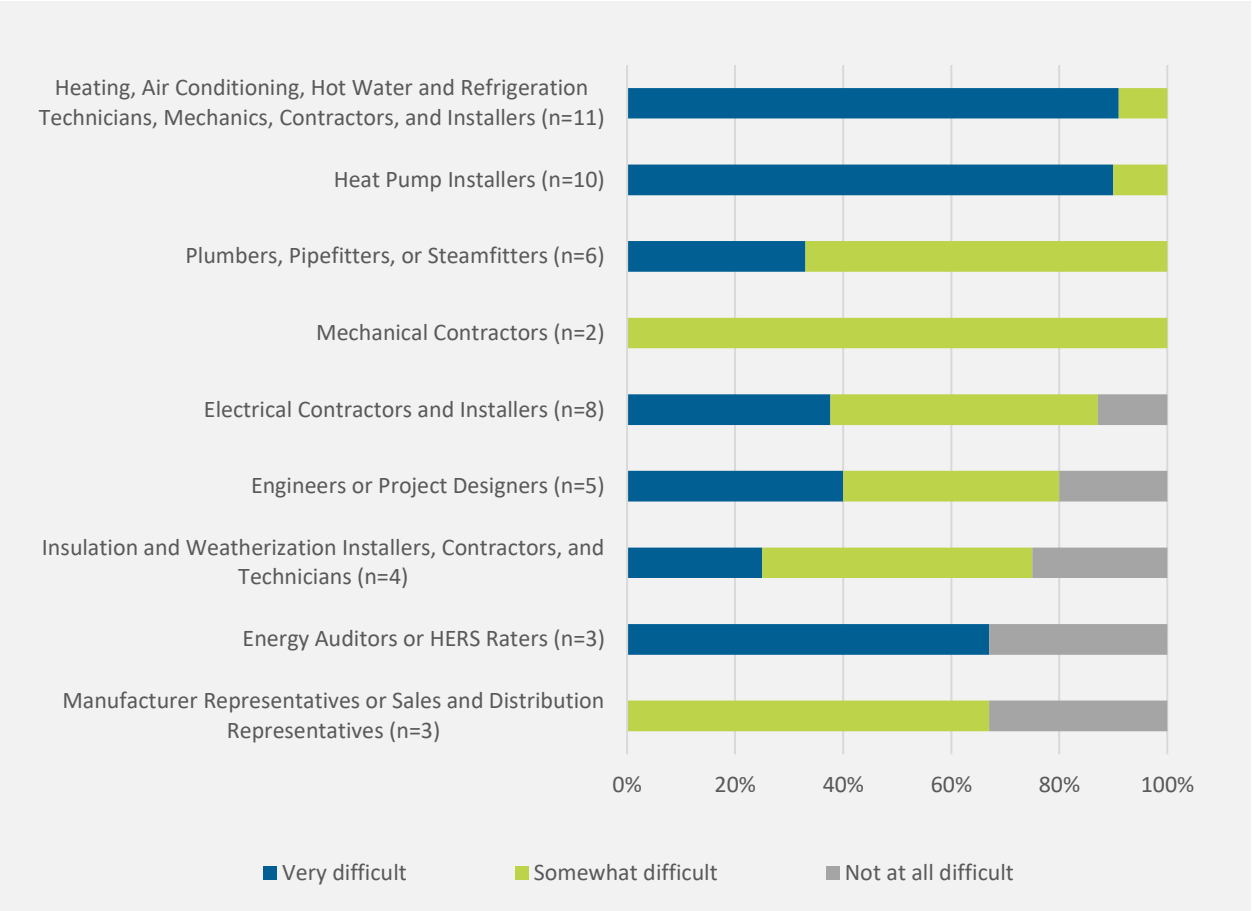


Many Rhode Island energy efficiency firms are growing into new areas of business. Almost four in ten firms expect to expand their capacity by hiring workers in occupations they did not previously employ. Employers expect to add employees from across all energy efficiency occupations surveyed, including HVAC technicians, electricians, energy auditors, engineers, heat pump installers, and weatherization technicians.

Hiring Difficulties

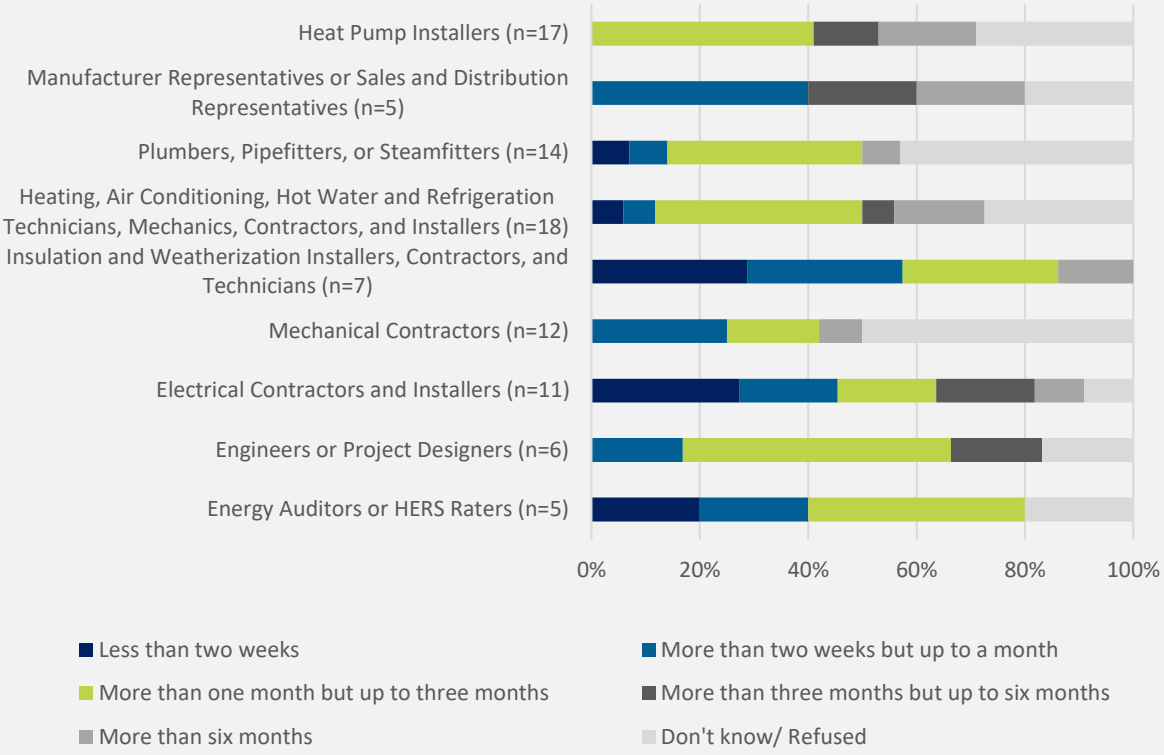
Nearly all employers surveyed indicated that they have faced difficulties hiring energy efficiency workers over the last 12 months, with nine in ten describing it as very difficult (56 percent) or somewhat difficult (35 percent) to find qualified applicants to fill a position. The most difficult to fill were HVAC technicians and heat pump installers, with nine in ten employers reporting it was very difficult to hire for these roles. Other positions were more likely to be described as somewhat difficult to fill.

Figure 5. Share of Employers Reporting it was Very, Somewhat, or Not Difficult to Fill Various Energy Efficiency Roles



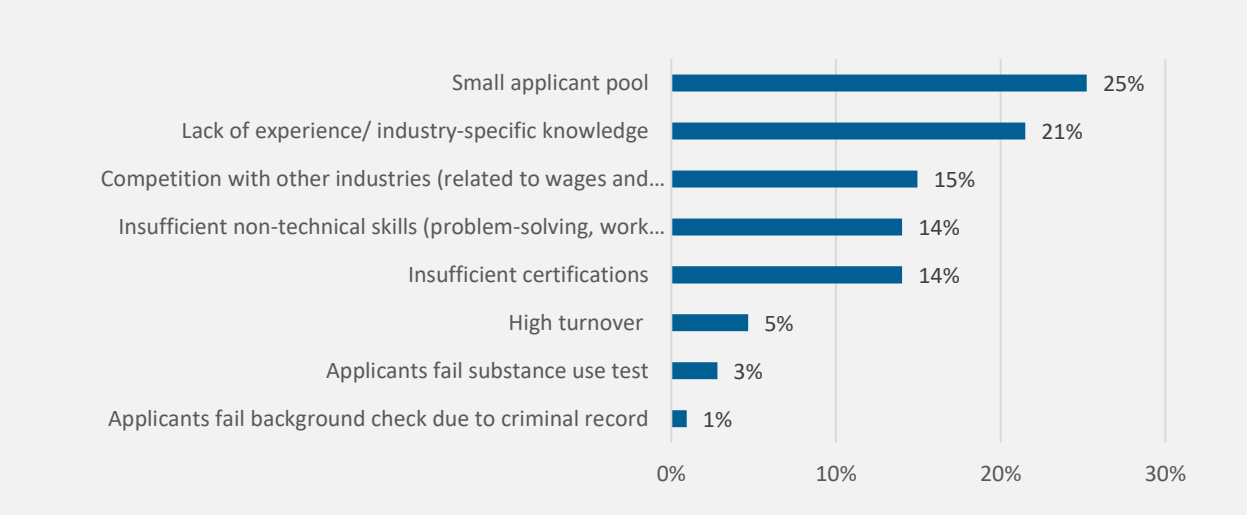
Employers also say filling open positions for heat pump installers and HVAC technicians took a long time. Nearly two-thirds (62 percent) of open HVAC technician positions took at least a month to fill, and a quarter took more than three months. Seven in ten (71 percent) open heat pump installer positions took more than a month to fill, with three in ten (30 percent) taking longer than three months. Other positions were somewhat easier to fill, with slightly less than half (45 percent) of open electrician positions, six in ten (58 percent) insulation and weatherization positions, and four in ten (40 percent) energy auditor roles being filled in under a month.

Figure 15. Length of Time Employers Took to Fill Individual Energy Job Openings, by Job Type



Reasons for hiring difficulty varied. Across all responses, two categories emerged: (1) a lack of labor supply and (2) a lack of workers prepared to step into the role immediately. A small applicant pool was the top reason for difficulty in hiring, with a quarter (25 percent) of respondents citing this challenge, and another 15 percent citing competition with other industries. Lack of experience/industry-specific knowledge was the second-leading reason, cited by two in ten (21 percent), followed by insufficient certifications (14 percent) and insufficient non-technical skills (14 percent). These results are comparable to surveys of energy efficiency employers in other northeast states.

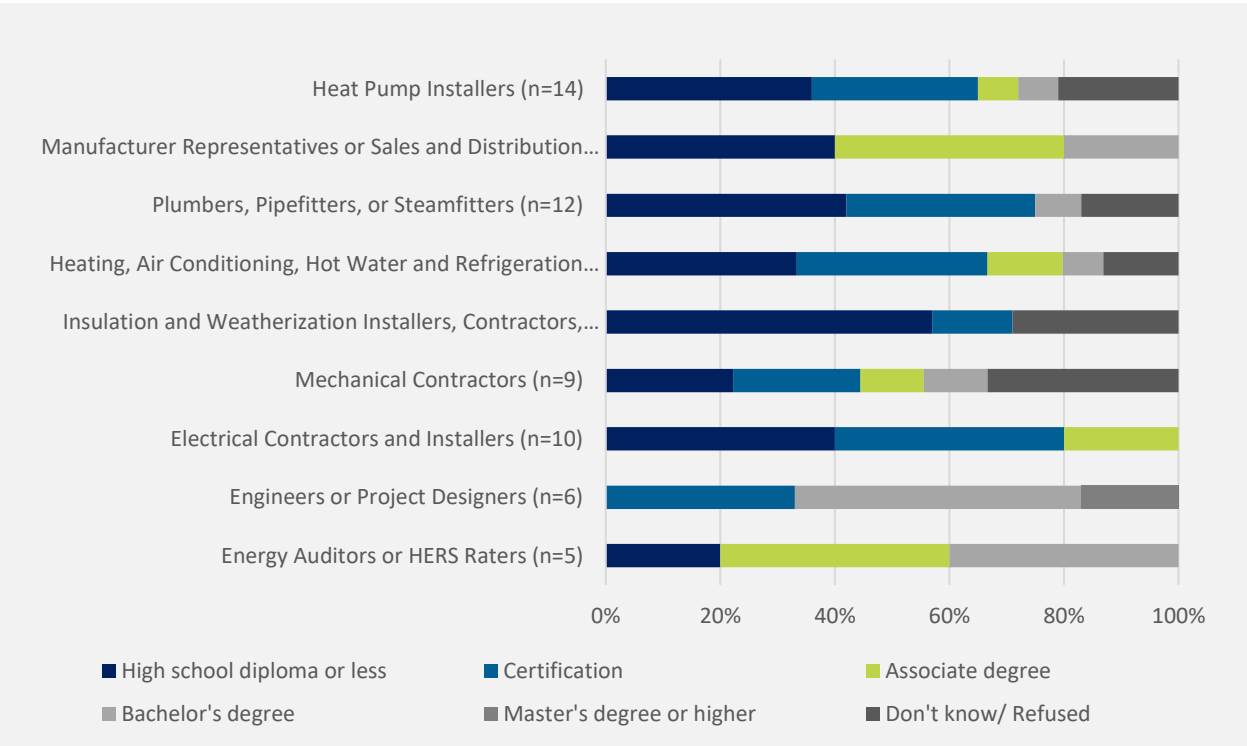
Figure 16. Primary Reason Employers Cited for Hiring Difficulty



Hiring Requirements

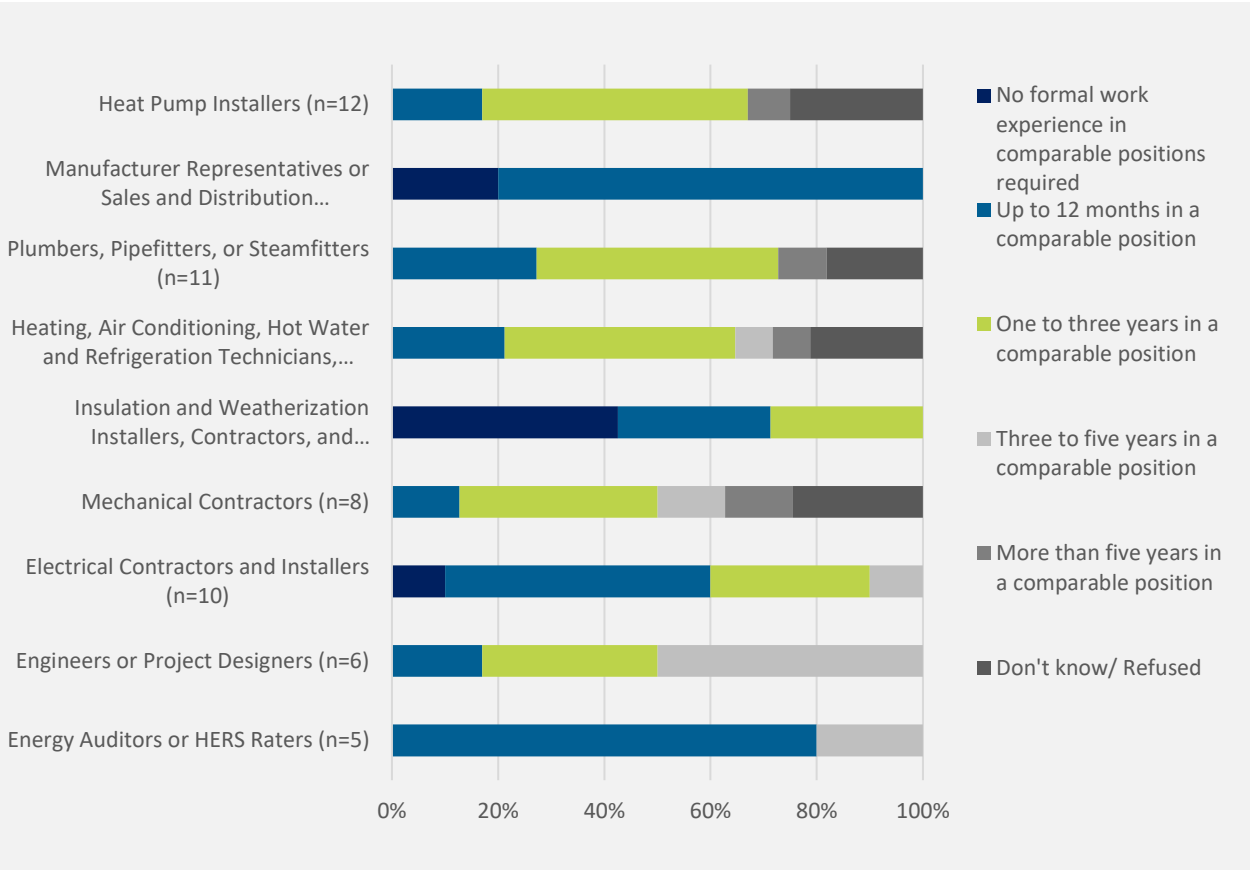
Respondents report that many of their energy efficiency job openings do not require a college degree. In fact, many employers report employing workers for several energy efficiency jobs that require a high school diploma or less; many other jobs require certification in the relevant field. More than half of jobs in insulation and weatherization require a high school diploma or less. Survey data generally indicate that employers value applicants' experience more than specific certifications, training, or education.

Figure 17. Energy Efficiency Employers' Education Requirements by Role



Most employers expect some work experience for most roles, with at least half requiring that heat pump installers (50 percent), plumbers (54 percent), HVAC technicians (57 percent), and mechanical contractors (64 percent) have a year or more of experience in a comparable role. There are, however, exceptions: Most notably, seven in ten (72 percent) employers require insulation and weatherization applications to have experience totaling one year or less, and four in ten (43 percent) do not require these applicants to have any formal work experience.

Figure 18. Energy Efficiency Employers' Requirements for Previous Work Experience by Role



Finally, about half of employers (52 percent) conduct substance use testing for potential applicants, and two-thirds (67 percent) conduct criminal background checks.

Figure 19. Do You Conduct Substance Use Testing for Potential Applicants?

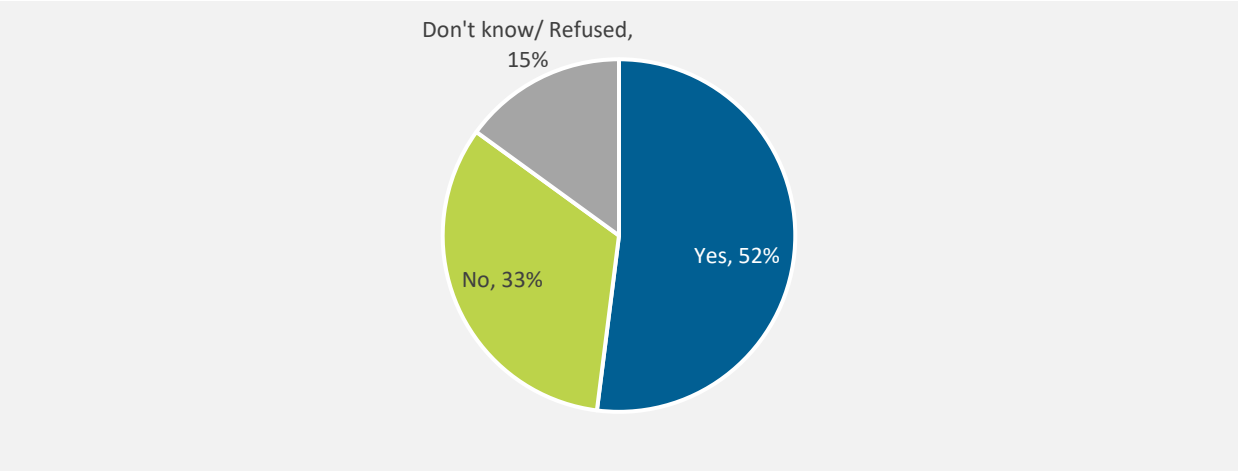
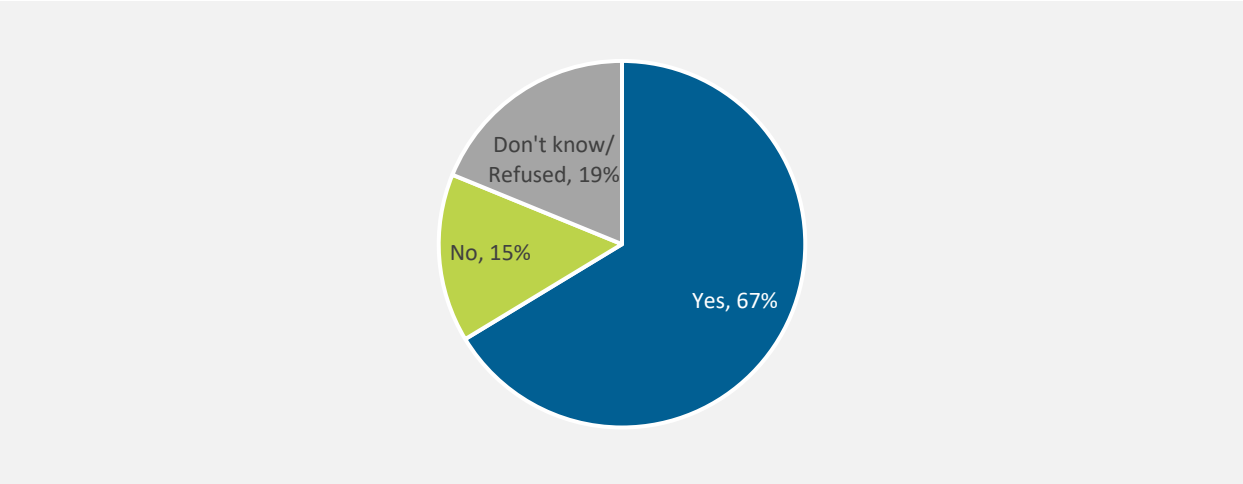


Figure 20. Do You Conduct Criminal Background Checks for Potential Applicants?

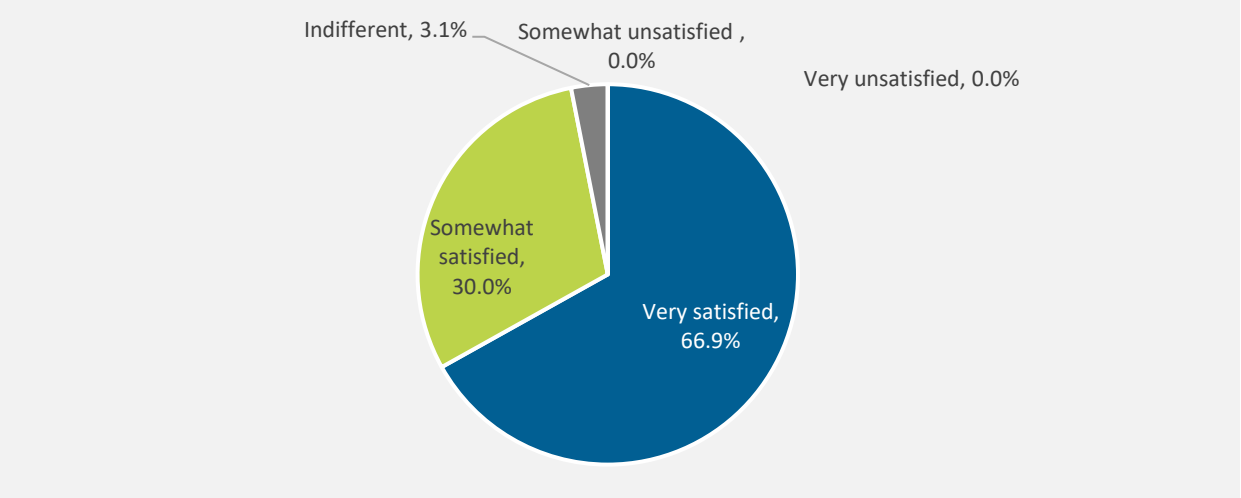


Workers

Benefits, Satisfaction, and Career Opportunities

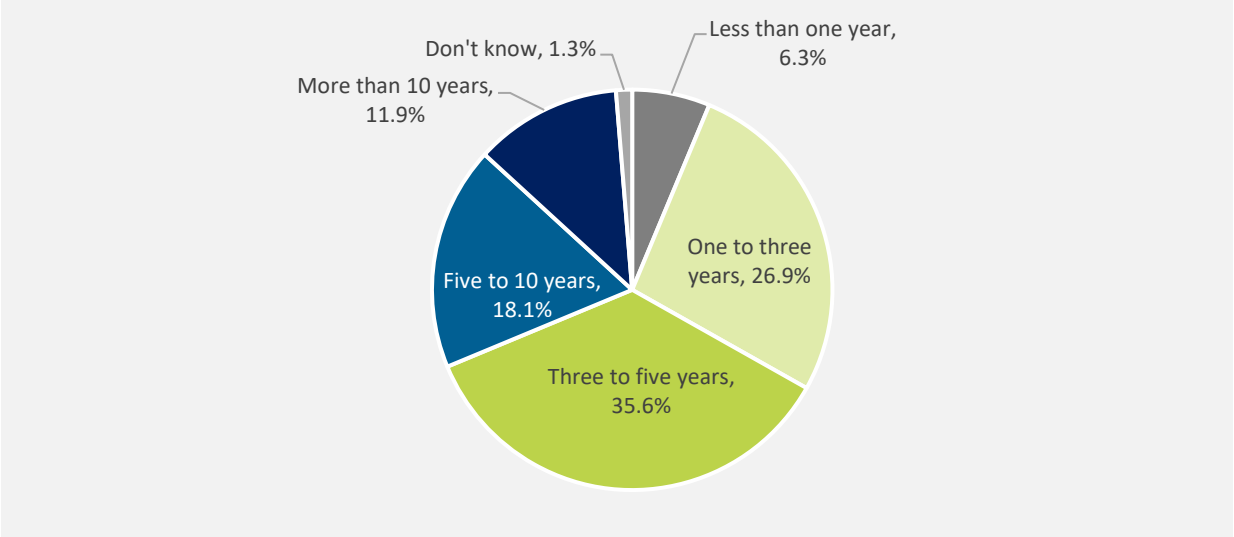
Nearly all energy efficiency workers are satisfied with their jobs, with two-thirds (67 percent) stating they are very satisfied.

Figure 21. Current Energy Efficiency Workers' Career Satisfaction



Most energy efficiency workers are early in their careers, with slightly more than one in ten (12 percent) having worked in energy efficiency longer than ten years. Nearly triple that share (33 percent) have been in the field three years or less.

Figure 22. Length of Time Current Energy Efficiency Workers Have Been Working in the Energy Efficiency Field



Nearly all workers see their future next step as an advancement within their company (71 percent) or within their industry (23 percent). In terms of current obstacles to advancement, only one third (36 percent) cite a lack of opportunities or open positions, about the same as those who foresee no obstacles (31 percent).

Figure 23. Next Step in Career or Promotion for Current Energy Efficiency Workers

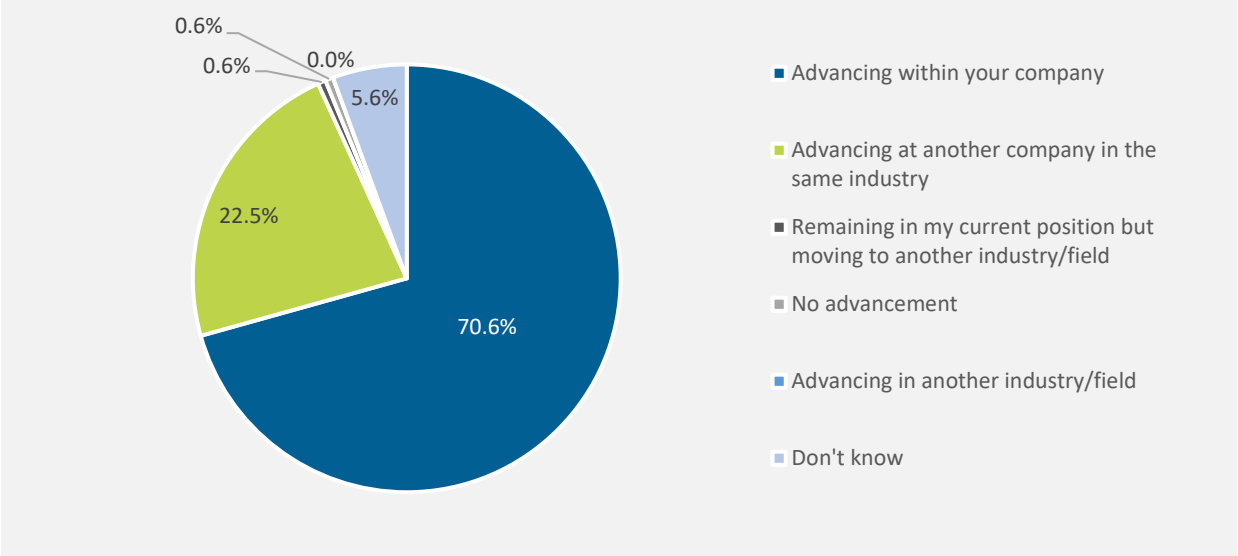
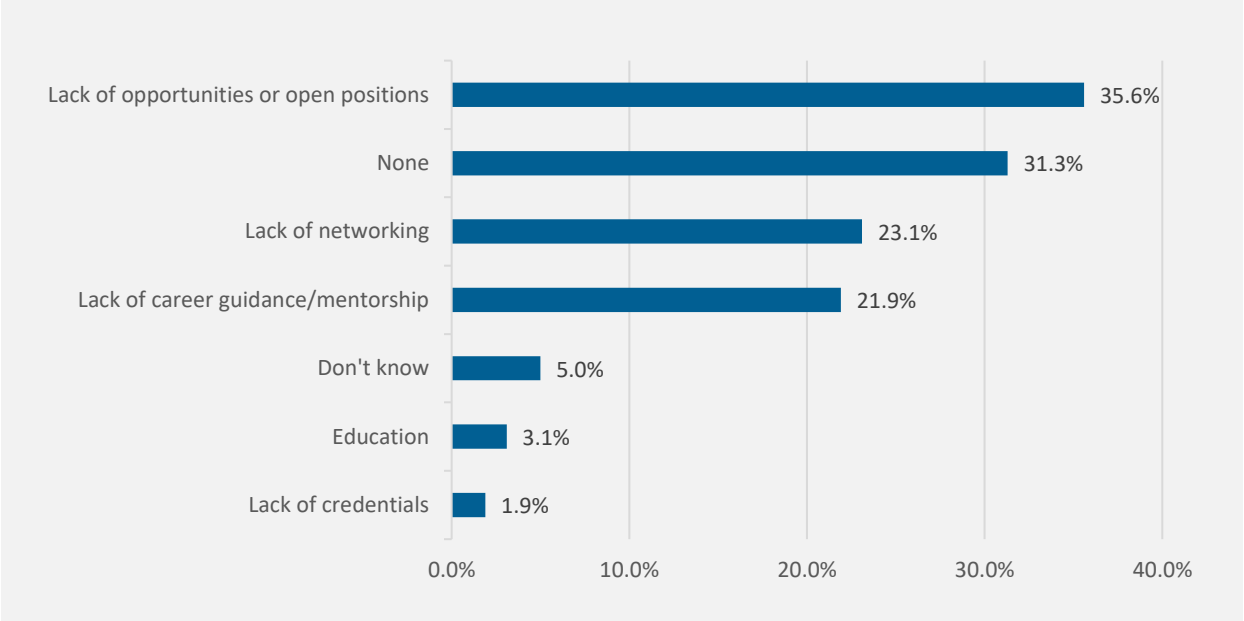


Figure 24. Obstacles to Promotion in the Energy Efficiency Field Foreseen by Current Workers[14]



[14] Survey respondents were allowed to select all that applied to the question asked, "do you foresee any obstacles to promotion within the energy efficiency field?"

Most energy efficiency employees in Rhode Island have healthcare benefits for their workers, with nearly six in ten receiving full coverage and another 30 percent receiving partial coverage from employers. Nearly 80 percent provide paid vacation. Some employers also offer other benefits, such as flexible work schedules (55 percent), a company vehicle (46 percent), or tuition or transportation support (26 percent and 25 percent, respectively).

Figure 25. As a Current Energy Efficiency Worker, Does Your Employer Offer Paid Healthcare Benefits?

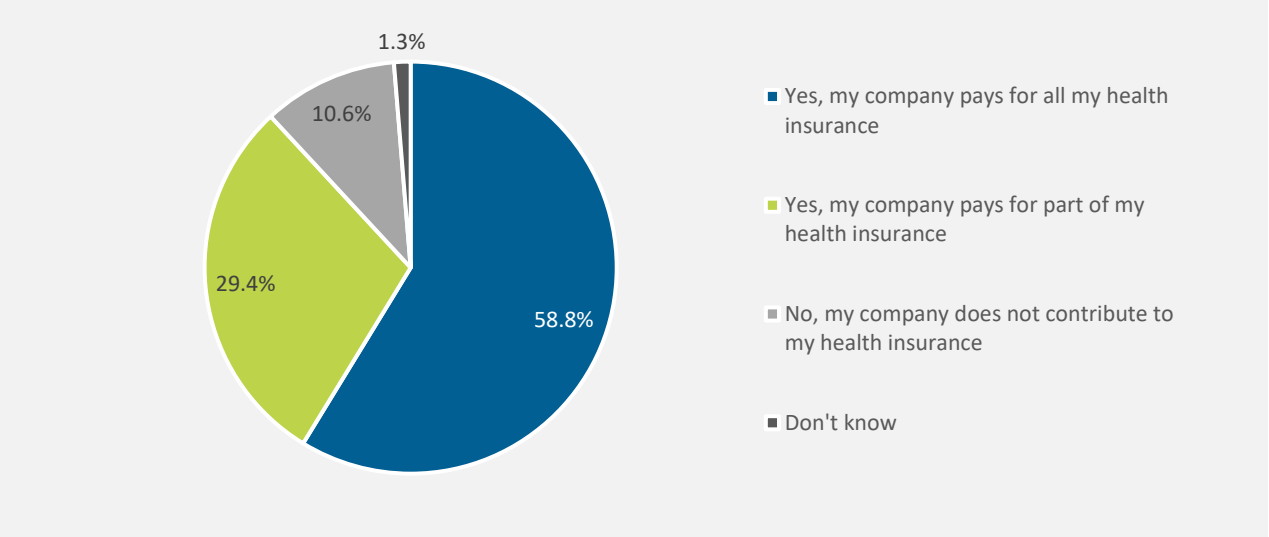


Figure 26. As a Current Energy Efficiency Worker, Does Your Employer Offer Paid Vacation Benefits?

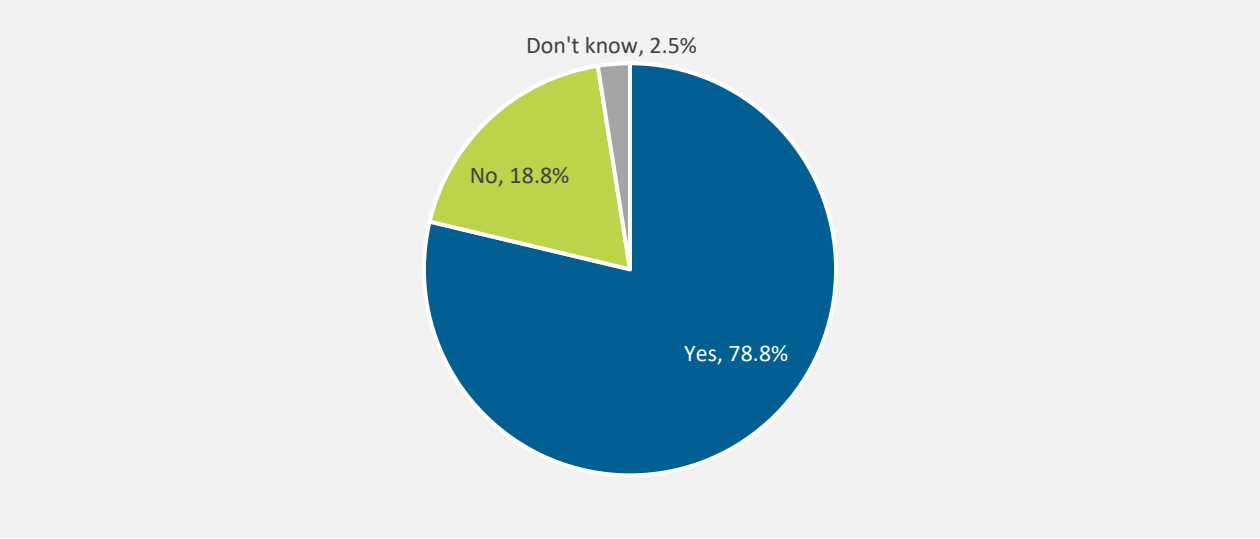
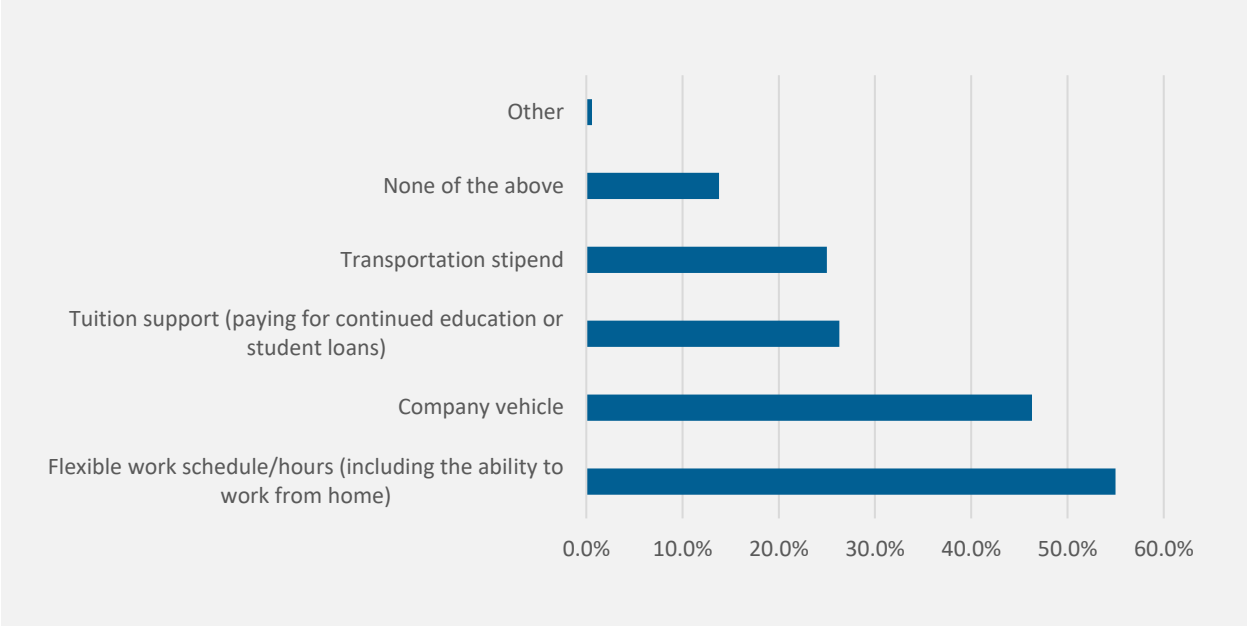


Figure 27. Share of Employers Providing Additional Benefits, by Benefit



Education and Career Support

One-third of current workers stated that training and education courses have helped them either obtain a job or increase their earnings in the field. These respondents specified that they completed trainings or courses through a wide variety of providers, including trade or technical schools, community colleges, colleges/universities, on-the-job or on-site training through their employee, and private training companies. One-third of workers also reported participating in apprenticeships, internships, or dedicated mentorships, with essentially all who participated (95 percent) stating these opportunities improved their job prospects or contributed to their success in the field.

Figure 28. Have You Completed Any Training or Education Courses That You Feel Have Either Helped You Get a Job or Increase Your Pay in the Energy Efficiency Field?

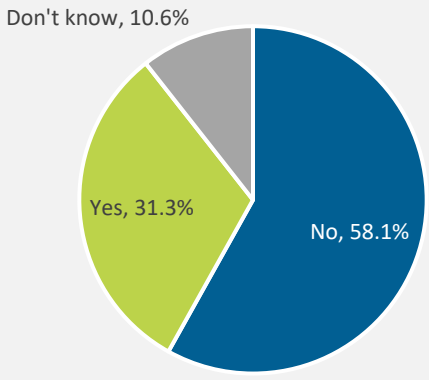


Figure 29. Participation in Formal Apprenticeship, Internship, or Mentorship Programs by Current Energy Efficiency Workers

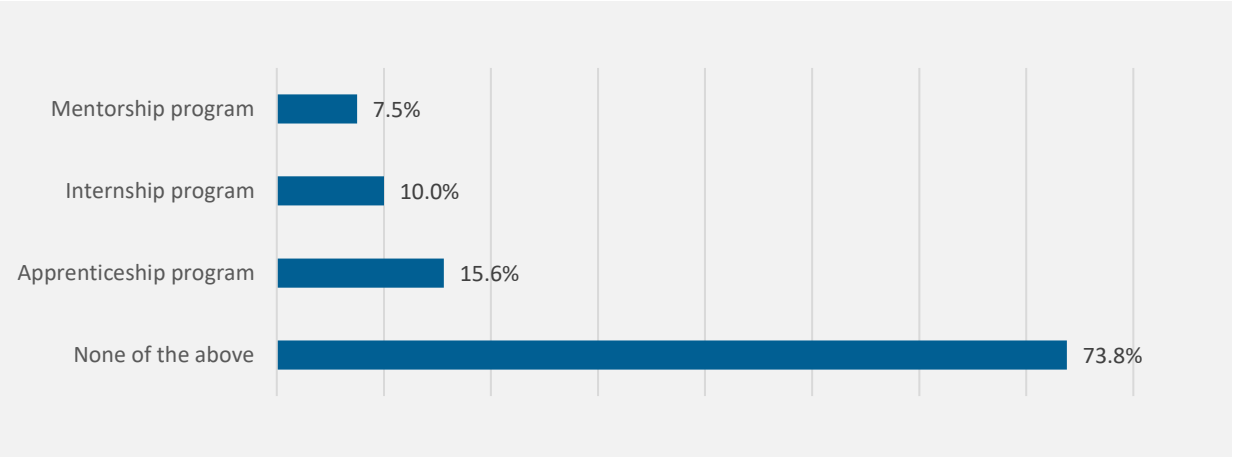
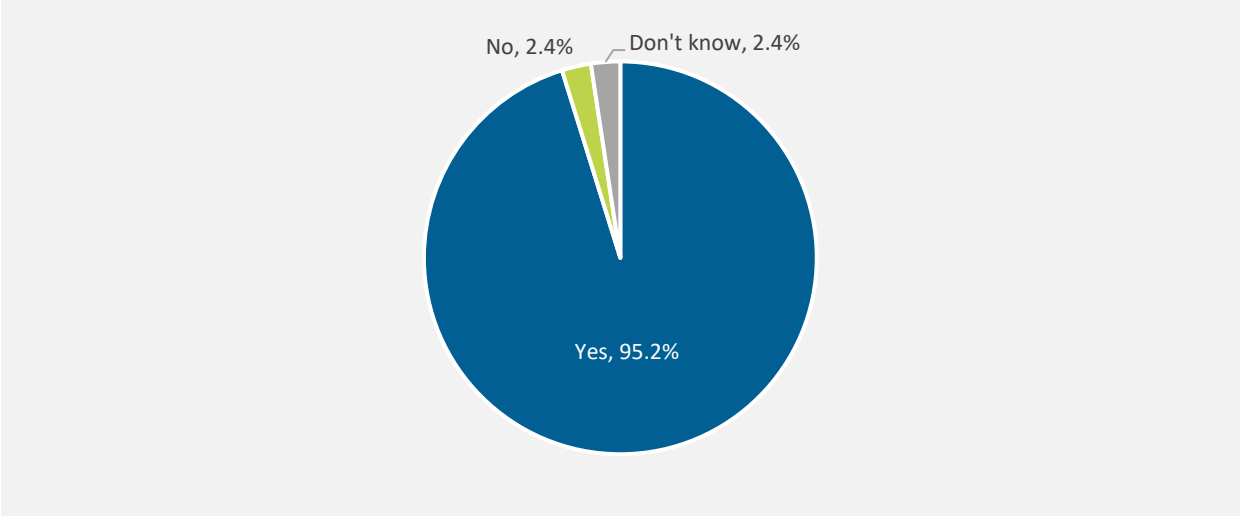
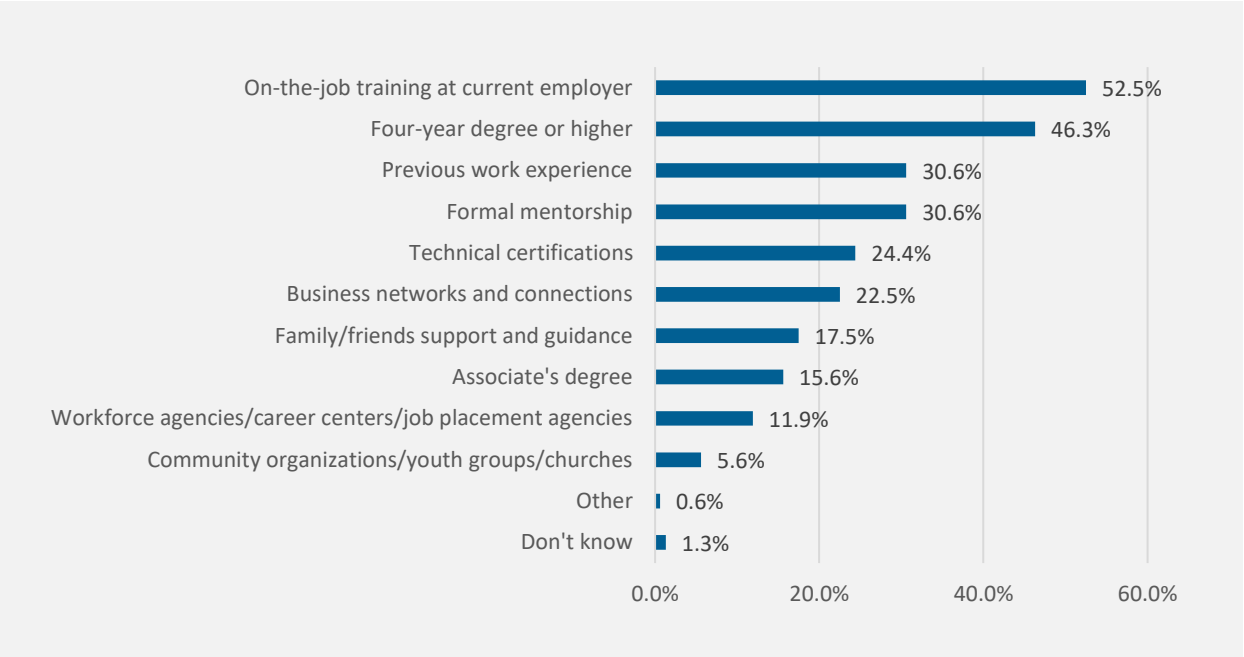


Figure 30. Did Participation in a Formal Apprenticeship, Internship, and/or Mentorship Program Improve Your Job Prospects or Your Success at Your Current Job?



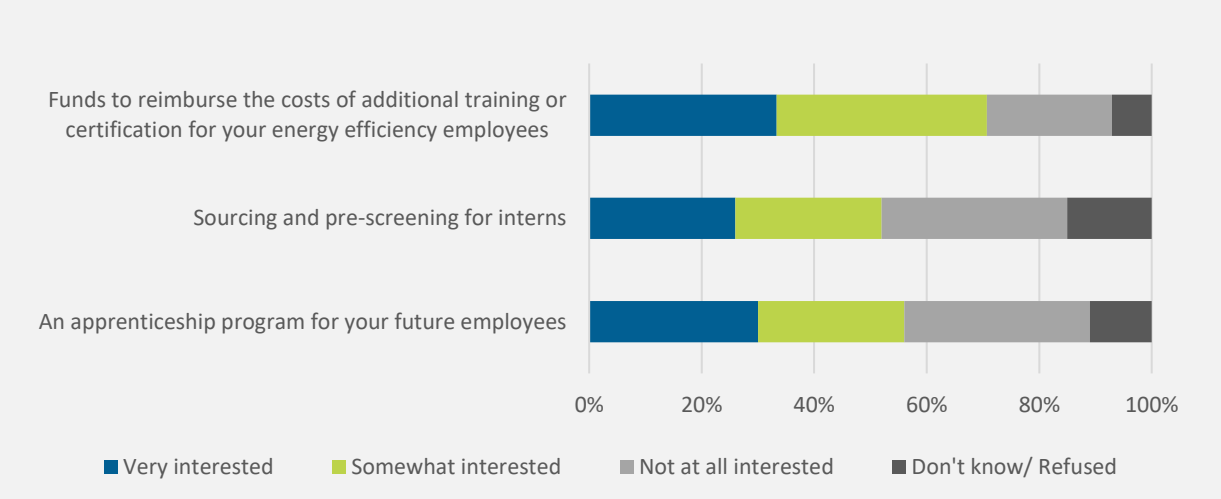
According to current energy efficiency workers, many important career growth opportunities are found through existing or prior work experience. Over half (53 percent) listed on-the-job training at a current job as important for successful career navigation, while formal mentorship and prior experience were each chosen by a third (31 percent) of workers. A quarter of respondents (23 percent) listed business networks and connections. Nearly half of workers (46 percent), list four-year or graduate degrees as important, and a quarter (24 percent) report that technical certifications are important for career growth and navigation.

Figure 31. Programs or Credentials Important for Successful Career Navigation in the Energy Efficiency Field, Reported by Current Workers



The majority of surveyed firms are interested in offering or accessing recruitment and training program offerings. Specifically, 56 percent reported that they are interested in funds to reimburse the costs of additional training or certification for their energy efficiency employees, and about half of businesses (56 percent) indicated some level of interest in an apprenticeship program for their future employees and/or sourcing and pre-screening for interns (52 percent).

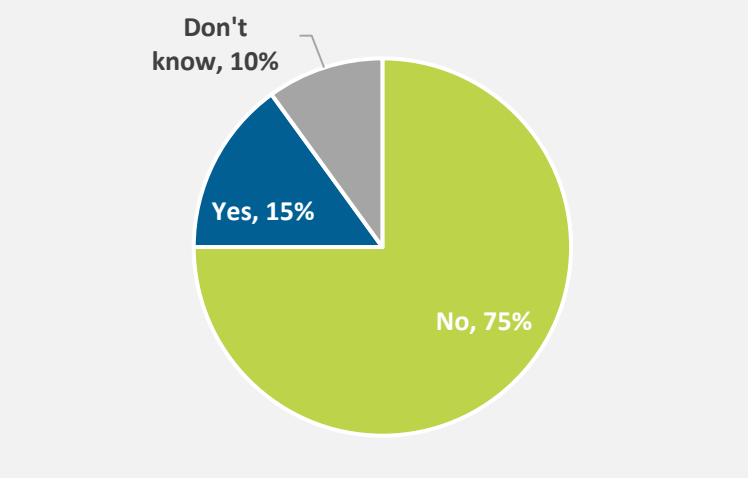
Figure 32. Surveyed Energy Efficiency Employers' Interest in Potential Recruitment and Training Programs



Certifications

Three-quarters (75 percent) of employers do not require employees to hold certifications beyond the state's requirements for the position they hold.

Figure 33. As a Current Energy Efficiency Worker, Does Your Employer Require You to Hold Specific Licenses or Certifications?



Across all occupations, employers were most likely to list the OSHA card (10-hour safety course), OSHA Confined Spaces Training, and Certified Energy Manager certifications as valuable, with completion of the OSHA trainings being relevant to all trade positions and completion of Certified Energy Manager training being important for roles such as energy auditor, engineer or project designer, and electrician.

Other certifications mentioned as valuable for different positions include:

- Air Conditioning Contractors of America (ACCA), Manual D (duct design)
- Air Conditioning Contractors of America (ACCA), Manual J (system sizing)
- Air Conditioning Contractors of America (ACCA), Manual S (equipment selection)
- Building Performance Institute (BPI), BPI Energy Auditor
- Construction Supervisor License (CSL): Specialty CSL Insulation license
- United States Environmental Protection Agency (US EPA), Section 608 Technician Certification
- United States Department of Energy (US DOE), Weatherization Assistance Program
- Weatherization Crew Chief Certification

Potential Energy Efficiency Workers

The difficulties employers face in hiring for energy efficiency jobs are not likely to be eased in the near term by an influx of new workers, judging by potential workers' knowledge of and interest in energy efficiency jobs. This is unfortunate, given that these jobs closely align with what these workers are seeking in a job, are typically of high quality, and receive exceptionally high job satisfaction ratings from current workers.

Awareness of Energy Efficiency Jobs

When asked if they were aware of energy efficiency job types, careers, or occupations, only 15 percent of potential workers responded yes. Six percent of potential workers were "very likely" to apply for a position in the energy efficiency industry (although 40 percent were "somewhat likely", indicating an openness to these career paths even if specific knowledge of them is lacking), and just two percent were aware of energy efficiency training and education programs in their area.

Figure 34. Have You Heard of Any Energy Efficiency Job Types, Careers, or Occupations?

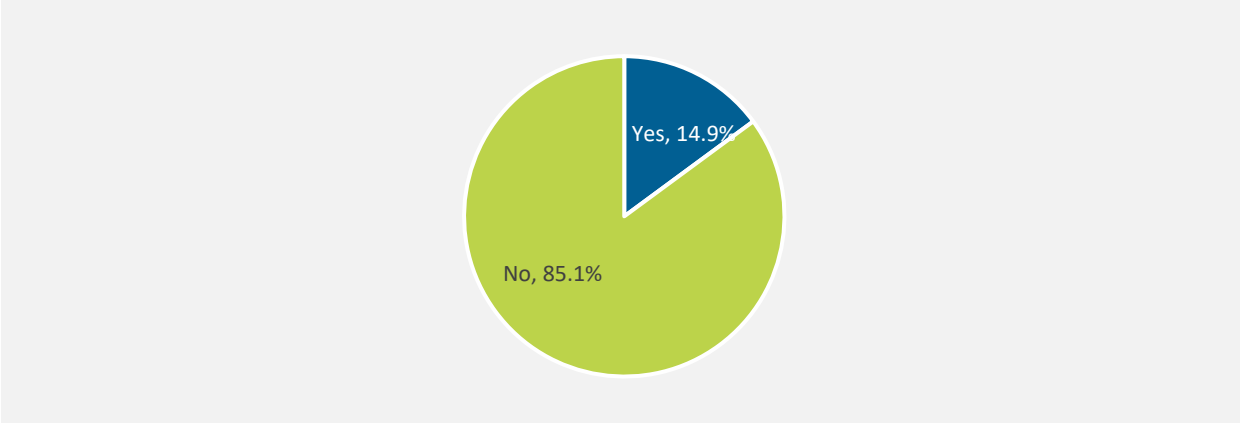


Figure 35. What is the Likelihood That You Will Apply for a Position in the Energy Efficiency Industry?

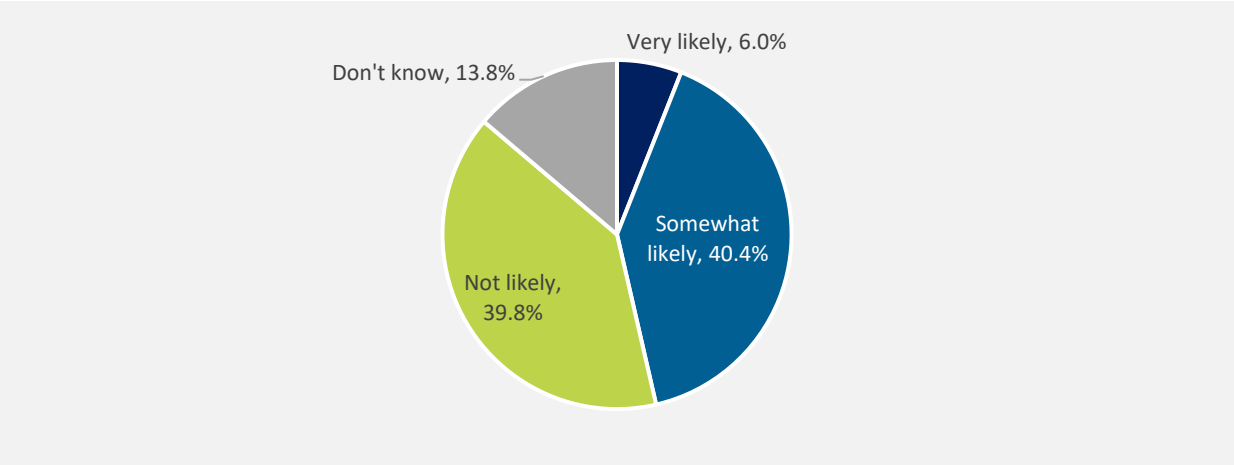
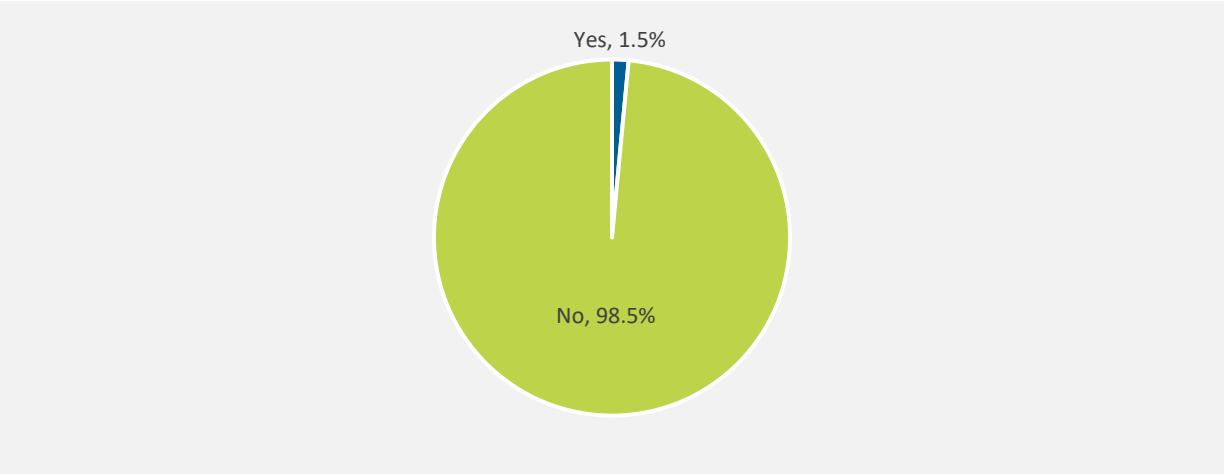


Figure 36. Are You Aware of Any Energy Efficiency Training or Education Programs in Your Area?



Job Qualities Sought by Potential Workers

Overall, potential workers highlighted the importance of good benefits, meaningful work, growth opportunities, and flexibility in schedule and location when evaluating job opportunities. These qualities align with how current workers describe their jobs. When asked the single most important quality they are looking for in a job, the most popular option chosen by potential workers was meaningful work and opportunities providing a better work-life balance (i.e., flexibility in schedule and/or job location).

Figure 37. Importance of Various Job Qualities to Potential Workers

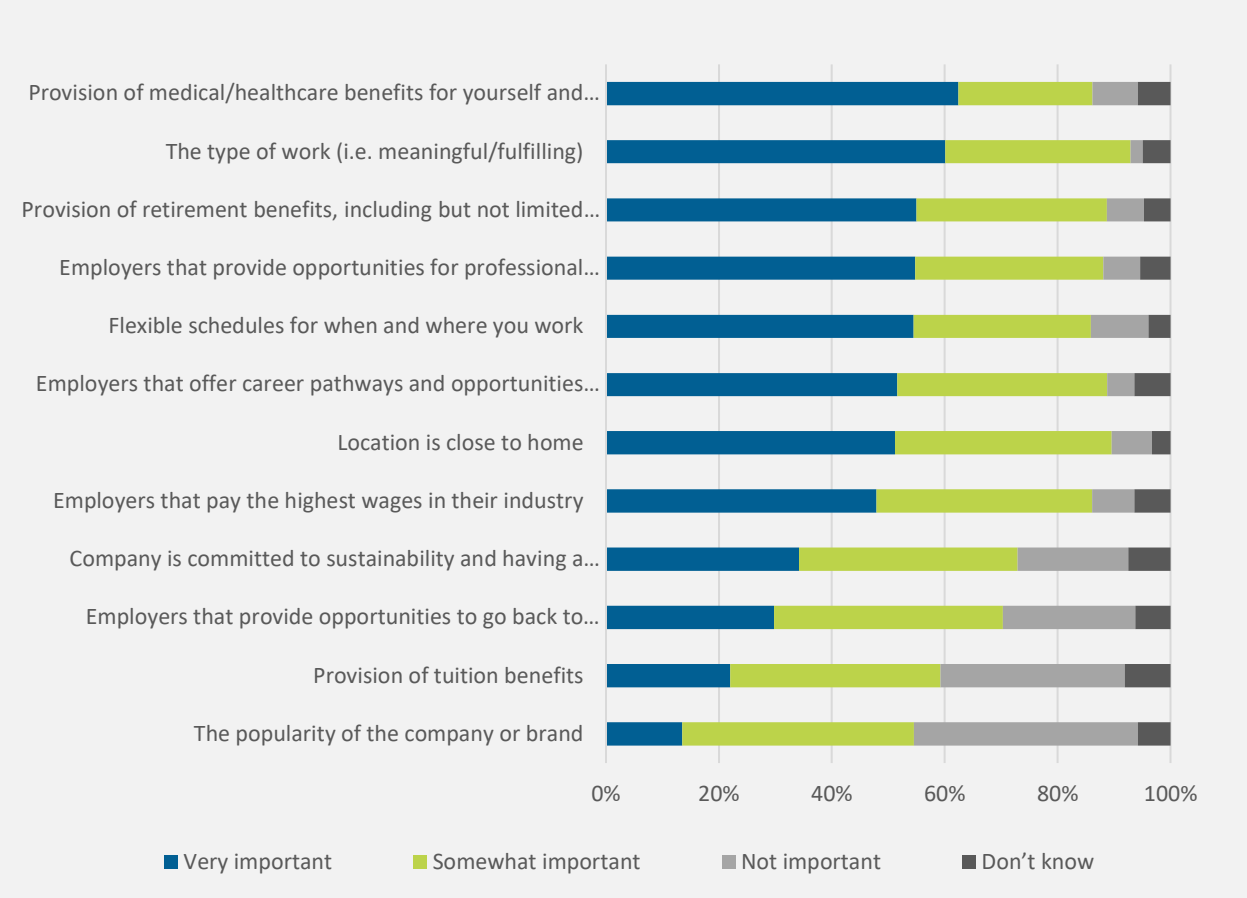
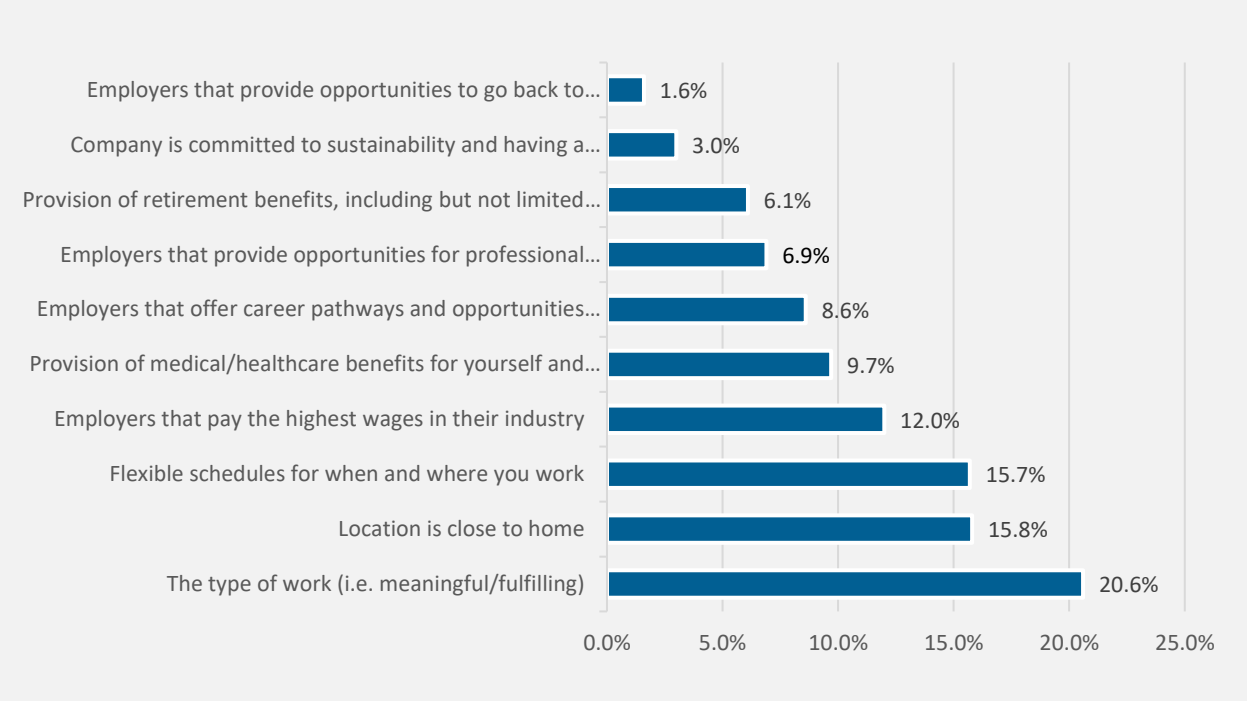


Figure 38. Factor Most Important to Potential Workers When Deciding Where to Work

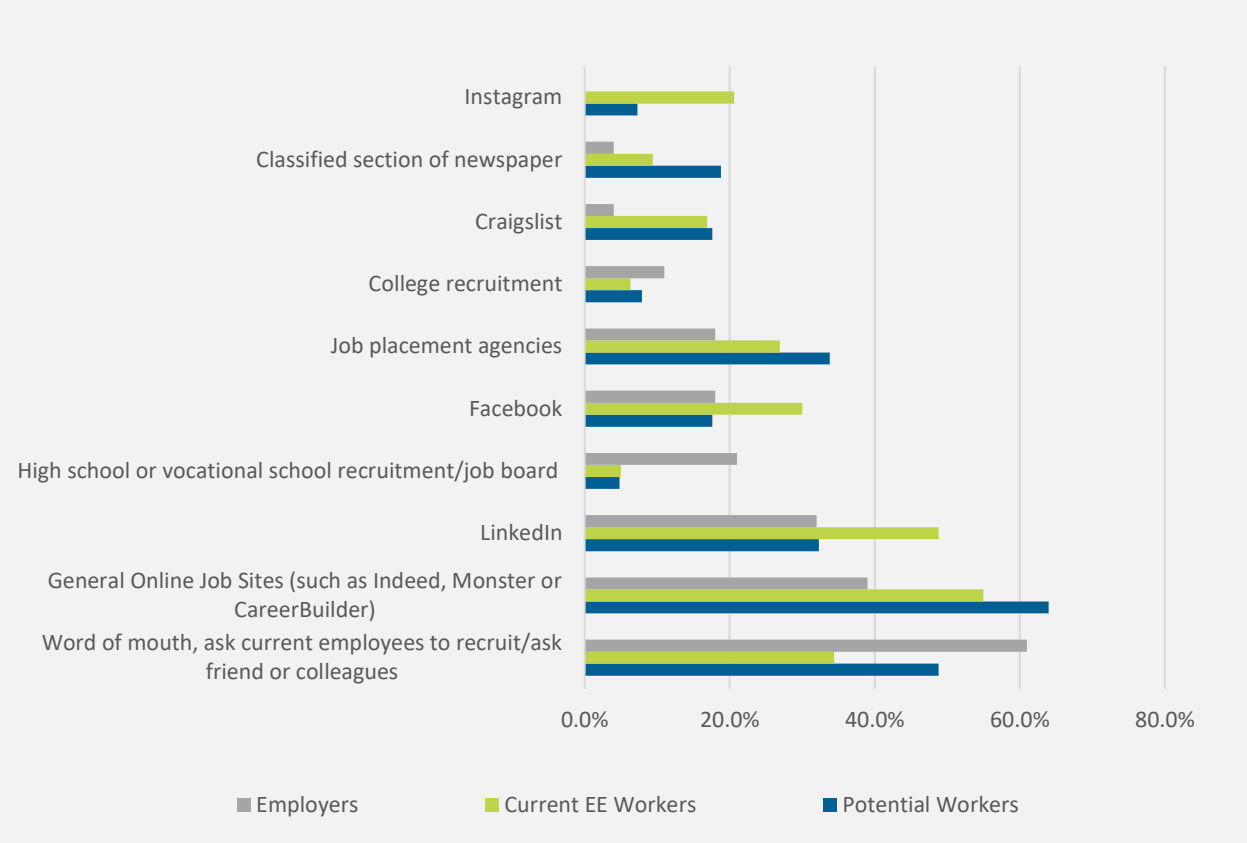


Use of Hiring Resources by Employers, Current Workers, and Potential Workers

Word of mouth and online job sites top the list of hiring resources used by energy-efficiency employers. Six in ten (61 percent) firms reported that they regularly use word of mouth, which includes asking current employees to recruit workers. Online job sites—including Indeed, Monster, and CareerBuilder—are used by four in ten hiring firms (39 percent), while LinkedIn is used by a third (32 percent). Other hiring resources, including social media platforms, job placement agencies, and recruiting from high schools and colleges, are used more sparingly.

There are differences between how potential and current workers search for jobs and how employers seek to fill them. Both groups of workers are more likely than employers to use online job sites (64 percent of potential and 55 percent of current workers, compared to 39 percent of employers). Job placement agencies are also more likely to be used by workers (34 percent of potential and 27 percent of current) than employers (18 percent). Craigslist (used by 18 percent of potential workers and 17 percent of current workers) and classified ads (used by 19 percent of potential and nine percent of current workers) are also more popular with workers than employers (4 percent of employers using each). Meanwhile, workers (49 percent of potential and 34 percent of current) are less likely than employers (61 percent) to rely on word of mouth. Other areas of misalignment between workers and employers are found in the use of high school or vocational school resources, social media, and job placement agencies.

Figure 39. Hiring Resources Used by Energy Efficiency Employers, Current Workers, and Potential Workers



Workforce Development Ecosystem and Funding Landscape

Summary

This chapter provides more detail on the current training landscape for energy efficiency jobs in Rhode Island as well as information about organizations in Rhode Island that can provide workforce development funding, career-building support services, and wraparound services. To conduct this analysis, BW Research compiled an inventory of workforce development programs and assets accessible to residents in the state, leveraging prior training inventories and publicly available listings on school, government, business, and association websites.

A review of the training and education assets in Rhode Island shows that current and potential workers have access to many training programs to guide their professional development and readiness in the energy efficiency field.

An evaluation of the overall landscape in Rhode Island reveals that a wide range of entities are involved in energy efficiency workforce development, including community colleges, universities, career and technical education centers, trade schools, unions, community organizations, and private institutions or companies. The programs they offer target a wide variety of energy efficiency occupations, with large concentrations of programs focused on energy auditors/HERS raters/building analysts/building inspectors, HVAC technicians, electricians, and engineers as well as operations and maintenance roles.

There are, however, gaps in the available programs that should be addressed for greater access and improved workforce development. A majority of the 280 programs identified are offered online, while 87 are offered physically in Rhode Island. Many in-person training courses were offered online during the COVID-19 pandemic, and there has been an ongoing transition into more hybrid options. Some program hosts interviewed for this report are hoping to keep these programs online while others are offering both options.

Northwestern Rhode Island appears to have no in-person energy efficiency trainings, although it includes counties with large percentages of their populations living in an environmental justice community. Access to energy efficiency trainings can help connect environmental justice communities with energy efficiency jobs and benefits. The southern and western parts of the state also have few energy-efficiency-related training opportunities.

Alongside these training assets, there are many organizations that can support the talent pipeline of residents—especially people of color, women, and those living in underserved communities—in taking advantage of these programs and opportunities for career development. These include community-based organizations that have a presence and trust within underserved and underrepresented communities, career and technical education centers that prepare high school-aged residents for trades occupations, and organizations that provide wraparound support services to workers and reduce barriers to accessing workforce development services and programs.

Funding from multiple sources appears to be available to most energy efficiency workforce training providers across the state, and organizations are able to stack funds from various sources to develop

programs. Funding sources include state and federal education, workforce, and energy program funds as well as private grants. Increasing the flexibility of these funds would allow workforce solutions providers to provide more holistic delivery of training programs, especially in underserved areas.

Workforce support and community organizations face other limitations with the programs they can deliver. Because grant money often comes with strings attached, these organizations require access to grants that specifically allow for the development of energy efficiency programs. Further, Community Action Agencies, or agencies implementing the Community Action Program (CAP), which employ and train energy auditors to improve residential efficiency, require additional funding—or an expansion of their current funding—so that they can complete any maintenance a home may require before weatherization work can begin. Otherwise, weatherization assistance programs will be unable to serve many of the households they could otherwise help.

Training Entities

The following is a brief overview of each of the training entities profiled in 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 students for, or prepare students for certification exams within, specific career pathways. Community colleges can also provide a more financially attainable path to an eventual four-year bachelor's degree program in an advanced career, like engineering.

Technical Schools
Technical schools are a broad category of organizations that host courses aimed at adults looking to 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 those accredited by OSHA or BPI) or create programs that aim to prepare workers for specific careers and signal value to potential employers (like HVAC technician trainings). Technical school fees vary, but most are for-profit entities.

Vocational High Schools
In Rhode Island, vocational high schools are government-funded, and most are intended to provide high school students with the complete training necessary for entry to a given career.

Trade Associations
Trade associations offer certificate programs similar to those offered by technical schools, but they are more often 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, such as electrical engineering or building sciences degrees. Some larger schools also host trade association events and training programs.

Community-based Organizations
Community-based organizations serve the needs of a local community, or communities, by hosting programs, services, or other supporting initiatives that advance the wellbeing and prosperity of the community members, based on their specific circumstances and desires. Typically, these not-for-profit organizations have a strong presence in the communities they serve and work to build trust among the local residents. Some initiatives include job training to align with economic and community development goals.

Energy Efficiency Training and Other Workforce Supports in Rhode Island

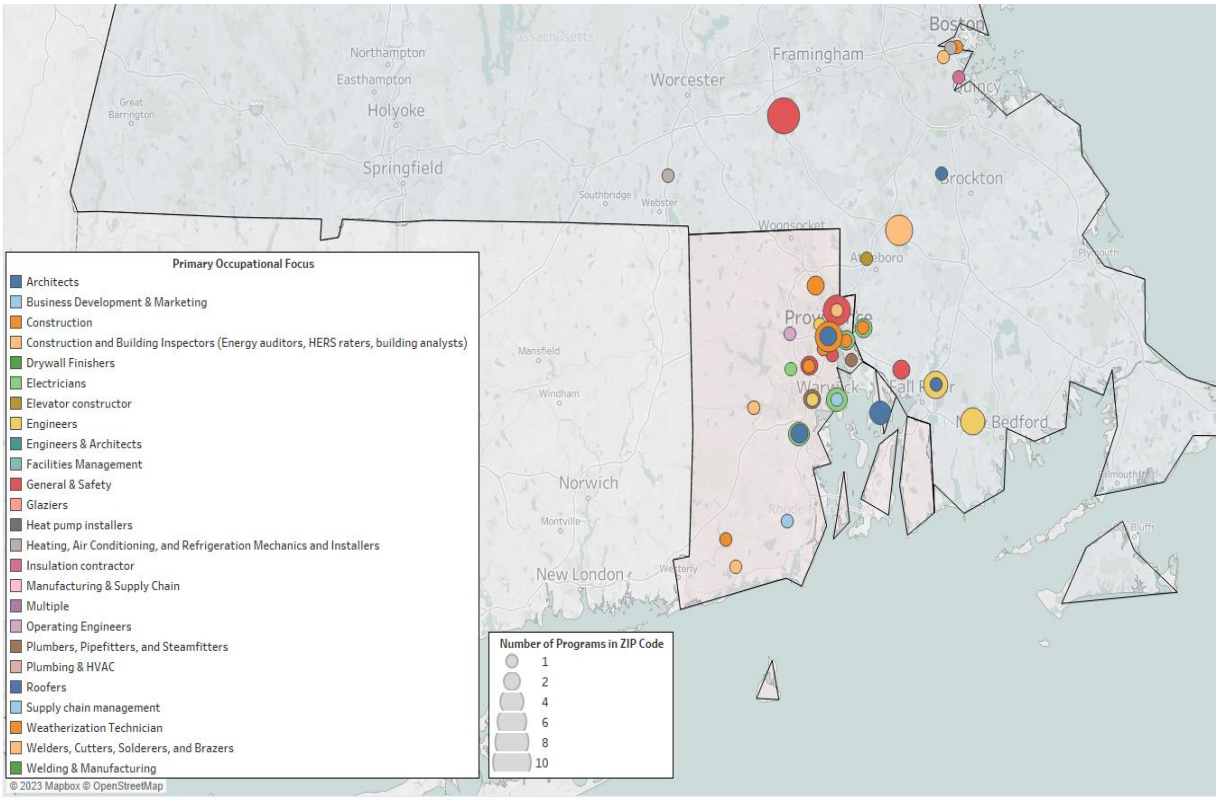
This section highlights the current training programs accessible to Rhode Island residents that are, or could be, involved in developing the state's energy efficiency workforce. This research has identified 280 programs, with 87 taking place physically in Rhode Island. Most identified programs, or 53.2 percent, are hosted by private training companies, and of those, 74.5 percent are held online. The remaining programs are hosted by a mix of community colleges, universities, career and technical education centers, trade schools, unions, community organizations, and other private institutions or companies.

Table 2. Location, Institution Type, and Number of Training Programs

Location	Institution Type	No. of Programs
Rhode Island		**87**
	College/University	21
	Community College	5
	Community-Based/Non-Profit Organization	1
	Industry Association	14
	Private Training Company/Technical School	27
	Union	5
	Utility	1
	Vocational-Technical High School	13
Massachusetts		**38**
	College/University	5
	Community College	7
	Community-Based/Non-Profit Organization	1
	Private Training Company/Technical School	11
	Technology Institute	5
	Union	9
Online		**155**
	College/University	5
	Community College	22
	Community-Based/Non-Profit Organization	4
	Industry Association	11
	Private Training Company/Technical School	111
	Technology Institute	2
	TOTAL	**280**

Location Analysis

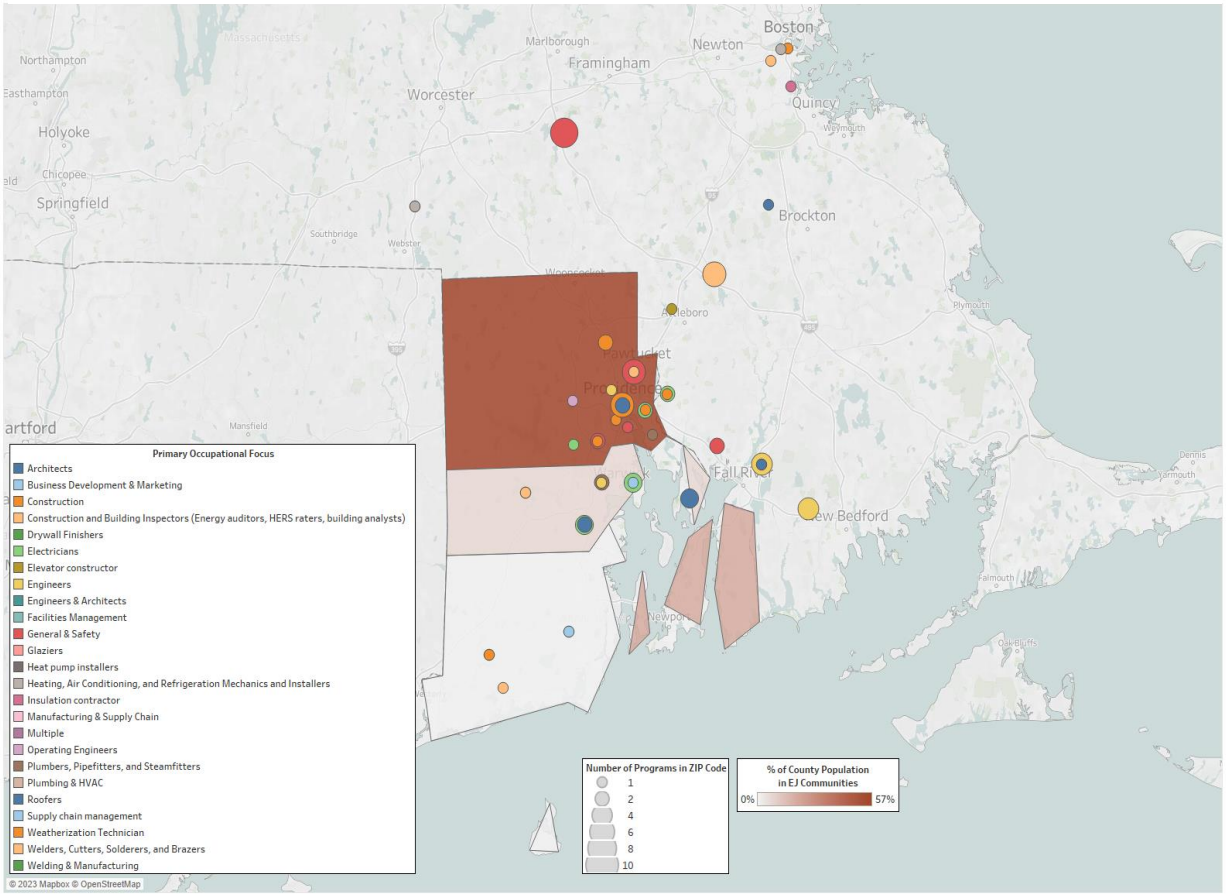
Figure 40. Map of In-Person Trainings Accessible to Rhode Island Residents by Primary Occupational Focus



A considerable proportion of the in-person Rhode Island-based trainings are found in the Providence-Warwick, RI-MA Metro Area. While there is a wide variety of occupational focus in this area, construction, electrician, and general and safety training programs are the most prominent. While there is a concentration of energy efficiency-related training programs in this metropolitan area, there is a lack of programs in the northwestern, western, and southern parts of Rhode Island. There are a few programs in southern Rhode Island, which are hosted by a career and technical education center, a university, and a private training company. These programs are focused on construction, engineering, construction and building inspection, supply chain management, and business development and marketing pathways.

A number of energy efficiency-related training programs identified are located in the state of Massachusetts, in Bristol, Suffolk, Middlesex, and Norfolk counties, which are close to or easily accessible from Rhode Island. These programs are focused mostly on engineers and construction and building inspectors, including energy auditors, HERS raters, and building analysts, and also includes general and safety programs.

Figure 41. Map of In-Person Trainings Accessible to Rhode Island Residents by Primary Occupational Focus, with Percentage of Environmental Justice Community Residents by Rhode Island County



Counties in the northern part of Rhode Island have the greatest share of residents living in an environmental justice community. Rhode Island residents who are interested in energy efficiency careers and live in environmental justice communities close to Providence and Pawtucket can access a variety of training programs. There is, however, a lack of training programs accessible to environmental justice community members living north of Pawtucket and west of Providence. This may make it difficult for these residents to explore energy efficiency career pathways. While the southern section of the state has relatively fewer energy efficiency-related training programs, a smaller share of residents here live in environmental justice communities.

Trainings Held Physically in Rhode Island

Among the eighty-seven energy efficiency-related training programs physically held in Rhode Island, almost one-fifth are apprenticeships, while another 17 percent are programs for job readiness. The research also identified several pre-apprenticeship and apprenticeship-readiness programs. Apprenticeships and related programs provide important opportunities for interested workers to get hands-on experience and land permanent positions. The variety of programs on offer allows multiple entry points to energy efficiency careers and suggest a strong pipeline of incoming workers. Certification

programs represent 11.5 percent while upskilling programs for professionals already in the field represent only seven percent of all in-person trainings in Rhode Island.

Table 3. Degree/Outcome of Energy Efficiency Trainings Held Physically in Rhode Island

Degree/Outcome	No. of Programs	Percent of Programs
Apprenticeship	17	19.5%
Job Readiness	15	17.2%
Pre-apprenticeship	11	12.6%
Certificate	10	11.5%
Bachelor's	9	10.3%
Associate’s	8	9.2%
Upskilling	6	6.9%
Course Credits	3	3.4%
Apprenticeship Readiness	2	2.3%
Certificate & Course Credits	2	2.3%
Continuing Education Unit (CEU) Credits	2	2.3%
Master's	2	2.3%

The identified energy efficiency training programs focus on a wide variety of occupations in the field. More than half of the programs identified focus on building construction workers, electricians, or engineers. Training programs for plumbers, pipefitters, and steamfitters; architects; and heating, air conditioning, and refrigeration mechanics and installers are also common, and a few programs focus on construction and building inspectors.

Table 4. Primary Occupational Focus of Energy Efficiency Trainings Held Physically in Rhode Island

Primary Occupational Focus	No. of Programs
Construction Professionals	13
Electricians	10
Engineers	10
All Occupations – a general & safety focus	10
Plumbers, Pipefitters, and Steamfitters	8
Architects	7
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	6
Construction and Building Inspectors (energy auditors, HERS raters, building analysts)	3
Business Development & Marketing Professionals	2
Heat Pump Installers	2
Plumbers & Heating, Ventilation, and Air Conditioning Technicians	2

Weatherization Technicians	2
Drywall Finishers	1
Elevator Constructors	1
Engineers & Architects	1
Facilities Management Professionals	1
Glaziers	1
Manufacturing & Supply Chain Professionals	1
Operating Engineers	1
Roofers	1
Supply Chain Management Professionals	1
Welders, Cutters, Solderers, and Brazers	1
Welding & Manufacturing Professionals	1
Multi-Occupational Focus	1

Most training programs in Rhode Island align with occupations that most energy efficiency employers employ or anticipate employing in the future.

Trainings Held Physically in Massachusetts

There are thirty-eight energy efficiency training programs held in Massachusetts that are accessible to Rhode Island residents (meaning they are a reasonable travel distance or accessible by train to Rhode Island residents and the educational institutions allow Rhode Island residents to apply). The programs in this category are located in the Massachusetts counties of Bristol, Suffolk, Middlesex, and Norfolk. These trainings are mostly certificate programs and cover a variety of occupations, though almost a quarter are general & safety trainings and 21 percent are engineering programs. Six of the thirty-eight programs focus on construction and building inspectors, including energy auditors, HERS raters, and building analysts.

Table 5. Degree/Outcome of Energy Efficiency Trainings Held Physically in Massachusetts, Accessible to Rhode Island Residents

Degree/Outcome	No. of Programs	Percent of Program
Certificate	18	47.4%
Associate Degree	5	13.2%
Job Readiness	4	10.5%
Apprenticeship	3	7.9%
Bachelor's Degree	2	5.3%
Master's Degree	2	5.3%
Professional Development	2	5.3%
Doctorate Degree	1	2.6%
None	1	2.6%

Table 6. Primary Occupational Focus of Energy Efficiency Trainings Held Physically in Massachusetts, Accessible to Rhode Island Residents

Primary Occupational Focus	No. of Programs
All Occupations – a general & safety focus	9
Engineers	8
Construction and Building Inspectors (energy auditors, HERS raters, building analysts)	6
Electricians	3
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	3
Manufacturing & Supply Chain Professionals	2
Architects	1
Construction Professionals	1
Elevator Constructors	1
Insulation Contractors	1
Roofers	1
Weatherization Technicians	1
Welders, Cutters, Solderers, and Brazers	1

Trainings Held Online

Over half, or roughly 55 percent, of the energy efficiency training programs identified by the research are held online. Among these 155 programs, approximately 37 percent provide certificates upon completion. Almost one-third grant Continuing Education Unit (CEU) credits for upskilling and professional development tracking. Very few are degree or job readiness programs. There are no online apprenticeships, because these require hands-on job training and experience.

Table 7. Degree/Outcome of Energy Efficiency Trainings Held Online

Degree/Outcome	No. of Programs	Percent of Programs
Certificate	58	37.4%
Continuing Education Unit (CEU) Credits	49	31.6%
Test Preparation	25	16.1%
Professional Development	10	6.5%
Master's	3	1.9%
Accreditation	2	1.3%
Apprenticeship Educational Hours	2	1.3%
Bachelor's	2	1.3%
Job Readiness	2	1.3%
Graduate Certificate	1	0.6%
Pre-apprenticeship	1	0.6%

The most popular occupational focus for online energy efficiency training programs is construction and building inspectors, including energy auditors, HERS raters, and building analysts. Among the 58 online certificate programs (non-graduate), nineteen focus on construction and building inspectors. Another popular occupational focus for these programs is heating, air conditioning, and refrigeration mechanics and installers. There are fewer programs designed for electricians and engineers, and there are only a few programs for plumbers, pipefitters, and steamfitters.

Table 8. Primary Occupational Focus of Energy Efficiency Trainings Held Online

Primary Occupational Focus	No. of Programs
Construction and Building Inspectors (energy auditors, HERS raters, building analysts)	37
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	23
Operations & Maintenance Professionals	22
All Occupations – a general & safety focus	15
LEED Green Associates	10
Electricians	8
Engineers	6
Heat Pump Installers	6
Management Analysts	6
Weatherization Technicians	4
Business Development & Marketing Professionals	3
Management Workers	3
Manufacturing & Supply Chain Professionals	3
Plumbers, Pipefitters, and Steamfitters	3
Architects	1
Construction Professionals	1
Plumbers & Heating, Ventilation, and Air Conditioning Technicians	1
Ventilation System Installers	1
Multi-Occupational Focus	2

SIDEBAR: CLEAResult Training Provider

CLEAResult, a private training company headquartered in Texas but with an office in Providence, Rhode Island, partners with various organizations to develop energy efficiency trainings based on need or request. With some regular partners, trainings occur monthly, some on the same topic and others on a different topic each month. While CLEAResult attempts to locate free spaces to hold the trainings, they often go where their partners are or where their partners request the training to be held. Some partners work with CLEAResult to train specific internal workers, while others open to trainings to the public.

The inventory captures some of the current CLEAResult trainings, including RI Energy-sponsored trainings, but not all. Below is a list of training topics that CLEAResult covers, though note that this is not

fully updated, as trainings and topics are constantly changing. CLEAResult has been responding to market demand for energy auditors, HVAC technicians, electricians, and plumbers, and has been working to increase the number of trainings for incoming workers. Strategic partnerships with CLEAResult and other training providers help to ensure that the trainings necessary to develop the state's energy efficiency workforce are available and accessible.

CLEAResult Training Topics

Residential

- Air Source Heat Pumps
- Envelope & Building Science
- Green Building: Standards and High-Preforming Homes
- Healthy Homes: Indoor Air Quality and Your Health
- Healthy Homes: Sheridan Small Home Virtual Tour
- Home Comfort: Heating, Cooling & Ventilation
- One- and Two-Family Dwelling Code
- Residential Energy Code Update
- Ventilation: Code Requirements and Compliance Strategies
- Weatherization:Insulation and Building Science
- Zero Energy Homes: Advanced Envelope & Building Science
- Zero Energy Homes: Designing HVAC for Large Spaces with Low Loads
- Zero Energy Homes: Mini Split Heat Pump Duct Design—Warwick, RI Case Study

Commercial

- Advanced Building Commissioning
- Intro to Commercial Building Commissioning
- Rhode Island Commercial Energy Code Update
- Rhode Island Stretch Code Training
- Zero Energy Buildings

Asset Inventory

This section highlights various entities involved in providing funding, career-building, and wraparound services to the Rhode Island workforce.

Funding for energy efficiency workforce development is available, but developing a job training program usually requires organizers to stack funding from a variety of sources. From interviews with energy efficiency stakeholders in Rhode Island, including community-based organizations, training providers, industry associations, technical education providers, and college or university programs, the research team was able to identify flows of funding relating to energy efficiency work and training. Table 8 below includes some stakeholders with whom the research team spoke and the sources of funding they shared.

Many stakeholders receive federal and state funds, notably from the Rhode Island departments of Education, Human Services, and Labor and Training and the Rhode Island Office of Energy Resources.

Local city funds are also available for certain organizations, such as career and technical education centers and community action agencies. Some training providers, including community action agencies and industry associations, may access utility, specifically Rhode Island Energy, funding for energy efficiency trainings.

Table 9. Sample of Energy Efficiency and Workforce Development Funding Opportunities

Organization Name	Funding Opportunity	Funder Type
Rhode Island State Council on the Arts	Build the Future Grant	State Agency
City of Providence	Hardest Hit Community Organizations Fund	State Agency
City of Providence	Workforce Development Funding Program	State Agency
Governor's Workforce Board	Apprenticeship Initiatives	State Agency
Governor's Workforce Board	Incumbent Worker Training Grants	State Agency
Governor's Workforce Board	PrepareRI	State Agency
Governor's Workforce Board	Real Skills for Youth	State Agency
Governor's Workforce Board	Workplace Accessibility Grants	State Agency
Rhode Island Department of Education	21st Century Technology and Equipment Fund	State Agency
Rhode Island Department of Education	Facility Equity Initiative	State Agency
Rhode Island Department of Education	Funding Formula for Aid to Education	State Agency
Rhode Island Department of Human Services	Rhode Island Works (RIW) Program	State Agency
Rhode Island Department of Human Services	WAP: Weatherization Assistance Program	State Agency
Rhode Island Department of Labor and Training	On-the-Job (OJT) Training Program	State Agency
Rhode Island Office of Energy Resources/Rhode Island Infrastructure Bank	Rhode Island Efficient Buildings Fund (RIEBF)	State Agency
Rhode Island Science and Technology Advisory Council	Internship Grant	State Agency
Rhode Island Foundation	Racial Equity and Social Justice Grants	Private

Table 10. Funding Sources of Example Stakeholders

Organization	Federal Funds	RI Dept of Human Services	RI Dept of Education	RI Dept of Energy	RI Dept of Labor and Training	State Aid for Career & Technical Programs	Local City Funds	Utility/ RI Energy	Community - Based Projects	Grants
Community-based Organization #1	X	X		X				X		
Community-based Organization #2	X	X					X	X		
Industry Association	X			X	X			X		
Career and Technical	X					X	X		X	

Education Center			
College/ University Program	**X**	**X**	**X**

Programs that are grant-funded are often somewhat limited in their scope of work, given that many grant-making entities specify the ways in which their grantees may use the funds. Therefore, some workforce development organizations, notably community-based organizations, may require specific energy efficiency grants in order to develop energy efficiency-focused training and education programs. In addition, Community Action Agencies, commonly referred to as CAP Agencies, expressed their need for more funding to complete weatherization work as well as an expansion of their funding to complete pre-weatherization projects in homes that request weatherization. These agencies employ and train energy auditors to improve residential energy efficiency. They receive funding specifically for weatherization work, but they report being unable to weatherize certain homes if the homes require pre-weatherization measures first, due to these funding restrictions.

Holistic funding approaches that provide for all the various aspects of a training program are especially helpful when designing training programs in underserved communities. Program aspects important to consider by funders include funding to hire teachers/instructors; spaces to hold the trainings; administrative workers to plan and organize the trainings; demonstration equipment; general and career counseling for participants; marketing and outreach efforts to find participants; and job placement assistance for participants who complete the training.

Wraparound services, such as transportation assistance, childcare, stipends to support costs of living over the course of the trainings, and career counseling, are important for reducing barriers to entry and bringing a more diverse workforce into the energy efficiency field. There are many residents of underserved communities who could advance in the energy efficiency field and enjoy the career and compensation benefits it provides if they could attend relevant training programs and receive the right support. Examples of wraparound service providers include Rhode Island Reconnect and Rhode Island Department of Human Services (DHS) programs, such as the Child Care Assistance Program and the Rhode Island Works program.

Career-building program providers are vital for increasing awareness of energy efficiency careers and increasing the pipeline of workers in this field. These organizations may be community-based which have a presence and trust within communities who may be interested in the benefits of an energy efficiency career. Other organizations include workforce development programs that focus on either directly hosting job training programs or connecting job seekers with education, training, and job opportunities in a wide range of fields, including energy. Some of these program providers target members of underserved, underrepresented, and marginalized communities, with the aim of connecting these individuals to workforce opportunities that fit their values, interests, and goals.

Table 11. Sample of Workforce Development and Career-building Program Providers

Organization Name	Function	Organization Type
Acadia Center	Advocacy	Climate Organization
Back to Work RI	Workforce Development	State Agency
Building Futures Rhode Island	Workforce Development	Industry Coalition
City of Providence, Workforce Solutions	Workforce Development	City Agency
CLEAResult	Workforce Development	Private
Climate Jobs RI	Advocacy & Job Creation	Labor Coalition
Community College of Rhode Island	Career Building/Job Readiness	Community College
Cranston Area Career and Technical Center	Career Building/Job Readiness	Career and Technical Education Center
Davies Career & Technical High	Career Building/Job Readiness	Career and Technical Education Center
Equus Workforce Solutions	Workforce Development	Private
Garden Time's Green Reentry	Workforce Development	Non-profit
Groundworks Rhode Island	Workforce Development	Non-profit
Institute for Labor Studies and Research	Workforce Development	Labor Union & Non-profit
Northeast Energy Efficiency Partnerships	Education	Non-profit
PrepareRI	Workforce Development	State & Private
Providence Career & Technical Academy	Career Building/Job Readiness	Career and Technical Education Center
Real Jobs Rhode Island	Workforce Development	Private
Regional Career Technical Center at Coventry High School	Career Building/Job Readiness	Career and Technical Education Center
Rhode Island Association, affiliate of PHCC National Association	Workforce Development	Industry Association
Rhode Island Black Business Association (RIBBA)	Workforce Development	Non-profit
Rhode Island Builders Association Residential Construction Workforce Partnership	Workforce Development	Non-profit
Rhode Island Department of Education	Education	State Agency
Rhode Island Department of Labor & Training: Workforce Development Services	Workforce Development	State Agency
Rhode Island Science and Technology Advisory Council	Workforce Development	State Agency
RI Builders Association	Workforce Development	Private
RI Energy Efficiency and Resource Management Council	Education	State Agency
RI Workforce Alliance, Economic Progress Institute	Workforce Development	Private
Skills for Rhode Island's Future	Workforce Development	Non-profit

State of Rhode Island Governor's Workforce Board	Workforce Development	State Agency
The Green & Healthy Homes Initiative	Workforce Development	Private
The Metropolitan Regional Career and Technical Center	Career Building/Job Readiness	Career and Technical Education Center
The Rhode Island College Workforce Development Hub	Workforce Development	Private
University of Rhode Island	Career Building/Job Readiness	Private
Warwick Area Career and Technical Center	Career Building/Job Readiness	Career and Technical Education Center
Workforce Solutions of Providence/Cranston	Workforce Development	State Agency
Youth Build Futures	Workforce Development	Non-profit

Specific Asset Examples

Many entities play key roles in increasing access to training and workforce development opportunities for low-income and underserved communities. Rhode Island Reconnect and Rhode Island's Community Action Agencies are two important examples of these types of workforce assets.

There are seven Community Action Agencies in Rhode Island that are not-for-profit organizations developed to address the needs of low-income communities through policy and advocacy; job training and technical assistance; education, housing, health, and financial supports; and capacity-building measures. In Rhode Island, they serve all thirty-nine cities and towns. As part of the weatherization programs, they hire and train energy auditors to complete energy efficiency assessments and weatherization measures in residential spaces across the state. They rely on federal and state funding as well as funding from the local utility, or Rhode Island Energy.

Rhode Island Reconnect works with job seekers to break down the barriers they face to achieving a career that supports them and their families with living wages and benefits. This organization provides participants with various wraparound services, such English language instruction, childcare, transportation, and counseling assistance, so they are able to complete their job training or education programs and earn the credentials they need to enter the workforce.

Recommendations

Based on the findings of this workforce assessment, this report offers the following recommendations for advocates and practitioners operating at the intersection of energy efficiency and workforce issues.

1 **Prioritize increasing the pipeline of future energy efficiency workers through education, communications, and information sharing.** Hiring challenges are apparent and being felt industry wide. In a tight hiring market, with significant growth opportunities ahead, bringing new workers into the industry is a foundational step toward building a strong and stable Rhode Island energy efficiency workforce**.** Most prospective workers, especially students and underserved populations, need greater access to and more information about the wide range of energy efficiency jobs that are available, the benefits of these jobs, their requirements, and the programs to support entry into this field. Select specific options include the following:

a. *Develop modern and inclusive marketing tools, resources, and materials about career pathways* that have information on trainings, wages, and market opportunities, as well as highlighting varying requirements for distinct types of jobs (especially entry-level).
b. *Launch a marketing campaign with targeted outreach and community-oriented communications activities to rebrand energy efficiency jobs,* highlighting their benefits, explaining what various jobs entail, and building enthusiasm for specific occupations.
c. *Address the need for a single database that has information about work-based learning opportunities* in energy efficiency, and make this available to students, instructors, and companies. There are several agencies that could host the database, including the Rhode Island Department of Education, the Governor's Workforce Board, and the Rhode Island Office of the Postsecondary Commissioner. PrepareRI's existing infrastructure—developed around work-based learning opportunities—could also be utilized.
d. *Expand funding options and ease the provision for wraparound support* to cover things like childcare and transportation costs and compensate students for missing paid employment opportunities outside of school or during the summers.
e. *Establish supportive environments and concierge-like services* to provide back-end support, career mentoring, and staffing and other organizational capacity to address various personal and societal barriers.

2 **Pursue a comprehensive approach that balances education, training, and certifications, while getting new workers the foundational, in-the-field experience they lack.** While education, training, and certifications can support securing and advancing in an energy efficiency career, this is not considered to be a significant barrier to energy efficiency employment in Rhode Island. In surveys, both employers and employees place a high priority on seeking and gaining experience in specific occupations. However, training, education, and work experience each fulfill important roles, and a comprehensive approach

that combines work-based learning and mentorship with certifications and ongoing training, among things items, can be beneficial in Rhode Island.

3 **Actively support efforts to secure initial energy efficiency employment.** Securing the first job can be exceedingly difficult for prospective entrants into an energy efficiency career, especially in technical or trade-related positions. Among youths, people of color, and those from underserved backgrounds, the most important way to get ahead is to get that first job. Even in an industry desperate for new workers, surveys and interviews confirm the importance of initial ability to do the work immediately. It is therefore critical to support aspiring energy efficiency workers in their efforts to launch this career. One approach is to alleviate some of the risk employers take when hiring new workers by helping to train them up more quickly, through specific apprentice programs or "earn-and-learn" programs sponsored by the state as well as through internships, specialized early technical education, and practical training that target individuals early in their careers.

4 **Strengthen educational institutions' emphasis on energy efficiency.** Rhode Island educational institutions (e.g., vocational-technical programs, high schools, community colleges, and four-year degree institutions) are not offering much in the way of an energy efficiency curriculum and are generally not focused on this sector. This begins with the emphasis on obtaining a four-year degree over a pathway into the trades, but it is compounded by a lack of instructors, lack of awareness and knowledge of opportunities and pathways, and perceptions of limited interest among students. A reawakening to the value of the trades is leading to some general optimism, but much more intentional focus is needed to change the dynamic among Rhode Island educational entities. Supporting early exposure to energy efficiency careers and encouraging partnerships with the energy efficiency sector that provide students with real-world experience are examples of best practice. So, too, is evolving current curriculums and hiring instructors to provide specific training and knowledge related to energy efficiency. Updating the vocational-technical program, high school, and community college models to train students more directly for energy efficiency careers, while also creating more seats for student demand and better mechanisms to connect students with opportunities for work-based learning and hands-on experience with employers, year-round, can aid their professional development and success.

5 **Bring an equity-centered approach to further increase the pipeline of workers and bring higher-quality job opportunities to underserved communities.** Many efforts to boost the pipeline of future efficiency workers could have the dual advantage of creating pathways to greater equity, access, and diversity in the workforce. These dual-advantage pathways may include establishing alternative means of accessing energy efficiency jobs; efforts to reach workers who are not native English speakers; investing in wraparound support services; and partnering with community organizations on workforce efforts.

a. *Explore options that support and expand alternative pathways to energy efficiency positions to ensure greater access.* Individuals who lack the means to earn a bachelor's or graduate degree can be shut out of many high-quality energy

efficiency jobs. Establishing alternative credentials, training certificates, and pathways can make these roles accessible to more individuals.

b. *Expand the language offerings so that workers who are not native English speakers—and especially Spanish speakers—can access energy efficiency jobs.* This is necessary to address one of the most common concerns expressed in interviews, which is the absence of resources and training capacity for Spanish speakers, as well as speakers of Portuguese, French, Chinese, and other languages. Those providing services to job seekers should also emphasize hiring bilingual staff, such as case managers, workforce concierges, outreach coordinators, and other relevant individuals.
c. *Fund wraparound services and recruitment initiatives that serve target populations in underserved communities.* Providing wraparound services, such as transportation and childcare assistance, housing, legal counsel, stipends to support costs of living during trainings, and career counseling, can begin leveling the playing field for those struggling with social and personal barriers. There are a number of wraparound providers already in the state, and successful expansion programs have been stood up to start addressing this need.
d. *Work closely with community-based organizations to reach underrepresented communities and tap into their pipeline of qualified future energy efficiency workers.* When recruiting workers from underserved communities, community-based organizations are effective conduits to target populations, due to their community presence, positive power dynamic, and strong level of trust within the community. Strategic partnerships that boost their capacity and provide staffing support can be key.
e. *Develop more holistic funding opportunities that can provide for all of the distinct aspects of developing a training program*. This can be especially helpful in underserved communities. Specific elements of training programs that do not always fall in the first tier of funding include (1) well-qualified instructors, (2) space for trainings, (3) administration and back-end workers, (4) demonstration equipment, (5) marketing and outreach to find hard-to-reach participants, and (6) job placement assistance.

6 **Encourage leadership and collaboration across the Rhode Island energy efficiency workforce development ecosystem.** Most interviewees highlighted the need for Rhode Island to more actively prepare for, and address, its energy efficiency workforce needs and move away from the current siloed approach. The state would benefit from addressing its lack of a leading entity or institution that can support collaboration, foster information sharing, and increase engagement with and enthusiasm about a growing energy efficiency workforce (akin to the role MassCEC plays in Massachusetts and NYSERDA plays in New York). There is a strong need for energy efficiency workforce development coordination across the state. Many actors are involved in related training programs, funding, the provision of wraparound services, and other workforce supports, but few are bringing everyone together to deliver coordinated services. Stakeholders within the workforce ecosystem, such as community organizations, training providers, industry groups, and RI Energy, should encourage and incentivize each other to coordinate and collaborate more effectively on this issue, engaging through the breadth of available working groups and advisory committees.

7 **Leverage and scale successful programs and success stories in Rhode Island.** To support the previous recommendation on leadership and collaboration, many programs in the state have developed models to learn from and scale up. Examples include the following:

a. The *Governor's Workforce Board*, which is the state's long-standing primary workforce training and investment entity. It is a critical player and partner in helping state entities design, fund, and build training programs, and it is the most likely candidate to lead the drive for a stronger focus on energy efficiency workforce development. Its new subcommittee, the Green Energy Workforce Advisory Committee, is a natural starting point.
b. Respected *government agencies* that are addressing the workforce needs in energy efficiency from different angles, including Rhode Island's Office of Energy Resources, Department of Education, Department of Labor and Training, Science and Technology Advisory Council, and Office of the Postsecondary Commissioner.
c. *Real Jobs Rhode Island*, an initiative led by businesses across the state, partners with employers, training providers, and community organizations to connect job seekers with employers, upskill current workers, recruit new workers, and support business ventures.
d. *Climate Jobs Rhode Island* is a coalition of labor, environmental, and community groups moving toward a just transition to a green economy that meets worker needs and advances equitable growth.
e. *Skills for Rhode Island's Future* is a non-profit organization designed to connect unemployed and underemployed individuals across the state with meaningful employment opportunities.
f. Garden Time's *Green Reentry* program supports formerly incarcerated or justice-impacted individuals who want to enter the workforce in environmental-based industries with job training and job readiness opportunities.
g. The community-based organization *Groundworks RI* offers adult job training to Rhode Islanders who are seeking environmental sector employment that allows them to work in their own communities. The organization places a special emphasis on serving formerly incarcerated individuals and public housing residents.
h. Specializing in the residential construction industry, the Rhode Island Builders Association's *Residential Construction Workforce Partnership* seeks to bridge the skills gap in the construction industry by offering residential construction trade training to interested adults. The Partnership also offers vocational English as a second language classes aligned with the carpentry program.
i. *YouthBuild Futures* is a non-profit that helps youth who lack a high school diploma or financial resources to tap into their potential through multiple initiatives, including education support and job training for the construction industry and other career pathways.
j. The *Career and Technical Education Board of Trustees*, which oversees Rhode Island's career and technical education programs, can help ensure that existing students are receiving the support they need to develop professionally and access technical and trade occupations and that prospective students have opportunities to explore these pathways.

Rhode Island Energy is an important stakeholder in developing Rhode Island's energy efficiency workforce, and working in partnership with many others, it can have considerable impact. Near-term actions to address energy efficiency workforce needs should include the following:

1. **Encourage workforce ecosystem coordination and leadership development** by advocating for an increased emphasis on energy efficiency and workforce development within relevant state-wide entities and supporting emerging leadership efforts around energy efficiency workforce development in the state. Where RI Energy participates in relevant working groups, committees, and advisory bodies, it can highlight the importance of focusing on this issue. It can also support the development of relationship building and collaboration among educators, policymakers, employers, training providers, unions, and community groups, which are critical to long-term success.

2. **Support marketing efforts and pipeline building** by further leveraging its marketing and communications capacity with credible information resources and campaigns and partnering with groups, especially those serving underserved communities, to raise awareness about the value and opportunities of energy efficiency jobs.

3. **Champion energy efficiency-related programs at all levels of education** by increasing support for specific programs in high schools and vocational-technical schools, including curriculum development, instructor recruitment, internships, and equipment needs. Utilities like RI Energy are well suited to understand the breadth of soft and hard skills tomorrow's energy workers need and can connect with and support trade schools and apprentice/internship programs to better develop these. RI Energy can also promote its own internships to specific schools in the region to help develop their students.

4. **Partner with contractors** to expand worker recruitment by communicating the benefits of energy efficiency careers, funding career navigators and wraparound supports, and educating contractors about opportunities in energy efficiency. RI Energy is well situated to support diversification and ensure the inclusion of contractors that resemble and represent the populations the utility serves. It can do so by encouraging small and minority-, women-, and veteran-owned business enterprises (MWVBEs) to participate in bidding processes and by assisting contractors—especially Hispanic/Latino contractors—in understanding how best to compete for bids. RI Energy can also support entrepreneurialism in this sector by working with the abundance of smaller firms working in the state's residential market.

Career Profiles

Construction and Building Inspectors

Summary: Construction and building inspectors conduct analyses of buildings and construction projects to determine the quality of the structures and systems as well as their compliance with the required legal codes, standards, regulations, or specifications. This requires familiarity with the specific structures and systems in the buildings as well as the measuring devices used to collect the necessary data. There are many types of inspectors, and they typically specialize in a building system or other building aspect. Energy auditors or raters are a type of inspector in the energy efficiency industry who evaluate a building's energy waste.

Often, construction and building inspectors need a high school diploma and some work experience in the construction industry, both of which provide inspectors with a foundation in the basic mathematics and mechanical skills used when conducting inspections. In addition to these typical educational and work experience requirements, construction and building inspectors complete on-the-job training to learn job duties more specific to their local codes and regulations, building or construction system, and reporting processes. Once experienced, they may advance to supervisory or management positions. Construction and building inspectors in Rhode Island earn a wage greater than statewide averages at the entry-level, median, and experienced levels. Jobs that could easily transition into construction and building inspector roles are found across multiple occupational groups, including business and financial operations; life, physical, and social sciences; protective services; farming, fishing, and forestry; and transportation and material moving.

JOB DESCRIPTION[15]

Construction and building inspectors evaluate buildings and other construction projects to ensure they are compliant with local and national codes, ordinances, and regulations. These inspectors review building plans and specifications; utilize several types of measuring and monitoring equipment to assess the electrical, plumbing, heating, and various other systems for damage or other issues; and document their findings to share with superiors, clients, or authorities. They may be involved at multiple stages of a project and play a vital role in certifying the quality and safety of the project.

There are several types of construction and building inspectors, including but not limited to coating inspectors, home inspectors, and inspectors who specialize in a specific system of a building or project. These specialty inspectors could be electrical inspectors, plumbing inspectors, elevator inspectors, or mechanical inspectors who focus on the heating, ventilation, air conditioning, and refrigeration systems. Energy auditors, a type of inspector, play a role in the energy efficiency industry by evaluating building and home systems, such as the insulation and the heating and cooling systems, to estimate air leakage and energy waste. From there, they can work with the building owners to determine the best ways to lower energy consumption, waste, and costs.

[15] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed May 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

WAGES

The entry-level, median, and experienced wages for construction and building inspectors in Rhode Island are greater than the statewide averages at each level, respectively. Entry-level inspectors earn $24 an hour, compared to the state average of just over $15 an hour for entry-level workers. Experienced inspectors can increase their wages to $40.50 per hour, which is a little more than $1 an hour greater than the average experienced worker wage in the state. The median hourly wage for construction and building inspectors in Rhode Island is just over $33 per hour.

Table 12. Wage Distribution[16]

	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Construction and Building Inspectors (Annual)	$49,900	$69,200	$84,300
Construction and Building Inspectors (Hourly)	$24.01	$33.27	$40.53

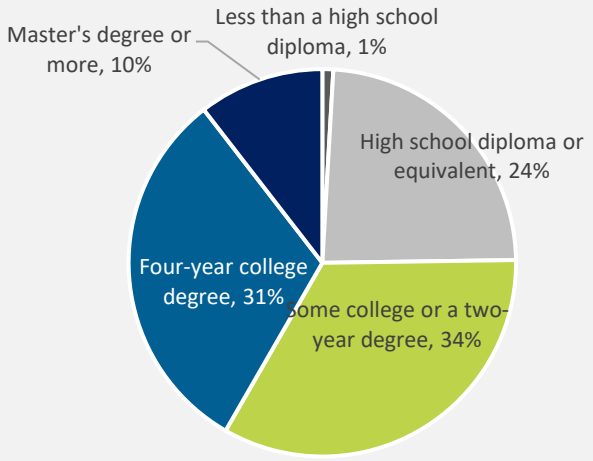
EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[17]

Typically, workers are required to have a high school diploma and construction work experience to become building or construction inspectors. Though much of their training occurs while on the job, basic skills learned in high school, such as mathematics and writing, provide trainees with a stronger educational foundation. During on-the-job training, inspectors learn about building codes and standards as well as local ordinances, inspection and evaluation techniques, and documentation practices. After completing sufficient training, inspectors may apply for a license or certification as required by the city or state. Energy auditors or raters do not need to meet national certification requirements, but earning a certification demonstrates a workers' competency and may open additional opportunities for development and advancement.

Of the current pool of construction and building inspectors in Rhode Island, one percent have less than a high school diploma or equivalent. Roughly one-quarter of current workers have a high school diploma or equivalent, and 34 percent have some college or a two-year degree. Just over three in ten have a four-year college degree, and the remaining ten percent have a master's degree or doctorate.

[16] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[17] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.

Figure 42. Educational Attainment of Current Workers[18]



Based on 163 active job postings for construction and building inspectors in Rhode Island between May 2022 and May 2023,[19] certifications currently in demand from employers include:

- Certified Construction Manager (CCM)
- Driver's License
- Envelope Professional
- Fire Inspector II
- Licensed Professional Engineer
- NICET Certification (not specified)
- NICET Level 1
- Occupational Health and Safety Technologist (OHST)
- Residential Building Inspector (RBI)
- Society for Protective Coatings Certification (SSPC)

Construction and building inspectors should understand common building systems in order to conduct proper evaluations of them and ensure their proper functioning. These workers should also know how to operate the measuring instruments and other equipment they use to gather the data needed to assess the systems and report their findings. Construction and building inspectors are most frequently required to have proficiency in some or all of the following:[20]

- Ammeters
- Fire Safety
- HVAC Systems
- Mechanical Systems

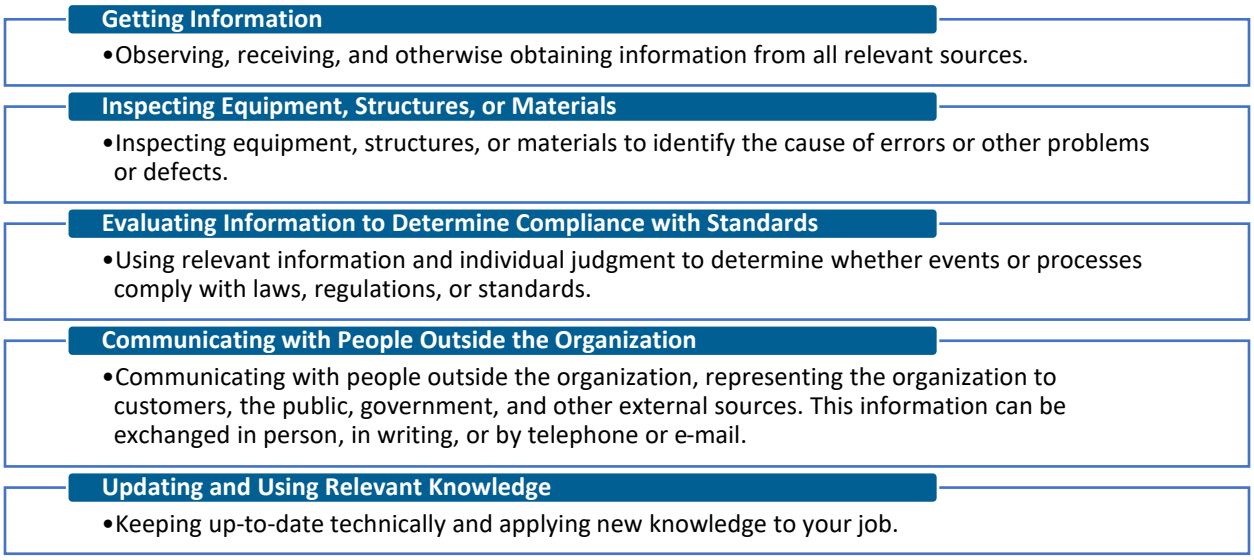
[18] Adapted from JobsEQ occupational profile for the construction and building inspector workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diversity, accessed May 2023. http://jobseq.eqsuite.com.

[19] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

[20] Based on 163 active job postings for construction and building inspectors in Rhode Island from 5/7/2022 to 5/7/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

- Microsoft Office
- Personal Computers (PCs)
- Plumbing Systems

Figure 43. Top Work Activities[21]



CAREER TRANSITION POTENTIAL

This section highlights occupations that require skills and experience levels similar to construction and building inspectors and could, therefore, allow for transition into an inspector job with minimal additional preparation. Jobs that could facilitate transition into a construction and building inspector position are found within several occupational groups, including business and financial operations; life, physical, and social sciences; protective services; farming, fishing, and forestry; and transportation and material moving.[22]

A construction and building inspector career is a good pathway into the energy efficiency industry for workers featured in the table below. Workers in these occupations have familiarity with inspection practices and understand the importance of safety measures. Like construction and building inspectors, they typically study relevant codes, laws, and regulations; collect data; analyze their findings; and report results.

Fire inspectors and investigators, agricultural inspectors, traffic technicians, and transportation inspectors would all see a median hourly wage increase following transition into a construction and building inspector career. On the other hand, compliance officers, miscellaneous business operations

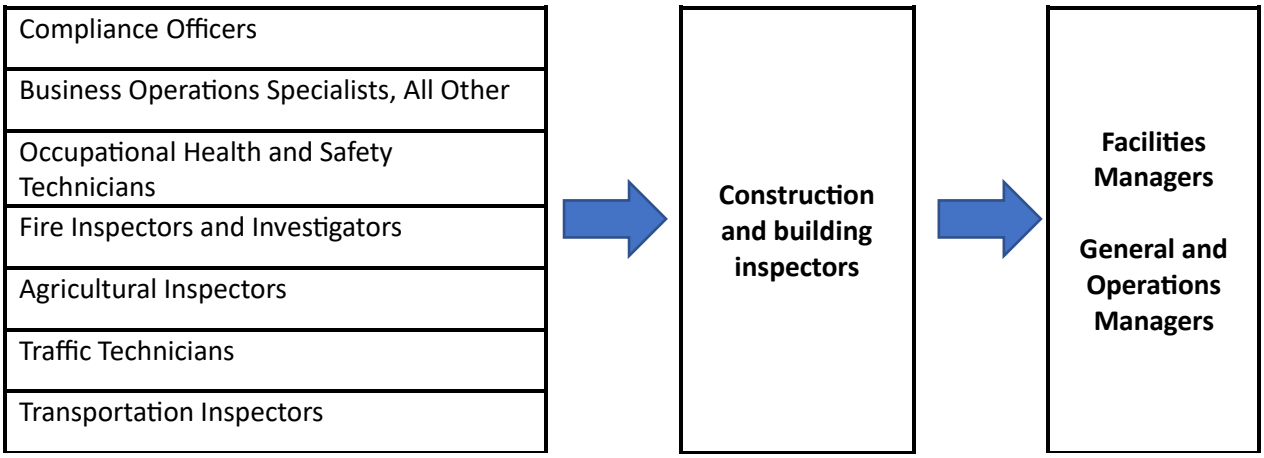
[21] ONET OnLine, Accessed May 2023. https://www.onetonline.org/.
[22] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

specialists, and occupational health and safety technicians would see a drop in their median hourly wages, with miscellaneous business operations specialists' wages falling the most—roughly $6 an hour. Workers in all of these occupations would meet the typical entry-level education requirements for construction and building inspectors, and workers in several of these occupations would exceed the requirements.

Table 13. Transferable Occupations[23]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry-Level Education
Construction and Building Inspectors	**354**	**$33.27**	**High school diploma or equivalent**
Compliance Officers	992	$38.49	Bachelor's degree
Business Operations Specialists, All Other	3,443	$39.52	Bachelor's degree
Occupational Health and Safety Technicians	80	$34.77	High school diploma or equivalent
Fire Inspectors and Investigators	53	$32.20	Postsecondary non-degree award
Agricultural Inspectors	44	$23.49	Bachelor's degree
Traffic Technicians	18	$26.39	High school diploma or equivalent
Transportation Inspectors	43	$25.72	High school diploma or equivalent

Figure 44. Career Transferability & Progression[24]



[23] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

[24] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

Electricians

Summary: Electricians are specialized in the electrical systems commonly found in buildings and infrastructure sites, and they are especially important in the construction and energy efficiency industries. They install, maintain, and repair the electrical, communication, lighting, and control systems and components in homes, buildings, and other establishments. There are five types of electricians, named for where they most often work or where their specialty lies: residential, commercial, industrial, auto, and maintenance. Following safety regulations is vitally important for all electricians. Experienced electricians may be sought for consultation by building engineers and architects designing new construction projects.

Jobs that could allow for an easy transition into an electrician position are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups. Entry-level and median wages for electricians in Rhode Island are greater than statewide averages. Electricians acquire the necessary skills and technology-specific knowledge through either a four-to-five-year apprenticeship or formal education. They must have a high school diploma or equivalent and be at least 18 years old. Many states require electricians to obtain a license. Electricians may advance to become master electricians, supervisors, or other related roles in project management.

JOB DESCRIPTION[25]

Electricians are necessary for construction projects because they install, maintain, and repair the electrical systems and components in homes and buildings. Specifically, they work with electrical power, communications, lighting, and control systems. They execute electrical wiring plans according to blueprints, connect electrical systems to power lines, and test the systems. Electricians must be vigilant in ensuring the safety of the systems and components they install and repair, and they must also take great care to ensure their own safety. Buildings engineers and architects may consult experienced electricians on new construction projects.

The five types of electrician are residential, commercial, industrial, auto, and maintenance electricians. Residential electricians are the most common and may find themselves working with phone, security, ventilation, and backup power systems in the home. Industrial electricians often need specialized knowledge of machines found in power plants, factories, mills, and mines, while auto electricians are expert in motor vehicles. There is currently a high demand for qualified electricians in various contexts, including hospitals, railways, telecom services, and airports. Electricians may be self-employed or do contractual work.

WAGES

The entry-level and median wages for electricians in Rhode Island are greater than the statewide averages. Entry-level electricians earn a little under $21 an hour, compared to the state average of just over $15 an hour for entry-level workers. Experienced electricians can increase their wages to over $36 per hour, though they earn less than the average experienced worker in the state. The median hourly wage for electricians in Rhode Island is between $30 and $31.

[25] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed January 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

Table 14. Wage Distribution[26]

	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Electrician (Annual)	$43,000	$63,600	$75,200
Electrician (Hourly)	$20.67	$30.57	$36.16

EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[27]

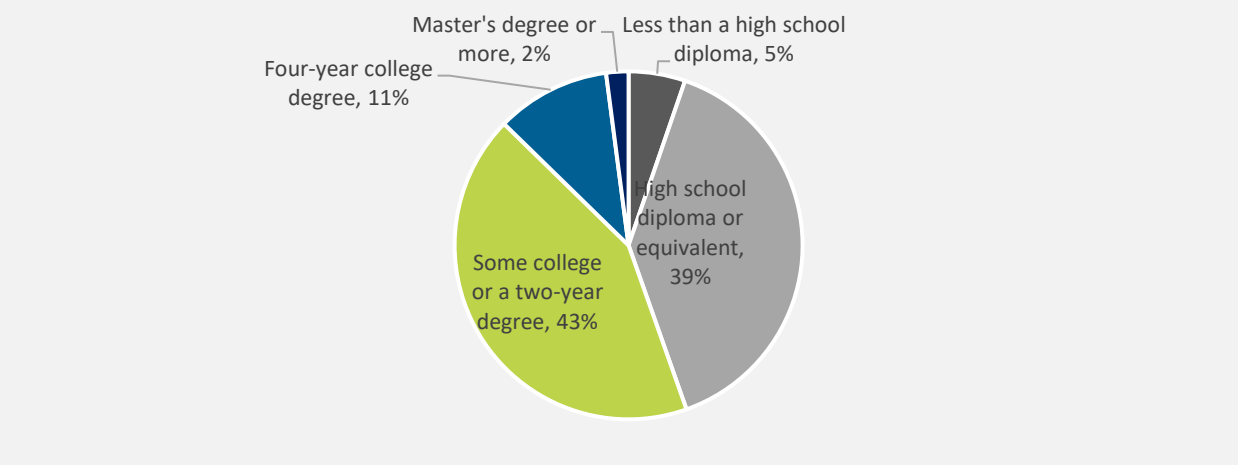
Electricians must have at least a high school diploma or equivalent. They often learn the trade in a four-to-five-year apprenticeship or in formal education. Workers can earn certification by taking a two-year electrician course at a technical school. Electricians must be at least 18 years old. A basic understanding of algebra is important for success.

Many states, including Rhode Island, require electricians to obtain a license. There are additional certifications available in photovoltaic, electrical generating, and lighting systems. Electricians must be able to read blueprints and interpret technical diagrams as well as understand the National Electrical Code and local regulations. They are required to stay up to date on codes and regulations as new safety measures and new products are released.

Of the current pool of electricians in Rhode Island, 39 percent have a high school diploma or equivalent. Only five percent have less than a high school diploma. Roughly four in ten electricians have some college or a two-year degree, while 13 percent possess a four-year college degree or higher.

[26] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[27] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.

Figure 45. Educational Attainment of Current Workers[28]



Based on 275 active job postings for electricians in Rhode Island between May 2022 and May 2023,[29] certifications currently in demand from employers include:

- Driver's License
- Commercial Driver's License (CDL)
- Class B Commercial Driver's License (CDL-B)
- Certified Tree Worker
- Certified Welder
- OSHA 10-hour Safety Training
- OSHA 30-hour Safety Training

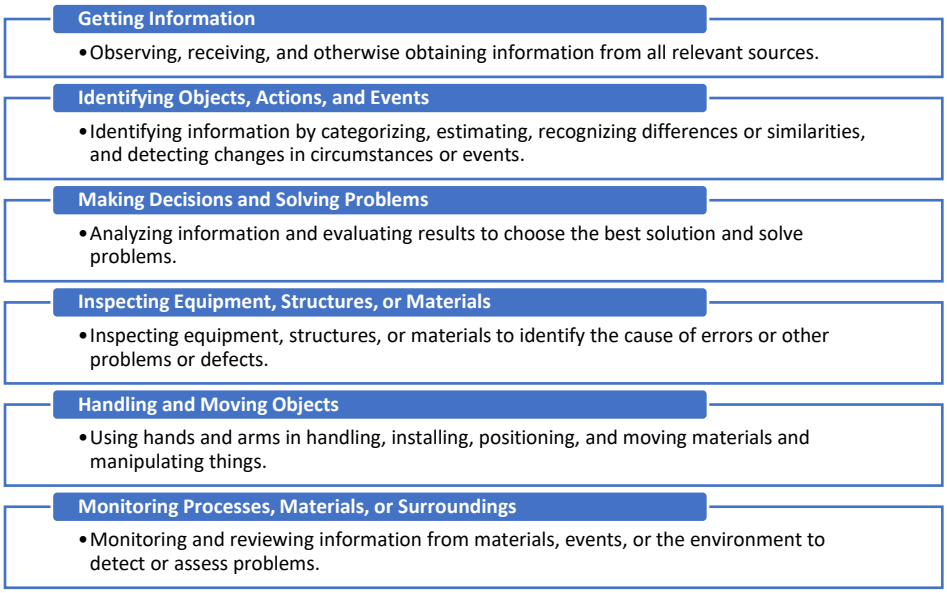
Since electricians are responsible for connecting and installing electrical circuits and systems, they are expected to know how to read blueprints and schematics and work with circuits and other electrical equipment, such as conduit benders. They also need to understand common plumbing and HVAC systems with electrical components that are found throughout the various buildings in which electricians work. Electricians are most frequently required to have proficiency in some or all of the following:[30]

- Ability to lift 41–50 pounds
- Ability to lift 51–100 pounds
- Blueprint Reading
- Circuits
- Conduit Benders
- Generators
- HVAC Systems
- Manufacturing

[28] Adapted from JobsEQ occupational profile for the electrician workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diversity, accessed May 2023. https://jobseq.eqsuite.com/.
[29] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.
[30] Based on 275 active job postings for electricians in Rhode Island from 5/7/2022 to 5/7/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com/.

- Plumbing
- Power Tools

Figure 46. Top Work Activities[31]



CAREER TRANSITION POTENTIAL

This section highlights the occupations that require skills and experience levels similar to electricians and could, therefore, allow for transition into an electrician job with minimal additional preparation. Jobs that could facilitate transition into an electrician position are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups.[32]

An electrician career is a good pathway into the energy efficiency industry for workers featured in the below tables. Heating, air conditioning, and refrigeration (HVAC) technicians understand the electrical components and wiring of heating, ventilation, air conditioning, and refrigeration systems in order to test, install, and maintain them. This familiarity with electrical systems can be expanded upon easily. Additionally, HVAC technicians would see a slight wage increase following this career transition. Elevator and escalator installers and repairers have key transferable skills owing to their ability to read and understand blueprints and connect electrical wiring, though these workers may see a substantial decrease in hourly wages after transitioning to a career as an electrician. Typical entry-level education requirements for HVAC technicians and elevator and escalator installers and repairers meet or exceed the typical requirements for electricians.

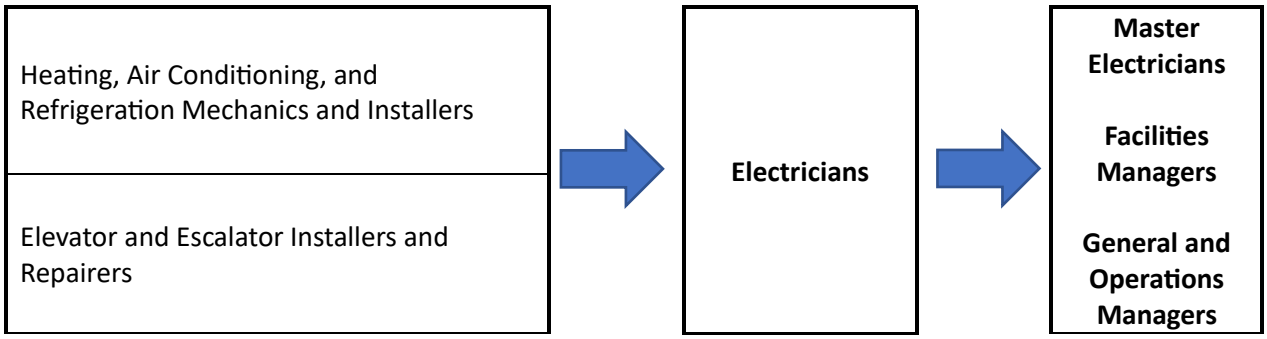
[31] ONET OnLine, Accessed January 2023. https://www.onetonline.org/.

[32] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

Table 15. Transferable Occupations[33]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry- Level Education
Electricians	**2,270**	**$30.57**	**High school diploma or equivalent**
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	1,263	$30.44	Postsecondary non-degree award
Elevator and Escalator Installers and Repairers	53	$61.58	High school diploma or equivalent

Figure 47. Career Transferability & Progression[34]



[33] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

[34] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

Heating, Air Conditioning, and Refrigeration Mechanics and Installers

Summary: Heating, air conditioning, and refrigeration mechanics and installers (HVAC technicians) specialize in installing, cleaning, and repairing heating, ventilation, cooling, and refrigeration systems. These workers are particularly important to the buildings and energy efficiency industries due to their specialization in temperature control and air quality systems, which consume substantial amounts of energy. They must be comfortable working in extremely hot or very cold environments and during evenings and weekends. Postsecondary education and apprenticeships are two common ways HVAC technicians learn the trade. Depending on their location, some may need to obtain a license to work in the field. It is vital that HVAC technicians are properly trained in handling hazardous refrigerants to prevent injuries, accidents, and fatalities. All HVAC technicians who plan to handle refrigerants are required to pass the US Environmental Protection Agency certification exam.

Jobs that could facilitate transition into a HVAC technician career are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups. Entry-level and median wages for HVAC technicians in Rhode Island are greater than statewide averages. HVAC technicians can become senior technicians with proper experience.

JOB DESCRIPTION[35]

HVAC technicians are important for temperature control and air quality in many types of buildings, as they install, clean, and conduct maintenance and repairs on heating, ventilation, cooling, and refrigeration systems. They commonly work in residences, schools, hospitals and commercial buildings, and manufacturing facilities. HVAC technicians must be comfortable working in environments that are extremely hot or very cold since they are often repairing malfunctioning temperature control systems. They may also work in awkward or cramped spaces where HVAC systems are typically located.

HVAC technicians may become specialized in a specific element of HVAC, such as radiant heating systems, commercial refrigeration, or solar panels. HVAC technicians sometimes work evenings and weekends on top of their regular hours to repair malfunctioning systems. As HVAC systems are becoming more complex, employers typically prefer technicians with a postsecondary education or who have completed an apprenticeship. It is especially important that technicians working with refrigerants understand and implement the required safety measures.

WAGES

Entry-level and median wages for HVAC technicians in Rhode Island are greater than the statewide averages. Entry-level HVAC technicians typically earn a little over $21 an hour, while the statewide entry-level average is just over $15 an hour. Experienced HVAC technicians earn almost $37 an hour, but this is roughly $2 an hour less than the average experienced worker in the state. The median hourly wage for Rhode Island HVAC technicians is just over $30 an hour.

[35] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed January 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

Table 16. Wage Distribution[36]

	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Heating, air conditioning, and refrigeration mechanics and installers (Annual)	$44,400	$63,300	$76,800
Heating, air conditioning, and refrigeration mechanics and installers (Hourly)	$21.34	$30.44	$36.92

EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[37]

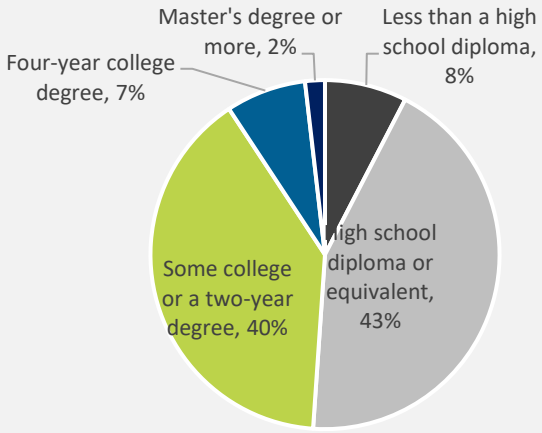
The typical entry-level education requirement for HVAC technicians is a postsecondary non-degree award. Today's employers prefer to hire HVAC technicians who have a postsecondary education or have completed an apprenticeship. A postsecondary education is completed in six months to two years, depending on the institution and the qualification, and upon completion, students earn either a certificate or an associate's degree. Apprenticeships typically last three to five years.

Relevant postsecondary education and apprenticeships provide vocational education along with instruction in mathematics and physics. In addition, HVAC technicians who handle refrigerants are required to pass the US Environmental Protection Agency certification exam. HVAC technicians may also be required to obtain state licenses. Rhode Island requires all contractors and subcontractors involved in building or repairing residential or commercial structures to be registered with the state's Contractors' Registration and Licensing Board.[38]

Of the current pool of HVAC technicians in Rhode Island, just over four in ten have a high school diploma or equivalent. Another four in ten have some college or a two-year degree. Roughly ten percent of HVAC technicians have a four-year college degree or higher, while the remaining eight percent have less than a high school diploma.

[36] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[37] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.
[38] State of Rhode Island, "FAQs for the contractor," accessed June 2023. https://crb.ri.gov/contractor-registration/faqs

Figure 48. Educational Attainment of Current Workers[39]



Based on 461 active job postings in for HVAC technicians in Rhode Island from May 2022 through May 2023,[40] certifications currently in demand from employers include:

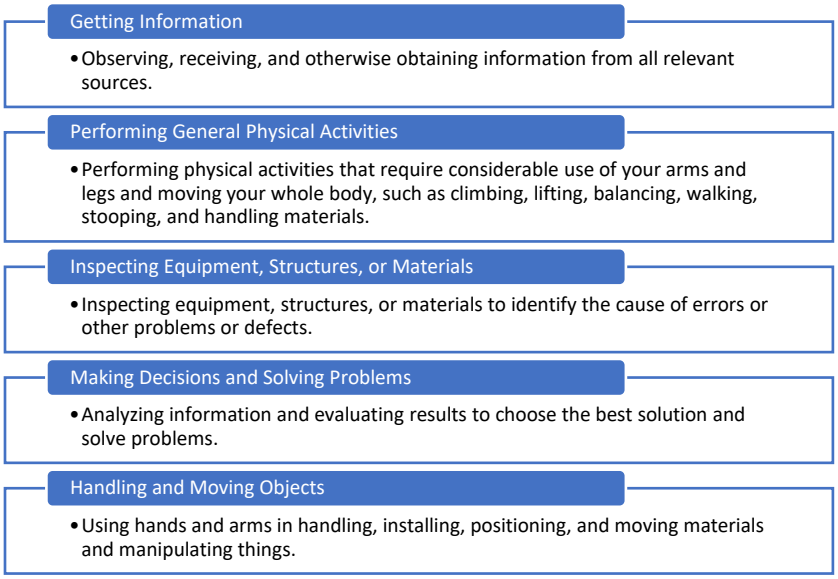
- Certification in Cardiopulmonary Resuscitation (CPR)
- Driver's License
- EPA Section 608 Certification (EPA 608)
- EPA Universal Certification
- OSHA 10-hour Safety Training
- Secret Clearance

HVAC systems include heavy components, so technicians need to be physically fit in order to carry, lift, or support them. It is helpful for HVAC technicians to have background knowledge or training in plumbing and electrical systems because they need to know how to connect HVAC systems with other piping systems and set up or fix the electrical components of HVAC systems. HVAC technicians are most frequently required to have proficiency in some or all of the following:[41]

- Ability to lift 51–100 pounds
- Boilers
- Gauges
- HVAC Systems
- Mechanical Systems
- Microsoft Office
- Plumbing
- Power Tools
- Refrigeration Systems
- Using Ladders

[39] Adapted from JobsEQ occupational profile for the electrician workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diveristy, accessed May 2023. http://jobseq.eqsuite.com.
[40] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.
[41] Based on 461 active job postings for HVAC technicians in Rhode Island from 5/7/2022 to 5/7/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

Figure 49. Top Work Activities[42]



CAREER TRANSITION POTENTIAL

This section highlights the occupations that require skills and experience levels similar to HVAC technicians and could, therefore, allow for transition into an HVAC technician job with minimal additional preparation. Jobs that could facilitate transition into an HVAC technician position are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups.[43]

Since HVAC systems require some background knowledge or training in plumbing and electrical systems, electricians and plumbers, pipefitters, or steamfitters could easily transition into HVAC careers. These workers already understand important components of the HVAC systems, though they would need to complete more advanced technical training related to HVAC systems. They would, however, see a small decrease in their median hourly wages following the transition.

An HVAC technician career is a good pathway into the energy efficiency industry for elevator and escalator installers and repairers. Since elevator and escalator installers and repairers are already trained in reading blueprints and connecting electrical wiring for elevators and escalators, they could easily learn these parts of the job. Like electricians and plumbers, elevator and escalator installers and repairers would need more specialized, technical training in HVAC systems. Elevator and escalator installers and repairers would see a significant wage decrease following the transition: The median hourly wage for an HVAC technician is roughly $31 less than the median hourly wage for elevator and escalator installers and repairers.

[42] ONET OnLine, Accessed January 2023. https://www.onetonline.org/.

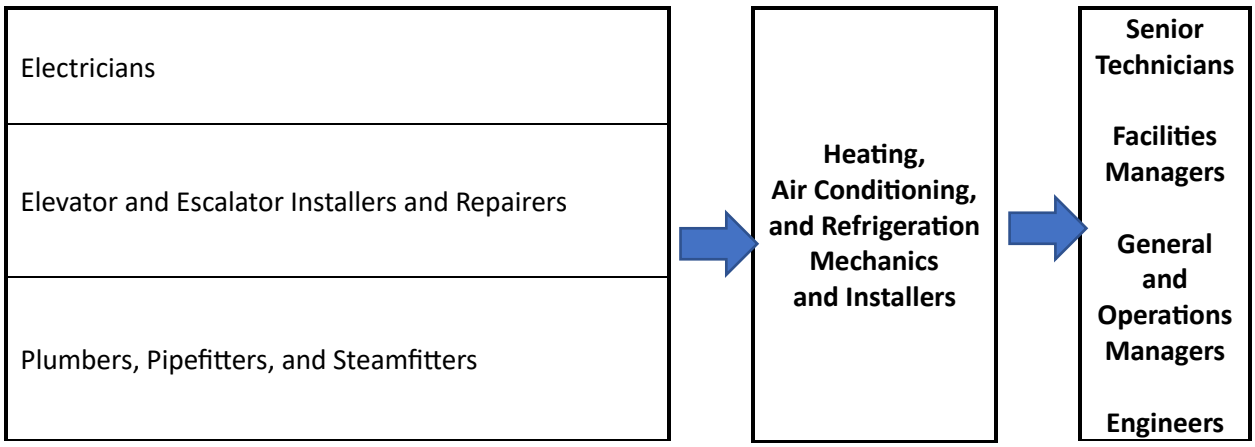
[43] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

Workers looking to transition to an HVAC technician position from any of these occupations would need a postsecondary non-degree award to meet the typical entry-level education requirements.

Table 17. Transferable Occupations[44]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry- Level Education
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	**1,263**	**$30.44**	**Postsecondary non-degree award**
Electricians	2,270	$30.57	High school diploma or equivalent
Elevator and Escalator Installers and Repairers	53	$61.58	High school diploma or equivalent
Plumbers, Pipefitters, and Steamfitters	2,108	$31.30	High school diploma or equivalent

Figure S0. Career Transferability & Progression[45]



[44] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

[45] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

Plumbers, Pipefitters, and Steamfitters

Summary: Plumbers, pipefitters, and steamfitters are all skilled workers in the construction and extraction occupational group. They install and repair the piping systems in buildings and other establishments, though each has additional distinct responsibilities. Plumbers typically work with piping systems for water and gas utilities, while pipefitters and steamfitters specialize in piping systems for chemicals, acids, and gases. Workers are usually in full-time employment and may be called in for emergencies outside their regular hours.

Jobs that could facilitate transition into a plumber, pipefitter, or steamfitter position are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups. Generally, the entry-level, median, and experienced wages for this occupational category are greater than Rhode Island average wages at each level. The typical entry-level education for these workers is a high school diploma or equivalent. They learn their trades in apprenticeships or vocational-technical schools and must pass a licensing exam, or multiple licensing exams depending on the individual's goals. With experience, these workers could become master plumbers or independent contractors in the energy efficiency industry.

JOB DESCRIPTION[46]

Plumbers, pipefitters, and steamfitters install and repair the piping fixtures and systems in homes, businesses, and industrial establishments and any other place where piping and related systems are found. In addition to their specialized work, plumbers, pipefitters, and steamfitters prepare cost estimates for clients, read blueprints and instructional diagrams, and determine which materials and equipment they need for a project. They also need to be aware of and follow local and state building codes.

These workers are often categorized together, but they have some distinct tasks. Plumbers install and repair piping systems for utilities such as water and gas in homes, businesses, and factories. Pipefitters and steamfitters (sometimes referred to as "fitters") install and repair piping systems for chemicals, acids, and gases, and steamfitters specifically work with systems carrying liquids or gases under high pressure. Plumbers and fitters may be employed full-time by schools, colleges, airports, municipalities, or other institutions owning buildings that require ongoing plumbing maintenance, though pipefitters and steamfitters most commonly work in manufacturing, commercial, and industrial spaces, and they may also work in large office buildings and power plants. Generally, plumbers and fitters work full-time regular hours, and they are sometimes called to respond to out-of-hours emergencies.

WAGES

The entry-level, median, and experienced wages for plumbers and fitters in Rhode Island are greater than the statewide averages. Entry-level plumbers, pipefitters, and steamfitters earn over $20 an hour while the average for entry-level workers in the state is just over $15 an hour. Experienced plumbers and fitters may earn more than $40 an hour, compared to the average Rhode Island experienced worker

[46] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed January 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

wage of $39 an hour. The median hourly wage for plumbers and fitters in Rhode Island is just over $30 per hour.

Table 18. Wage Distribution[47]

	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Plumbers, Pipefitters, Steamfitters (Annual)	$42,000	$65,100	$84,200
Plumbers, Pipefitters, Steamfitters (Hourly)	$20.19	$31.30	$40.48

EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[48]

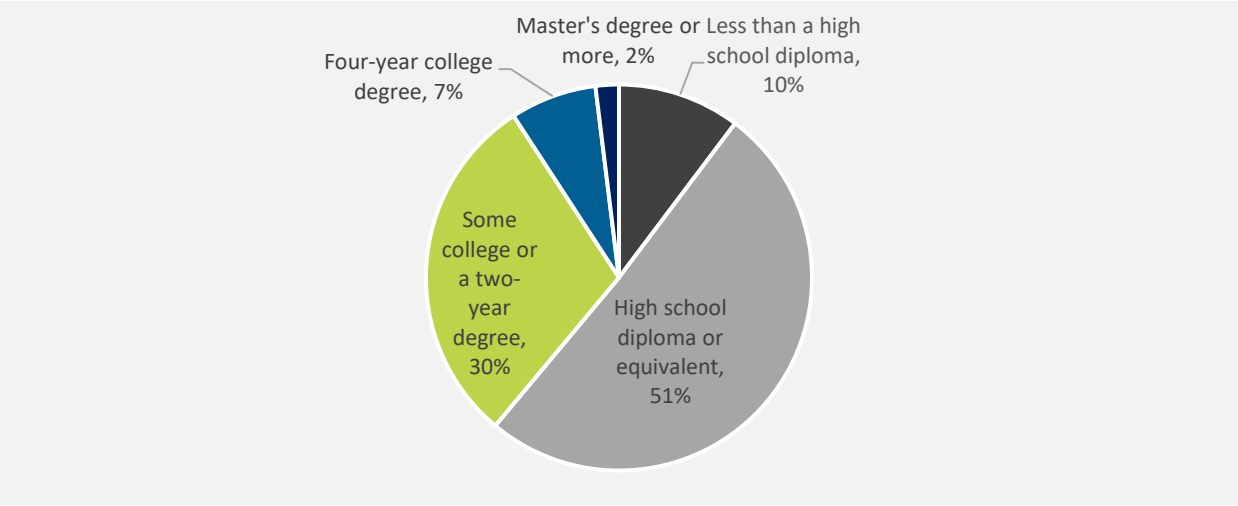
Plumbers and fitters often learn their trade on the job or through an apprenticeship, which typically provides both technical instruction and 2,000 hours of paid, on-the-job training. Vocational-technical training is also offered at some schools. Fitters need to be trained in welding in addition to the design, safety, and tool-use courses typically seen in the piping system curriculum. Applied mathematics, applied physics, and chemistry lessons are typically given to apprentices as well.

Upon completing an apprenticeship and passing a licensing exam, trainees can become journey-level workers. Many states, including Rhode Island,[49] require licensed plumbers and fitters. Fitters are sometimes required to obtain additional licenses to work on gas lines. At the journey level, plumbers and fitters are generally qualified to perform their tasks without oversight, though some localities require workers to gain an additional two to five years of experience after passing the exam before they can work independently. With several years of experience, plumbers may take a more advanced exam to earn master plumber status. In some locations, experienced plumbers can become independent contractors after obtaining additional licenses. Rhode Island requires all contractors and subcontractors involved in building or repairing residential or commercial structures to be registered with the state's Contractors' Registration and Licensing Board.[50]

Of the current pool of plumbers, pipefitters, and steamfitters, ten percent have less than a high school diploma. Just over half, or 51 percent, have a high school diploma or equivalent. Roughly three in ten have some college or a two-year degree, while seven percent have a four-year degree. The remaining two percent of current plumbers, pipefitters, and steamfitters have a master's degree or more.

[47] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[48] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.
[49] New England Institute of Technology, "Learn How to Get Your Plumbing License in Rhode Island," 26 March 2022. https://www.neit.edu/blog/plumbing-license-rhode-island#:~:text=Any%20aspiring%20plumber%20in%20Rhode,solvent%2C%20cement%2C%20and%20caulking.
[50] State of Rhode Island, "FAQs for the contractor," accessed June 2023. https://crb.ri.gov/contractor-registration/faqs

Figure 51. Educational Attainment of Current Workers[51]



Based on 249 active job postings for plumbers in Rhode Island between May 2022 and May 2023,[52] the certifications currently in demand from employers include:

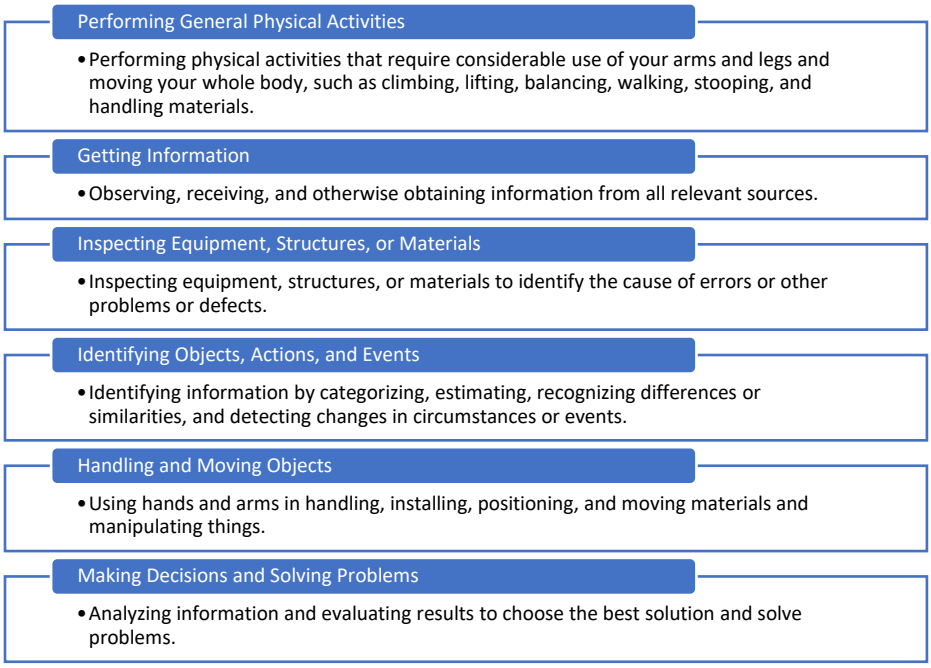
- Commercial Driver's License (CDL)
- Driver's License
- EPA Section 608 Certification (EPA 608)
- EPA Universal Certification
- OSHA 10-hour Safety Training

Plumbers, pipefitters, and steamfitters need to be highly skilled in plumbing and draining systems. The ability to solder and weld pipes is also often necessary to install and conduct maintenance or repairs on piping systems. Physical strength is often required as workers may need to lift or carry heavy piping materials. Plumbers and fitters are most frequently required to be proficient in some of all of the following:[53]

- Ability to Lift 41–50 pounds
- Ability to Lift 51–100 pounds
- Blueprint Reading
- Boilers
- Drainage Systems
- HVAC Systems
- Mechanical Systems
- Plumbing
- Soldering
- Welding

[51] Adapted from JobsEQ occupational profile for the plumber, pipefitter, and steamfitter workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diveristy, accessed May 2023, https://jobseq.eqsuite.com/.
[52] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.
[53] Based on 249 active job postings for plumbers in Rhode Island from 5/7/2022 to 5/7/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

Figure 52. Top Work Activities[54]



CAREER TRANSITION POTENTIAL

This section highlights the occupations that require skills and experience levels similar to plumbers, pipefitters, and steamfitters and could therefore allow for transitioning into a plumber or fitter job with minimal additional preparation. Jobs that could facilitate transition into these positions are found within the building and grounds cleaning and maintenance; construction and extraction; installation, maintenance, and repair; and transportation and material moving occupational groups.[55]

People working in jobs featured in the table below may find plumbing and fitting careers to be good way to transition into the energy efficiency industry. Workers in some of these occupations are trained in working with machines and the equipment used to install or repair them, including the mathematical and critical thinking skills needed to install systems and diagnose and fix problems. The transition into a plumbing or fitting career will also be eased for workers who understand electrical systems; are capable of interpreting blueprints and instructional diagrams; have experience learning and implementing safety measures; or have the skills to design, install, and repair electrical systems.

Boilermakers also have knowledge and skills relevant to fitters owing to their specialization in assembling, installing, maintaining, and repairing large containers holding liquids such as chemicals and oil, and gases. Assembling boilers also provides familiarity with welding.

[54] ONET OnLine, Accessed January 2023. https://www.onetonline.org/

[55] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

Landscaping and groundskeeping workers, stonemasons, electricians, and general maintenance and repair workers may also be suited to these jobs and would all see wage increases following transition into plumbing or fitting. Several of the highlighted occupations would see a drop in wages, however, with electrical power-line installers and repairers faring worst with median hourly wages falling roughly $17.50 per hour.

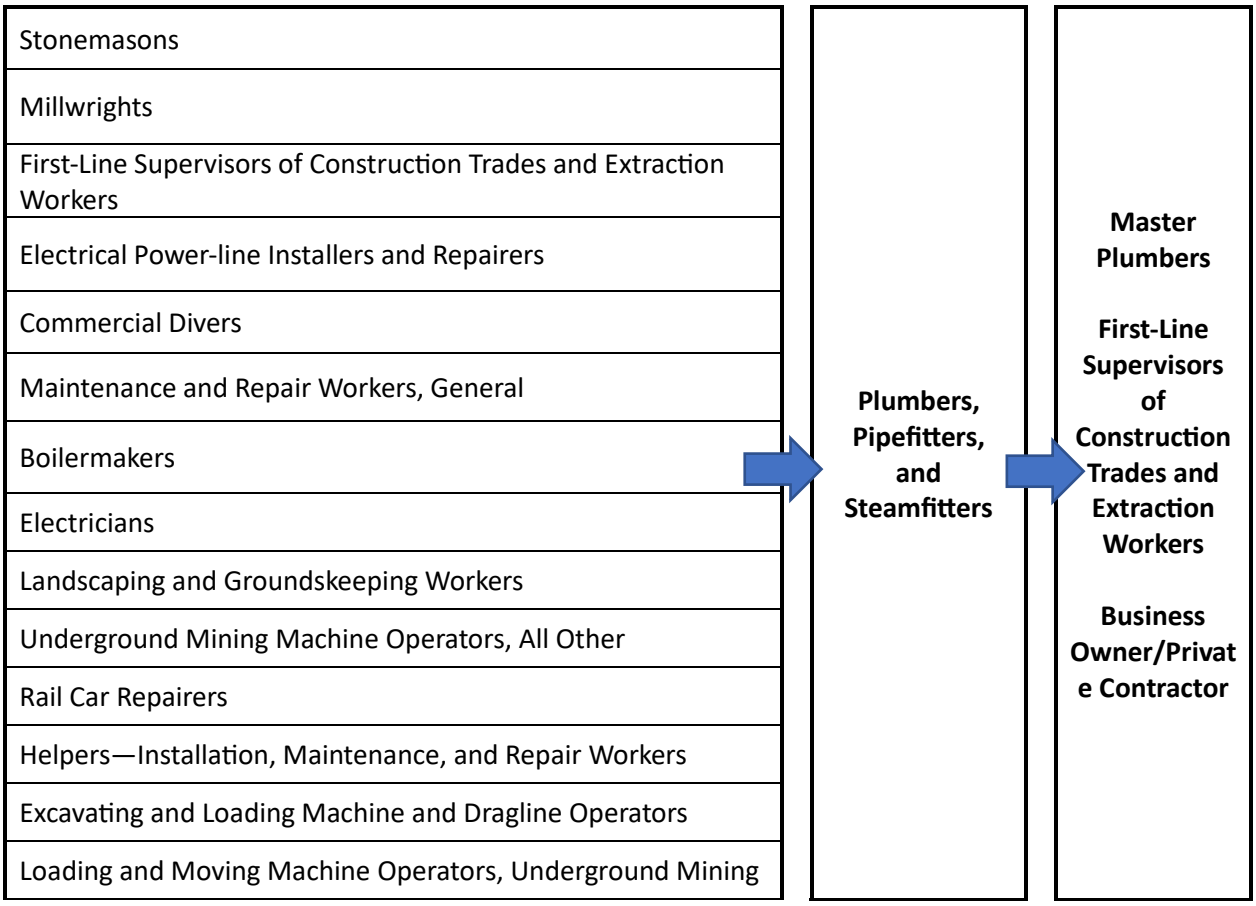
A high school diploma or equivalent is the typical entry-level education requirement for most of the highlighted occupations, which matches the typical requirement for entry-level plumbers and fitters. Landscaping and groundskeeping workers, underground mining machine operators, all other, and underground mining loading and moving machine operators who do not have a high school diploma or equivalent would typically need to acquire this to enter a plumbing or fitting career.

Table 19. Transferable Occupations[56]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry- Level Education
Plumbers, Pipefitters, and Steamfitters	**2,108**	**$31.30**	**HS diploma or equivalent**
Stonemasons	36	$25.78	HS diploma or equivalent
Millwrights	81	$31.70	HS diploma or equivalent
First-Line Supervisors of Construction Trades and Extraction Workers	2,192	$39.75	HS diploma or equivalent
Electrical Power-line Installers and Repairers	191	$48.82	HS diploma or equivalent
Commercial Divers	9	$32.96	Postsecondary non-degree award
Maintenance and Repair Workers, General	4,859	$24.08	HS diploma or equivalent
Boilermakers	48	$36.04	HS diploma or equivalent
Electricians	2,270	$30.57	HS diploma or equivalent
Landscaping and Groundskeeping Workers	4,715	$19.99	None
Underground Mining Machine Operators, All Other	6	$33.09	None
Rail Car Repairers	29	$32.77	HS diploma or equivalent
Helpers—Installation, Maintenance, and Repair Workers	168	$18.86	HS diploma or equivalent
Excavating and Loading Machine and Dragline Operators	79	$29.75	HS diploma or equivalent
Loading and Moving Machine Operators, Underground Mining	2	$31.24	None

[56] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

Figure 53. Career Transferability & Progression[57]



[57] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

Insulation Workers, Floor, Ceiling, and Wall

Summary: Floor, ceiling, and wall insulation workers install and replace the insulation material found in buildings. This work often requires long periods of standing, bending, or kneeling, often in confined spaces. Insulators must know how to use common hand and power tools to remove and install insulation. Installing insulation requires understanding what type and how much insulation material is required for each project; experience with measuring, cutting, and shaping the material to suitably fit; and proficiency in securing insulation in place and protecting it from contact damage and moisture. Insulation workers may need to protect themselves from insulation material particles, which can irritate the eyes, skin, and lungs. Proper insulation helps save energy and reduce noise in buildings.

Jobs that could facilitate transition into a floor, ceiling, and wall insulator position are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups. Entry-level building structure insulators in Rhode Island earn a little more than the statewide average for entry-level positions. There are typically no entry-level educational requirements, as workers usually learn the trade on the job. Insulation workers who remove or handle asbestos need specialized training accredited by the US Environmental Protection Agency. The Rhode Island Department of Health also has training, certification, and licensing requirements for asbestos abatement workers.

JOB DESCRIPTION[58]

In general, insulation workers, or insulators, install and replace insulation material in building structures or mechanical systems. Building structure insulators typically work indoors and install and replace insulation in attics, under floors, and behind walls. They read blueprints, measure and cut the materials to fit into walls and around systems and frameworks in the walls, and take care to secure the insulation and protect it from moisture. Proper insulation helps to save energy and reduce noise in buildings. Insulation workers may also install fire-stopping materials to reduce the risk of fire and smoke spreading throughout the building. They are often employed by drywall and insulation contractors.

Floor, ceiling, and wall insulation workers will find themselves standing, bending, or kneeling for prolonged periods, and they must be able to work in confined spaces. A well-ventilated work environment is helpful for preventing insulation materials from irritating the eyes, skin, and lungs. Workers who remove asbestos require special training due to the associated health risks. Generally, floor, ceiling, and wall insulators work regular hours but may occasionally have work overtime to meet tight construction deadlines.

WAGES

Entry-level floor, ceiling, and wall insulation workers in Rhode Island earn almost $17 an hour, which is a little more than the average entry-level worker in the state. The median hourly wage for building structure insulators is less than the state average by roughly $2 per hour. Experienced insulation workers typically earn a little more than $28 an hour, which is less than the $39-an-hour statewide average for experienced workers.

[58] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed January 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

Table 20. Wage Distribution[59]

	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Insulation Workers, Floor, Ceiling, and Wall (Annual)	$35,000	$45,100	$59,200
Insulation Workers, Floor, Ceiling, and Wall (Hourly)	$16.82	$21.70	$28.46

EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[60]

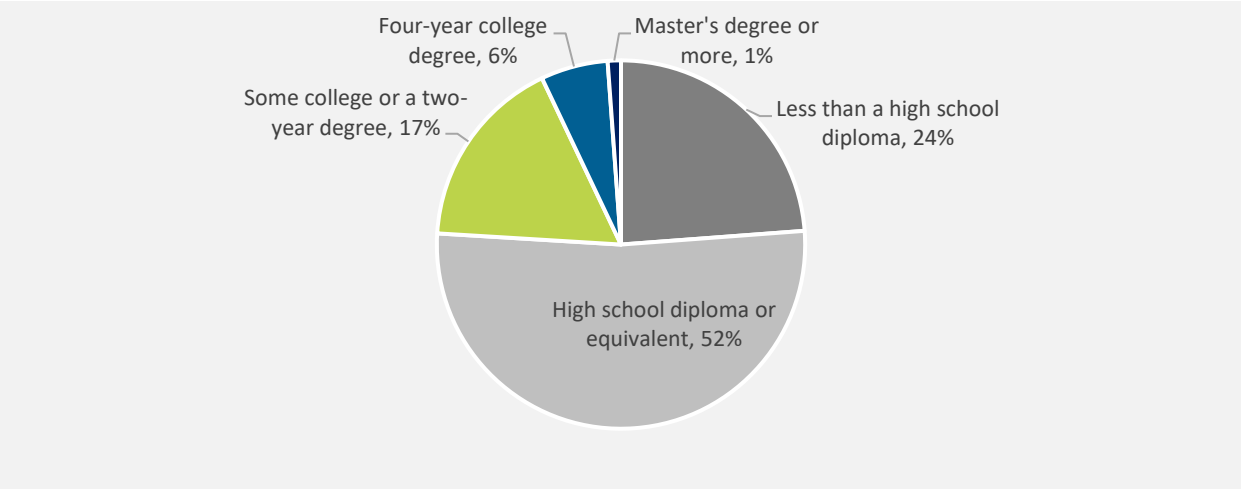
While there are no specific education requirements for building structure insulators, high school mathematics, mechanical drawing, and science courses are helpful. Floor, ceiling, and wall insulation workers often learn the trade in short-term, on-the-job training, working alongside experienced insulators. Eventually, they can remove and dispose of old insulation, read specifications to determine the amount and type of insulation needed, and measure and cut the materials. Learning to secure insulation with stapes, tape, or screws and installing aluminum, sheet metal, or plastic barriers to protect it from contact damage and moisture are also important. Installers of spray foam insulation also learn to use air compressors.

The US Environmental Protection Agency requires all insulation workers who handle asbestos to receive specialized training through programs accredited by the agency. According to the Rhode Island Department of Health asbestos control regulations, asbestos abatement must be done by workers who meet the Rhode Island Department of Health training, certification, and licensing requirements.[61] Insulation workers who do not work with or near asbestos must still use caution, because insulation particles can irritate the eyes, skin, and lungs. They must keep their work area well-ventilated and follow product and employer safety protocols. In addition, they can wear personal protective equipment to protect themselves from irritating materials and hazardous fumes.

Of the current pool of floor, ceiling, and wall insulation workers in Rhode Island, 24 percent have less than a high school diploma. About half have a high school diploma or equivalent. Seventeen percent have some college or a two-year degree, and six percent have a four-year college degree, and fewer than one percent have a master's degree or more.

[59] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[60] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.
[61] 216 RI Code R. § 216-50-15-1 (Asbestos Control), available at https://rules.sos.ri.gov/regulations/part/216-50-15-1.

Figure 54. Educational Attainment of Current Workers[62]



Based on eight active job postings for floor, ceiling, and wall insulation workers in Rhode Island from May 2022 through May 2023,[63] the certification most frequently in demand from employers is a driver's license.

Insulation workers must be skilled at using hand and power tools to remove, measure, cut, and install insulation materials accurately. Since they install insulation in ceilings and walls, they must also be comfortable using ladders and lifting heavy materials and equipment. In general, building structure insulators are most frequently required to be proficient in one or more of the following:[64]

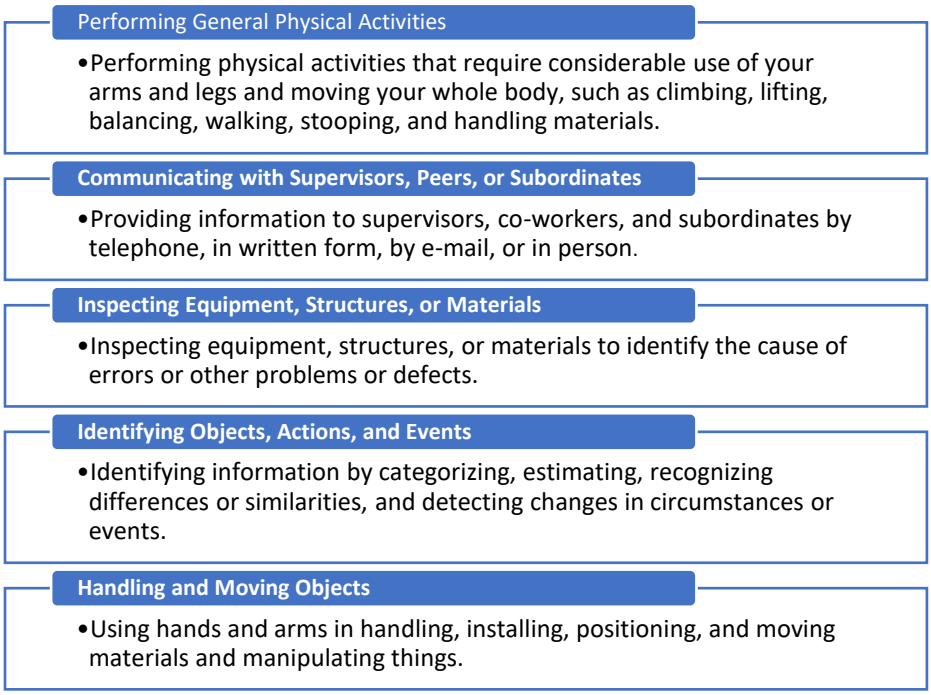
- Ability to Lift 101–150 pounds
- Ability to Lift 31–40 pounds
- Extension Ladders
- Generators
- Spanish

[62] Adapted from JobsEQ occupational profile for the floor, ceiling, and wall insulation workers workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diveristy, accessed May 2023. https://jobseq.eqsuite.com/.

[63] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

[64] Based on eight active job postings for floor, ceiling, and wall insulation workers in Rhode Island from 5/10/2022 to 5/10/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

Figure 55. Top Work Activities[65]



CAREER TRANSITION POTENTIAL

This section highlights the occupations that require skills and experience similar to floor, ceiling, and wall insulation workers and could, therefore, allow for transition into a building structure insulator job with minimal additional preparation. These transferrable occupations are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups.[66]

People working in jobs featured in the table below may find building structure insulation careers to be a good way to transition into the energy efficiency industry. Construction and maintenance painters are familiar with working on walls and ceilings since they apply paint and other materials to these as well as to building machinery, equipment, and other infrastructure. Fence erectors must perform accurate measurements and be proficient in the use of hand and power tools—two skills necessary for floor, ceiling, and wall insulation workers. Riggers, like building structure insulators, must exercise accuracy, safety, and mathematics knowledge in performing their jobs.

All of the occupations highlighted have typical entry-level education requirements that meet or exceed those for floor, ceiling, and wall insulation workers. None of the highlighted occupations would see a wage increase after transitioning to an insulator position. Riggers would see the largest drop, with their median hourly wages falling roughly $7.

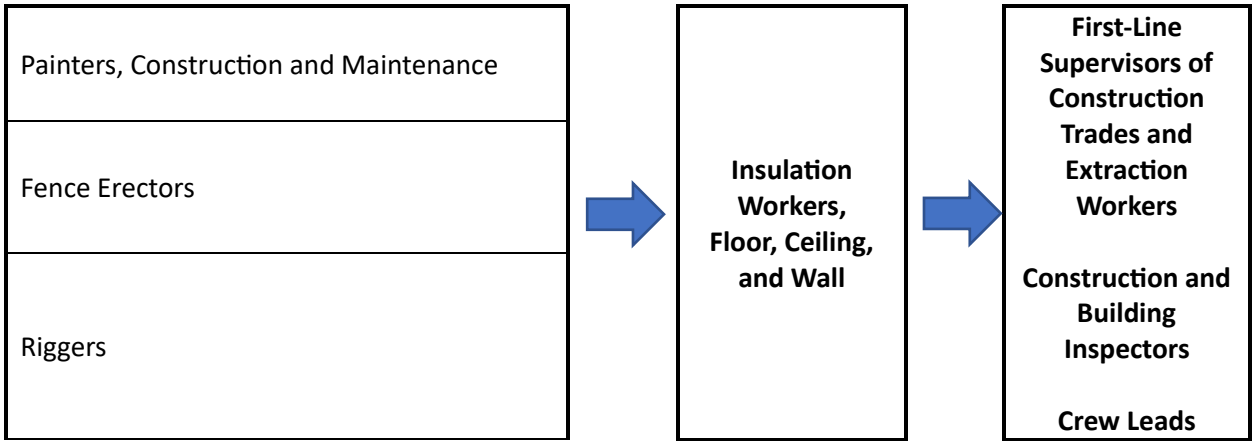
[65] ONET OnLine, Accessed January 2023. https://www.onetonline.org/

[66] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

Table 21. Transferable Occupations[67]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry- Level Education
Insulation Workers, Floor, Ceiling, and Wall	**109**	**$21.70**	**None**
Painters, Construction and Maintenance	1,359	$23.94	None
Fence Erectors	70	$22.31	None
Riggers	128	$29.10	High school diploma or equivalent

Figure 56. Career Transferability & Progression[68]



[67] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

[68] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

General Maintenance and Repair Workers

Summary: General maintenance and repair workers perform maintenance and repairs on machinery, equipment, or structures. They inspect products, diagnose problems, and develop solutions to fix the problems. Maintenance and repair workers may work on a wide range of systems, including electrical and plumbing, though they refer more complicated issues to specialized and licensed tradespeople. They may need to work in uncomfortable positions or environments.

Jobs that could facilitate transition into a general maintenance and repair worker role are largely found within the construction and extraction and the installation, maintenance, and repair occupational groups. Entry-level general maintenance and repair workers earn an hourly wage of a little under $17, which is around $1 an hour more than the statewide average for entry-level workers. The typical entry-level education requirement for this occupation in Rhode Island is a high school diploma or equivalent. Individuals often learn the trade on the job or in technical education programs. Once experienced, they could transition into supervisor positions or specialized tradesperson careers.

JOB DESCRIPTION[69]

General maintenance and repair workers maintain machinery, mechanical equipment, or structures. They perform routine maintenance tasks, assemble machinery or equipment, and fix or replace faulty components or systems, including those related to electrical or plumbing systems. These workers must be good problem solvers, as they often inspect machinery or equipment, diagnose problems, and develop solutions. Though very versatile, general maintenance and repair workers need to be able to identify which issues require a licensed tradesperson, such as an electrician or plumber, to complete specialized maintenance and repairs.

These workers may work indoors or outdoors, depending on their industry and tasks. They often use common hand and power tools to complete their work and may find themselves standing, walking, or reaching for extended periods of time, lifting heavy materials, and working in uncomfortable environments. General maintenance and repair workers typically work 40 hours a week, with occasional overtime when emergency repairs are needed.

WAGES

The entry-level and median hourly wages for general maintenance and repair workers in Rhode Island are slightly greater than statewide averages. The experienced wage for these workers is roughly $10 per hour less than the statewide average for experienced workers.

[69] Job description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook and O*NET OnLine, accessed January 2023. https://www.bls.gov/ooh/. https://www.onetonline.org.

Table 22. Wage Distribution[70]

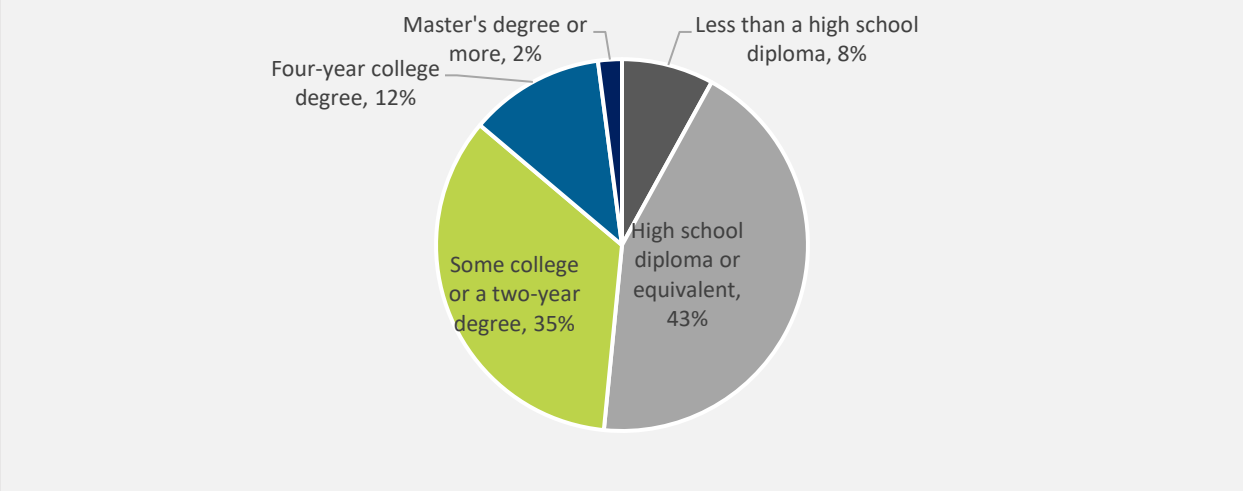
	Entry-Level	Median	Experienced
State Average (Annual)	$31,900	$49,800	$81,300
State Average (Hourly)	$15.33	$23.96	$39.09
Maintenance and Repair Workers, General (Annual)	$34,500	$50,100	$61,200
Maintenance and Repair Workers, General (Hourly)	$16.57	$24.08	$29.42

EDUCATION, EXPERIENCE, SKILL REQUIREMENTS, & CERTIFICATIONS[71]

The typical entry-level education requirement for a general maintenance and repair worker in Rhode Island is a high school diploma or equivalent. These workers often learn the trade while on the job, working alongside experienced colleagues, for a period generally ranging from three months to one year. Some prospective maintenance and repair workers also learn basic skills in mechanics, blueprint reading, and mathematics in high school courses or technical education programs. Over time, these workers learn how to conduct maintenance and repairs on a wide variety of systems, machines, and equipment. Once experienced, general maintenance and repair workers may transition into management positions, become licensed tradespeople in a specialized trade, or start their own businesses.

Of the current pool of general maintenance and repair workers in Rhode Island, eight percent have less than a high school diploma. Just over four in ten have a high school diploma or equivalent, and 35 percent have some college or a two-year college degree. Twelve percent of current workers have a four-year college degree, and two percent have a master's degree or higher.

Figure 57. Educational Attainment of Current Workers[72]



[70] JobsEQ, Occupational Wages from 2022 Q4, accessed May 2023. https://jobseq.eqsuite.com.
[71] Education and Experience description adapted from US Bureau of Labor Statistics Occupational Outlook Handbook, O*NET OnLine, and JobsEQ. https://www.bls.gov/ooh/. https://www.onetonline.org. https://jobseq.eqsuite.com.
[72] Adapted from JobsEQ occupational profile for the electrician workforce as of 2022 Q4 and based on place-of-residence employment estimates. JobsEQ, Occupational Diveristy, accessed May 2023. https://jobseq.eqsuite.com.

Based on 2,418 active job postings for general maintenance and repair workers in Rhode Island from May 2022 through May 2023,[73] certifications currently in demand from employers include:

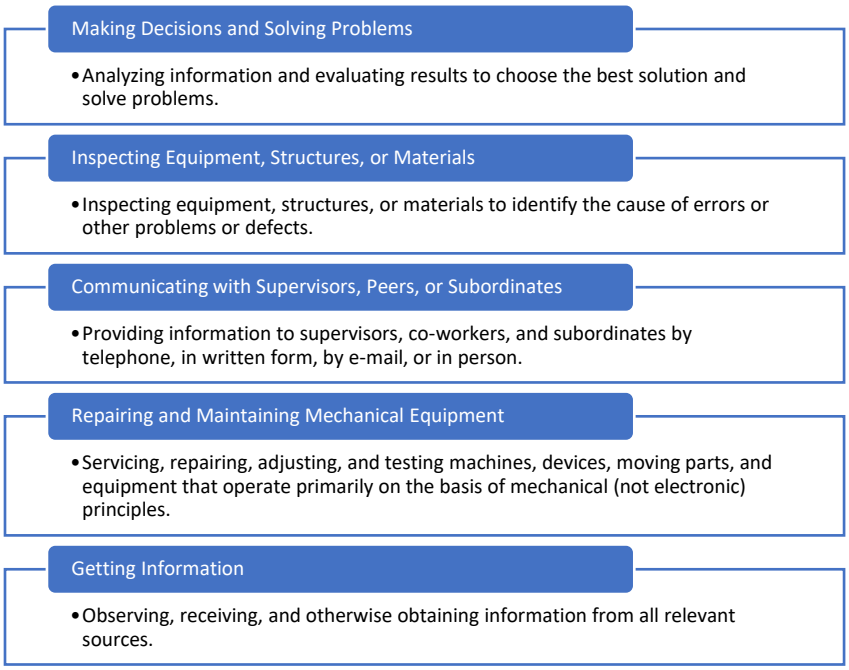
- Certified Maintenance & Reliability Professional (CMRP)
- Class A Commercial Driver's License (CDL-A)
- Class B Commercial Driver's License (CDL-B)
- Commercial Driver's License (CDL)
- Department of Transportation Medical Card
- Driver's License
- EPA Section 608 Certification (EPA 608)
- Forklift Certified
- OSHA 10-hour Safety Training
- Secret Clearance

General maintenance and repair workers often work in buildings, conducting common building maintenance and repair duties. They typically understand electrical, plumbing, and heating, ventilation, and air conditioning systems so that they can perform routine maintenance and common repairs. They must also know how to use various hand and power tools, such as screwdrivers, drills, and hammers, to install and make repairs on equipment, machinery, or other systems. General maintenance and repair workers are most frequently required to be proficient in one or more of the following:[74]

- Ability to Lift 41–50 pounds
- Ability to Lift 51–100 pounds
- Building Maintenance
- HVAC Systems
- Landscaping
- Mechanical Systems
- Microsoft Office
- Plumbing
- Power Tools
- Using Ladders

[73] JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.
[74] Based on 2,418 active job postings for general maintenance and repair workers in Rhode Island from 5/7/2022 to 5/7/2023. JobsEQ, Real Time Intelligence (RTI) Job Postings, accessed May 2023. https://jobseq.eqsuite.com.

Figure 58. Top Work Activities[75]



CAREER TRANSITION POTENTIAL

This section highlights occupations that require skills and experience levels similar to general maintenance and repair workers and could, therefore, allow for transition into a maintenance and repair job with minimal additional preparation. Jobs that could facilitate transition into these positions are found within the construction and extraction and the installation, maintenance, and repair occupational groups.[76]

People working in jobs featured in the table below may find general maintenance and repair careers to be a good way to transition into the energy efficiency industry. These workers have knowledge of certain types of machinery and equipment, as well as general mechanics. Some, including, elevator installers and repairers, also have knowledge of electrical systems. Workers in all of the featured occupations are well positioned to expand their skills and knowledge to other types of machinery, equipment, and systems to meet the requirements of general maintenance and repair roles.

Motorcycle mechanics would see a slight increase in their median hourly wage following transition to a general maintenance and repair position. Workers in other transferable occupations would see a drop in their median hourly wages, with elevator and escalator installers and repairers seeing the largest fall of $37.50 an hour. The entry-level education requirements for all of these occupations meet or exceed the typical entry-level requirement for general maintenance and repair workers.

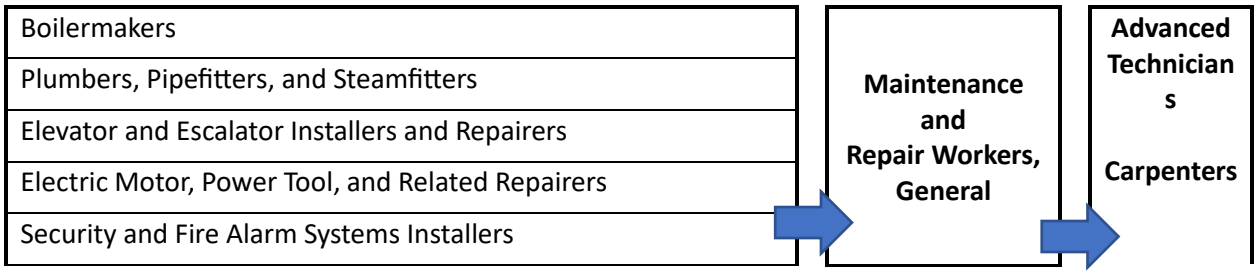
[75] ONET OnLine, Accessed January 2023. https://www.onetonline.org/

[76] Transferable occupations are taken from US Bureau of Labor Statistics, O*NET OnLine, Career Changers Matrix, accessed May 2023. https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html. Only occupations that are within the top five indices for the most highly related or transferable occupations are included in this analysis.

Table 23. Transferable Occupations[77]

Occupation	Total Jobs in Rhode Island, 2022 Q4	Median Hourly Wage, 2022 Q4	Typical Entry- Level Education
Maintenance and Repair Workers, General	**4,859**	**$24.08**	**High school diploma or equivalent**
Boilermakers	48	$36.04	High school diploma or equivalent
Plumbers, Pipefitters, and Steamfitters	2,108	$31.30	High school diploma or equivalent
Elevator and Escalator Installers and Repairers	53	$61.58	High school diploma or equivalent
Electric Motor, Power Tool, and Related Repairers	47	$25.48	High school diploma or equivalent
Security and Fire Alarm Systems Installers	299	$24.44	High school diploma or equivalent
Motorcycle Mechanics	50	$23.17	Postsecondary non-degree award
Control and Valve Installers and Repairers, Except Mechanical Door	181	$38.51	High school diploma or equivalent
Industrial Machinery Mechanics	930	$29.87	High school diploma or equivalent
Millwrights	81	$31.70	High school diploma or equivalent
Electrical Power-line Installers and Repairers	191	$48.82	High school diploma or equivalent
Signal and Track Switch Repairers	15	$43.38	High school diploma or equivalent
Stationary Engineers and Boiler Operators	118	$31.48	High school diploma or equivalent
Transportation Inspectors	43	$25.72	High school diploma or equivalent

Figure 59. Career Transferability & Progression[78]



[77] Based on place-of-work employment estimates available from JobsEQ, Occupational Snapshot, Occupational Diversity, and Occupational Education and Training Requirements, accessed May 8, 2023. https://jobseq.eqsuite.com/.

[78] Career progression estimates are based on a cumulation of research for this occupation, from all previously cited sources.

Motorcycle Mechanics		**Electricians** **Foremen** **Head Mechanics** **Facilities Managers** **HVAC Technicians**
Control and Valve Installers and Repairers, Except Mechanical Door		
Industrial Machinery Mechanics		
Millwrights		
Electrical Power-line Installers and Repairers		
Signal and Track Switch Repairers		
Stationary Engineers and Boiler Operators		
Transportation Inspectors		

Appendix A: Primary Research Methodology

Rhode Island Energy Efficiency Definition

The state of Rhode Island defines energy efficiency as the following six sub-technologies: advanced building materials and other, efficient lighting, ENERGY STAR appliances, microgrid, storage, and smart grid. While microgrid, storage, and smart grid jobs are typically included in the "transmission, distribution, and storage" or "clean grid and storage" sectors for the DOE employment reports and other clean energy industry reports, they are included in the energy efficiency sector for this report per Rhode Island's clean energy technology definition. In addition, in the DOE reports, microgrid jobs are reported within a category of "microgrid and other," but the microgrid jobs have been split out here. Likewise, job numbers for "Advanced Materials & Insulation" and "Other" energy efficiency jobs are listed separately in the DOE reports, but they are combined into the Advanced Materials and Insulation & Other" category here. In this category, "Other" includes jobs relating to variable speed pumps, other design service, software, energy auditing, rating, monitoring, metering, leak detection, policy or non-profit work, and consulting that cannot be specific to a detailed sub-technology.

Rhode Island Energy Efficiency Employment Data

The employment data in this report is pulled directly from the 2022 Rhode Island Clean Energy Industry Report (CEIR) produced for the Office of Energy Resources (OER) which is from the 2022 United States Energy and Employment Report (USEER) released by the Department of Energy. The 2022 USEER utilizes data from the Bureau of Labor Statistics Quarterly Census of Employment and Wages (BLS QCEW 2020 Q2) and Current Employment Statistics (CES Table B-1), as well as survey data. The survey was designed and implemented by BW Research Partnership. For the past decade, national, state, and local energy-related data collection and analysis efforts have used this survey methodology.

The survey uses a stratified sampling plan based on industry code (North American Industry Classification System or NAICS), establishment size, and geography to determine the proportion of establishments that work with specific energy related technologies, as well as the proportion of workers in such establishments that work with the same. These data are then analyzed and applied to existing public data published by the BLS QCEW, effectively constraining the potential universe of energy establishments and employment.

This report only uses the energy efficiency employment data that is presented in both the 2022 RICEIR and the 2022 USEER. Rhode Island is one of several states that takes publicly available data from USEER and reapportions employment data to match specific definitions across clean energy, including energy efficiency.

Rhode Island Clean Energy Employer Survey

BW Research conducted employer survey interviews with energy efficiency organizations throughout Rhode Island. The survey sample included a compilation of known energy efficiency firms that had

completed surveys for the United States Energy and Employment Report (USEER)[79] in the last three years, email and phone samples compiled from contractor lists provided by RI Energy and RI OER, an online panel (pre-recruited individuals that have agreed to participate in survey research)of potential respondentsthrough a third party of relevant businesses (e.g. firms in construction, engineering, appliance repair), and a sample of firms known to employ the relevant industry codes (NAICS) from DataAxleUSA[80]. Known Rhode Island energy efficiency firms from the USEER survey sample were recontacted as part of the research effort. Samples were de-duplicated before fielding the employer survey and contact information was checked upon completion of data collection to ensure that duplicate responses were removed. The survey instrument was programmed internally by BW Research and each respondent was assigned a unique ID to prevent duplication.

The employer survey was fielded between February 7th and March 24th in 2023 and resulted in 31 total completes by firms, accounting for 95 occupational completes. Respondents were asked a question about whether they employed occupations from a list and then were asked follow up questions about each of the occupations that they employ at their firm. On average, each employer answered questions for 3.1 occupations. The online survey consisted of an initial invite email and seven reminders, which resulted in a 3.6% response rate (sample size = 837). The online panel survey resulted in a response rate of 1.0% (sample size = 488). The average survey duration was 12.2 minutes.

Rhode Island Potential Worker Survey

BW Research conducted a survey of potential energy efficiency workers in Rhode Island. To qualify for the survey, potential respondents had to be residents of Rhode Island between 18 to 64 years of age, and either working or currently looking for employment. An overview of the potential worker survey methodology is found in the table below. Potential worker respondents were recruited for online panels (pre-recruited individuals that have agreed to participate in survey research). The response rate for the online panel survey was 35.7% and the sample size was n=575.

Table 24. Overview of Potential Worker Survey Methodology

Method	Online Survey (Panel)
Universe	852,354[81] Residents 18 Years and Older in Rhode Island
Number of Respondents	205 Potential Workers Completed a Survey
Average Length	5.2 minutes
Field Dates	February 1st through February 4th, 2023
Margin of Error	The *maximum* margin of error for questions answered by all 205 respondents was +/-6.84% (95% level of confidence).

[79] For more information on the US Department of Energy US Energy & Employment Jobs Report (USEER), visit https://www.energy.gov/policy/us-energy-employment-jobs-report-useer.

[80] Relevant NAICS codes include: Plumbing, Heating, and Air Conditioning Contractors (238220) and Electrical Contractors and Other Wiring Installation Contractors (238210).

[81] US Census Bureau, American Community Survey (ACS) 2020 1-year experimental data estimates, accessed 06/02/23. https://www.census.gov/programs-surveys/acs/data/experimental-data/1-year.html.

Rhode Island Current Worker Survey

BW Research conducted a survey of current energy efficiency workers in Rhode Island. Current workers were recruited from an online panel (pre-recruited individuals that have agreed to participate in survey research) from a pool of relevant occupations, including electricians, HVAC technicians, and construction laborers, among others, who worked in Rhode Island. Once in the survey, respondents were further screened by employment status (had to be working) and involvement in energy efficiency work (installation, repair, maintenance, or sales and distribution of goods and/or services related to energy efficiency technologies). The current worker survey was fielded between February 1st and March 15th in 2023 and resulted in 160 completes. The response rate for current workers from panel (pre-recruited individuals that have agreed to participate in survey research) was 8.2% and the sample size was n=1,950 (number of potential respondents in relevant occupations that work in Rhode Island). The average survey duration was 4.4 minutes/

Stakeholder Interviews

Between March and May 2023, the research team conducted 14 interviews with workforce development stakeholders, experts, leaders, and educators across Rhode Island. In doing so, BW Research gathered qualitative data on perceived workforce needs and the challenges of building a strong and dynamic energy efficiency industry.