Workforce Planning and Analysis Appendix

Executive Summary

Rhode Island's Current Clean Energy Workforce

Rhode Island's clean energy workforce continues to expand steadily, mirroring the state's transition toward a more sustainable and electrified economy. The sector is defined by consistent growth across multiple industries, a relatively young labor force, and high worker satisfaction. Together, these factors point to a resilient and motivated workforce well-positioned to support the state's clean energy and climate goals.

Steady growth across multiple clean energy industries reflects Rhode Island's ongoing transition toward a more sustainable and electrified economy. Rhode Island employed nearly 15,000 clean energy workers in 2024—a 3% increase from the previous year. Energy efficiency remains the largest segment, accounting for more than half of the state's workforce, while renewable and efficient heating and cooling represent another quarter. Renewable energy, including solar and wind, makes up about 15% of clean energy jobs. Although clean transportation is currently the smallest sector, it is growing the fastest, with employment rising by 8% from 2023 to 2024.

Rhode Island's clean energy workforce is notably younger than the state's overall labor force, indicating greater presence of new talent in clean energy. This trend suggests that retirements may have a smaller near-term impact compared to other sectors with more aging workers. However, programs that support the retention of experienced workers, will help preserve critical management and technical expertise as the industry continues to grow, and provide mentors and trainers for the next generation.

Workers in the state's clean energy workforce are highly satisfied with their employment. Nearly all surveyed workers expressed satisfaction with their careers, with more than half saying they are very satisfied. Few indicated plans to leave the clean energy field, underscoring low attrition and a stable workforce. Most respondents also understand their progression for career advancement—either within their current employer or elsewhere in the industry—suggesting that Rhode Island's clean energy sector is capable of offering meaningful, long-term career pathways for its workers.

Projected Workforce Needs for Clean Energy in Rhode Island

Modeling conducted for this study projects that Rhode Island's clean energy economy will add thousands of new jobs by 2035, with particularly strong increases for Electricians, HVAC/R Mechanics and Installers, and many other construction trades. While most occupations grow, notable gaps—especially among Solar Installers and Electrical Power-Line Installers and Repairers

—underscore the importance of early planning and expanded training capacity to meet potential gaps in the supply of these workers. Addressing these shortages through coordinated workforce strategies will be critical to sustaining growth and meeting future energy targets.

Rhode Island's clean energy economy is projected to add more than 6,600 new jobs by 2035, based on modeling impacts from the Act on Climate, driven largely by growth in construction and maintenance occupations. Electricians are expected to see the most substantial increase, nearly doubling their numbers as electrification expands across the state's energy, transportation, and building sectors. Construction Laborers and HVAC/R Mechanics and Installers are also poised for significant gains, reflecting rising demand for installation, maintenance, and energy efficiency work. While most occupations are expected to grow, modest declines in select supply chain roles highlight the importance of targeted transition strategies to support balanced and sustainable workforce development.

Based on projected workforce demand, Rhode Island has the potential for significant workforce gaps in several key clean energy occupations, most notably among Solar Installers and Electrical Power-Line Installers and Repairers. Demand for Solar Installers is projected to grow by 130% by 2035, the largest increase among all priority occupations, while demand for Electrical Power-Line Installers and Repairers is expected to nearly double. Few training programs currently exist for these roles, and employer expectations may underestimate the scale of future demand—particularly for linework. Strengthening coordination between unions, employers, training providers, and state agencies will be essential to ensuring Rhode Island is meeting the need for workers critical to the state's clean energy infrastructure and climate goals.

Most of the few occupations in Rhode Island projected to experience job losses from an energy transition have clear, adjacent crossover opportunities that build on workers' existing skills and experience. Many roles expected to see reduced employment during the energy transition share transferable competencies with growing clean energy and technical occupations, offering practical pathways for workers to transition with targeted reskilling programs. This overlap can facilitate the design of transition programs that help displaced workers move smoothly into expanding sectors of the clean energy economy.

In addition to job impacts, modeling results show the Climate Action Strategy is projected to deliver public health benefits for Rhode Islanders by reducing exposure to fine particulate matter (PM2.5). From 2023 to 2035, nearly $22 million in avoided health-related costs are expected statewide, with more than one-third, about $7 million, accruing to LIDAC communities. These communities also experience benefits earlier: LIDACs reach their highest single-year reduction in 2026, when 15% of their total projected health-impact reduction occurs, compared to the statewide peak occurring in 2034.

Reskilling and Transition Strategies and Opportunities

As Rhode Island's energy landscape evolves, much of the state's overall workforce already possesses the foundational skills needed to transition into clean energy careers. Targeted reskilling,

short-term technical training, and stronger connections to ocean-based industries can accelerate these shifts while ensuring equitable access to opportunity. Emphasizing transferable skills, competitive wages, and recognized credentials will help workers and employers adapt together to a changing economy.

While Rhode Island's clean energy industry continues to thrive, entry into the sector remains challenging for prospective workers. During listening sessions and interviews, stakeholders and community members noted limited visibility into clean energy job opportunities and uncertainty around training for emerging roles. Workers and training providers also expressed difficulty identifying clear career pathways for jobs in new clean energy industries and understanding job quality across the sector. These findings highlight an opportunity for the state, particularly through the Office of Energy Resources and its climate dashboard, to centralize and promote accessible information and career guidance, helping more Rhode Islanders connect to clean energy employment opportunities.

Much of the Rhode Island workforce already possesses the communication and problem-solving abilities needed for career transitions into clean energy. Active listening, critical thinking, and speaking are the top skills shared across Rhode Island's fastest-growing clean energy occupations, as well as those projected to decline. Future upskilling, and retraining efforts for those already with work experience should emphasize technical and trade-specific competencies that align with emerging clean energy jobs.

Rhode Island's 'Ocean State' identity is central to expanding and filling climate-connected jobs, as the state's maritime economy naturally aligns with the growth of many clean energy industries. The cultural and economic foundation built around ocean-based work means that many workers and businesses already possess transferable skills suited to offshore wind, marine energy technology, and other blue-and-green-economy sectors. This alignment is reinforced through education and training—industries like fisheries, eco-tourism, and oceanography are well established, and the state's four-year universities report growing interest in environmental studies, sustainability, and green management across diverse majors. The University of Rhode Island, in particular, has cultivated a longstanding reputation as a business school dedicated to sustainability, helping develop a professional pipeline for clean energy and climate-related service jobs. Rhode Island should build on these strengths by intentionally integrating its ocean-based industries, educational programs, and clean energy initiatives into a unified workforce strategy that leverages the state's maritime heritage to meet growing offshore wind and marine energy technology demands.

Short-term reskilling and retraining that build on existing skills are essential to developing Rhode Island's clean energy workforce. State workforce leaders emphasized that most emerging clean energy roles are not new occupations but rather require updating the skills of existing tradespeople through targeted certifications and short courses. Training skilled workers such as Electricians, and HVAC/R Mechanics and Installers in newer clean energy technologies—such as solar installation, advanced HVAC systems, and energy storage—can quickly expand the available labor pool. Safety training is also critical for specialized areas like offshore wind and battery

systems. Retraining is especially important for workers in industries impacted by the clean energy transition, such as fossil fuels. Providing paid training opportunities, along with wraparound support, and transparent pathways into new clean energy roles can help ensure an equitable and just transition for these experienced workers.

Workers in traditional energy industries described in listening sessions and interviews how they have built long-term careers and take deep pride in their current work; many do not recognize how their existing skills and experience can transfer to clean energy occupations. Expanding education and outreach can demonstrate these connections. Reassuring workers that clean energy careers can meet or exceed the wages, stability, and purpose of their current roles will be essential to effecting successful workforce transitions.

Rhode Island's clean energy economy offers the potential for high wages and good benefits, including in occupations with lower barriers to entry. Four of the fourteen priority occupations—Electrical Engineers, Electrical Power-Line Installers and Repairers (Linemen), First-Line Supervisors of Construction Trades, and Solar Photovoltaic Installers—earn wages above $46 per hour, placing them in the state's highest wage tier. Notably, Solar Photovoltaic Installers and Linemen combine high wages with strong employer demand and accessible entry pathways, making them key targets for training and recruitment efforts. Survey data also point to solid opportunities for wage growth and job quality across clean energy: most workers report access to healthcare and retirement benefits, and many receive overtime pay and flexible scheduling.Capacity of Existing Workforce Training and Education

Rhode Island's training and education ecosystem provides a strong starting point for building a clean energy workforce, with a robust network of CTE schools, unions, and apprenticeships. However, gaps remain in specialized areas such as solar installation and linework, and stronger alignment between training efforts and employer demand is needed. Expanding credential pathways, regional access, and coordination among providers will help ensure that training keeps pace with industry growth and needs.

Rhode Island's extensive network of clean energy and climate-related training programs spans key occupations and regions, positioning the state to build a skilled and equitable clean energy workforce in the future. Within the state are nearly 200 training programs related to key clean energy and climate occupations. About one-quarter of these programs focus on Electrical Engineering, reflecting robust early exposure to engineering education through CTE pathways. Additionally, Construction Laborers also have widespread training availability across both youth and adult programs, including apprenticeships. While training opportunities are found in every county, they are most concentrated in Providence County, which aligns with many of the state's environmental justice communities. Expanding access in the cities of Woonsocket and Newport will help ensure equitable pathways into clean energy careers statewide for those residents.

When compared to the projected growth across Rhode Island's clean energy economy, certain occupations show a mismatch between training activity and immediate job availability. This reflects a common "chicken-and-egg" challenge in workforce development—balancing the need to

prepare workers early for emerging roles with the risk of training ahead of market demand. Addressing this gap, especially for Solar Photovoltaic Installers, requires better coordination between training providers, employers, and state agencies to align program timing and capacity with supportive policies, and projected industry growth, ensuring a ready and appropriately sized workforce as new clean energy opportunities accelerate.

Training opportunities for several key clean energy occupations in Rhode Island, such as Sheet Metal Workers, Solar Photovoltaic Installers, and Electrical Power Line Installers, remain limited. Fewer than three programs were identified statewide for each of these three occupations. Many of these roles rely on on-the-job training or utility-based apprenticeships, such as those offered through local unions. While formal solar installation programs are sparse, some electrician training programs and online certifications provide relevant skills and pathways into the occupation. Expanding accessible, in-state training for these high-demand roles will be essential to meeting future workforce needs.

Most Rhode Island clean energy employers require or prefer certifications for their workers, underscoring the importance of industry-recognized credentials in the sector. Industry and trade associations are the most common providers of certification training, followed by private online programs, apprenticeships, in-house training, and community colleges. These partners—along with unions and technology manufacturers—play a vital role in shaping and providing training that meets employer needs and ensures workers have the skills required for a rapidly evolving industry. Strengthening coordination and establishing shared objectives among these entities will help align certification pathways with Rhode Island's workforce development goals.

Rhode Island's strong Career and Technical Education (CTE) network already plays an important role in preparing the state's clean energy workforce and will be valuable in efforts to expand access to clean energy jobs among new workers. More than two-thirds of surveyed clean energy workers reported attending a career or vocational school for at least six months, and over one-third of all identified training programs in the state are CTE-based. Because Rhode Island's education system operates on a student choice model, students can enroll in programs outside their home districts. This structure innately expands access to specialized clean energy training across the state, strengthening pathways into high-demand technical careers for all Rhode Island's young workers.

Unions also play a pivotal role in Rhode Island's clean energy workforce and help to meet the state's workforce needs through "earn while you learn" apprenticeship programs that combine paid training with classroom instruction. These pathways support both new and mid-career workers who will practice their trade in clean energy industries. However, in interviews and listening sessions, many unions report long waitlists and limited apprenticeship openings. Unions must navigate uncertain demand projections in filling apprenticeship classes, to ensure their current and future members have consistent employment opportunities. Strengthening coordination between unions, employers, and the state can help align training with upcoming workforce needs and help to ensure a steady pipeline of skilled workers.

Apprenticeship, internship, and mentorship programs are popular entry points into Rhode Island's clean energy workforce. A majority of surveyed clean energy workers reported that apprenticeships, mentorships, or internships helped them enter their current occupation, and nearly all participants found these experiences effective in advancing their careers. Employers echoed this sentiment—six in ten reported hiring workers from Rhode Island apprenticeship programs, and nearly all said these programs improved employee performance. With 20 apprenticeship and eight pre-apprenticeship programs identified across key occupations, along with internship opportunities through the Governor's Workforce Board, these hands-on pathways are essential to building a skilled and job-ready clean energy workforce.

Real Jobs Rhode Island, administered by the Rhode Island Department of Labor and Training, stands as one of the state's most successful and widely recognized workforce development programs. Established in 2015, the employer-driven initiative partners with businesses, training providers, and community organizations to design and deliver strategies that address specific industry workforce needs—from job placement and upskilling to entrepreneurial and pipeline development. Since its launch, Real Jobs RI has trained more than 38,000 individuals, placed over 17,000 jobseekers, and supported more than 6,000 businesses, making it a cornerstone of Rhode Island's efforts to build a responsive, industry-aligned workforce system, and a helpful model for future clean energy workforce needs.

Collaboration and Coordination Among the Workforce Ecosystem.

The continued success of Rhode Island's clean energy transition depends on effective collaboration among employers, unions, educators, training providers, and community partners. Expanding awareness of available programs, aligning training with employer needs, and embedding equity into workforce strategies will help strengthen this ecosystem. By fostering coordination and shared investment, Rhode Island can ensure its clean energy growth benefits all communities statewide.

Collaboration between employers and training providers is essential to building Rhode Island's clean energy workforce pipeline. Employers working directly in the design, installation, and maintenance of clean energy systems have firsthand knowledge of the skills and certifications workers need to succeed. Many of these skills are most effectively taught through on-the-job learning, found in apprenticeships, internships, and industry-led training programs. Trade associations and employers themselves often serve as key training providers, offering certification courses and hands-on experience that complement classroom instruction. Strengthening partnerships between industry and training stakeholders will help ensure Rhode Island's workforce remains aligned with employer needs and ready to meet the demands of a rapidly evolving clean energy economy.

Rhode Island clean energy employers expressed strong interest in additional resources to support workforce development, but many are unaware of existing entrepreneurial and business support programs. Expanding and promoting these resources, such as funding to reimburse training and certification costs, can help employers more effectively upskill their

workforce. These findings also indicate a need for stronger outreach and coordination among clean energy employers.

Equity-focused initiatives are increasingly embedded within Rhode Island's clean energy training infrastructure, though stronger connections between employers and community-based organizations are still needed. Many training providers are expanding access by offering programs in multiple languages, operating centers within environmental justice communities, and partnering with local organizations to recruit diverse participants. Several also provide targeted support for formerly incarcerated individuals, recognizing the barriers they face as many employers continue to conduct background checks. Paying trainees from disadvantaged communities for their time in training programs and adopting "train the trainer" models can further expand opportunity and build trust within underrepresented groups. Continued collaboration between employers, community organizations, and training providers will be essential to ensuring all Rhode Islanders can benefit equitably from clean energy workforce growth.

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Introduction

The 2021 Act on Climate established ambitious goals for Rhode Island to address climate change, most notably the mandate to achieve net-zero greenhouse gas emissions by 2050. The 2025 Climate Action Strategy outlines the pathway to meeting these goals, emphasizing emissions reduction and a just transition toward clean energy.

A well-prepared workforce is central to this transition. Meeting the state's economywide emissions reduction targets across multiple sectors will require both the expansion of new, clean energy occupations and a managed decline in employment across traditional industries. **This report provides a comprehensive workforce analysis to assess potential job creation and loss associated with decarbonization efforts and to identify the workforce development and training needs that will accompany these changes.**

Key questions guiding this analysis include: What opportunities and gaps exist in preparing Rhode Island's workforce for large-scale decarbonization? How can coordination and collaboration among state, education, and industry partners be strengthened? What best practices from other climate and energy planning efforts can inform Rhode Island's approach to integrating workforce needs and worker voices? And how can the state better support workers who may need to transition into new occupations or industries?

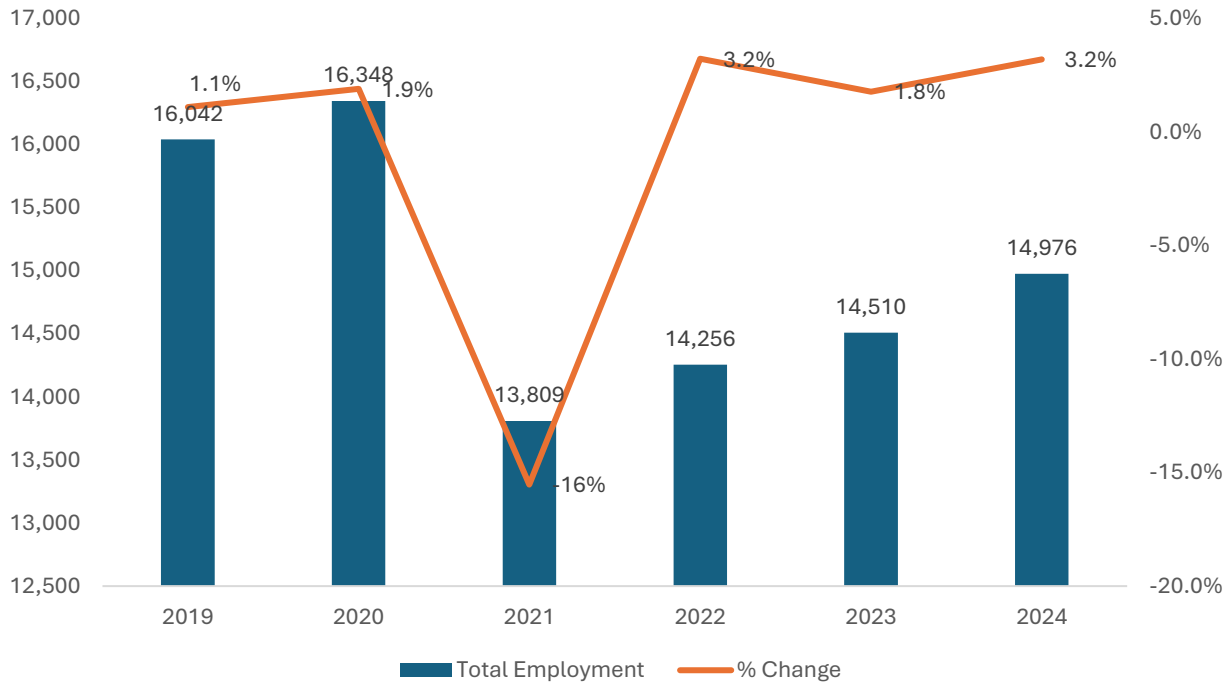
To address these questions, the research team conducted quantitative and qualitative analyses of Rhode Island's current and future energy workforce. This included modeling and secondary data analysis to assess demand for key roles, as well as evaluation of the supply side of the workforce—such as training program availability, employer needs, and worker readiness. Stakeholder engagement was central to this effort, encompassing executive interviews with education providers, community organizations, and government agencies, along with in-person and virtual community sessions.

Rhode Island stands at the forefront of an opportunity to build a climate-ready workforce that delivers good wages, equity, and broad community benefit. Achieving this vision will depend on centering worker perspectives, building clear training and career pathways, and ensuring that all Rhode Islanders share in the opportunities of a clean energy economy. Collaboration, transparency, and accountability will be essential to realizing this goal.

The Current Clean Energy Workforce

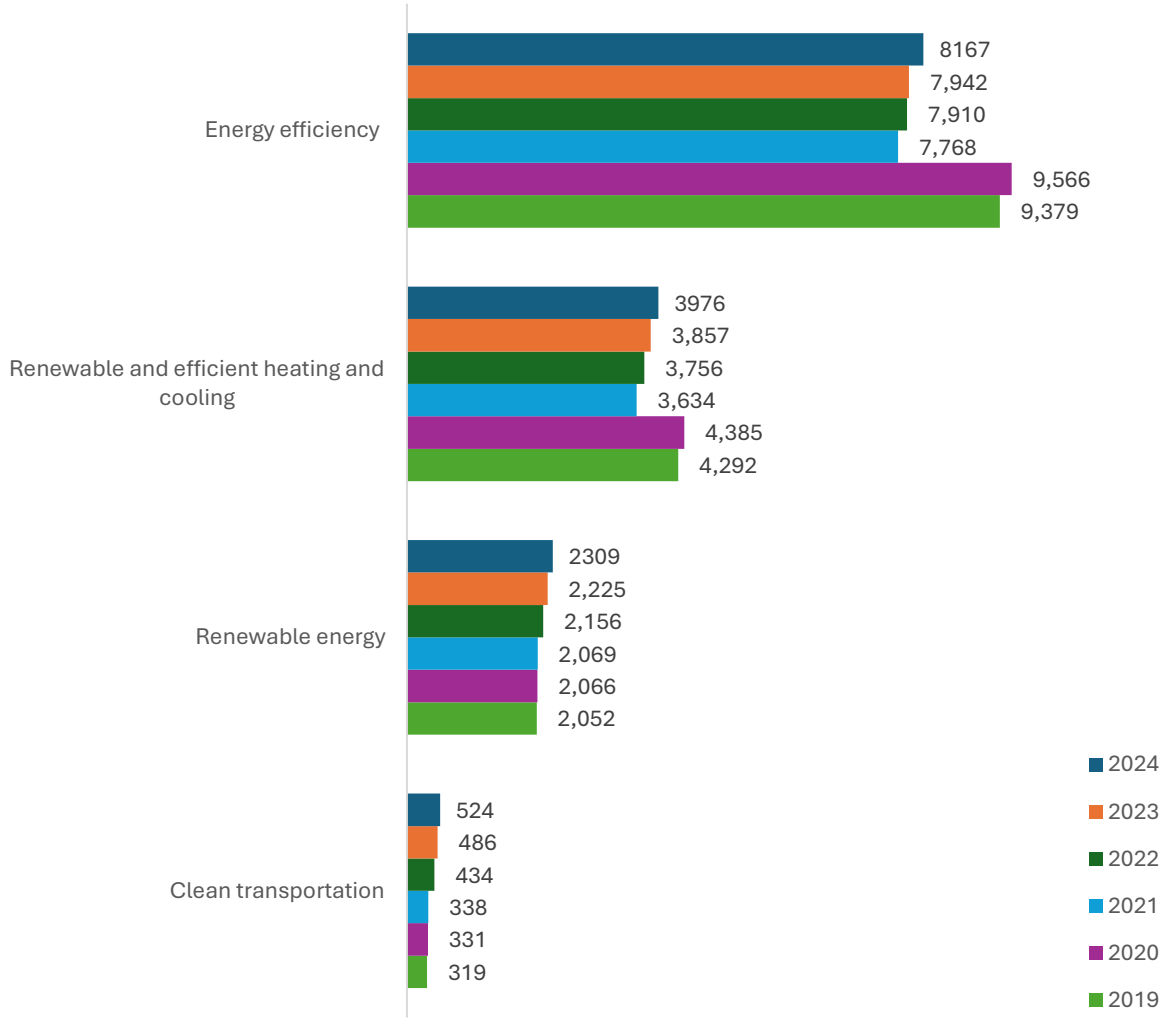
Clean energy in Rhode Island is a growing industry, employing nearly 15,000 clean energy workers at the start of 2024. The industry suffered employment loss in 2021 due to impacts from the global pandemic, but since 2021 the industry has been recovering, growing by 5% from 2021 to 2024. Within the last tracking periods, 2023 to 2024, employment grew by 3% (Figure 1).

Figure 1. Clean Energy Employment in RI, 2019-2024



Energy efficiency workers make up over half of the state's clean energy workforce (55%), with over 8,000 workers as of 2024. These workers install electrification technologies, such as efficient lighting and ENERGY STAR appliances, along with advanced building materials. Over a quarter of the clean energy workforce (27%) works in renewable and efficient heating and cooling, performing activities such as installing high-efficiency heating and cooling systems. Renewable energy workers, who work in solar and wind, make up 15% of the workforce. While the clean transportation sector is the smallest in the state's clean energy industry, it experienced the highest growth rate from 2023 to 2024, rising by 8% (Figure 2).

Figure 2. Clean Energy Employment by Major Technology, 2019-2024

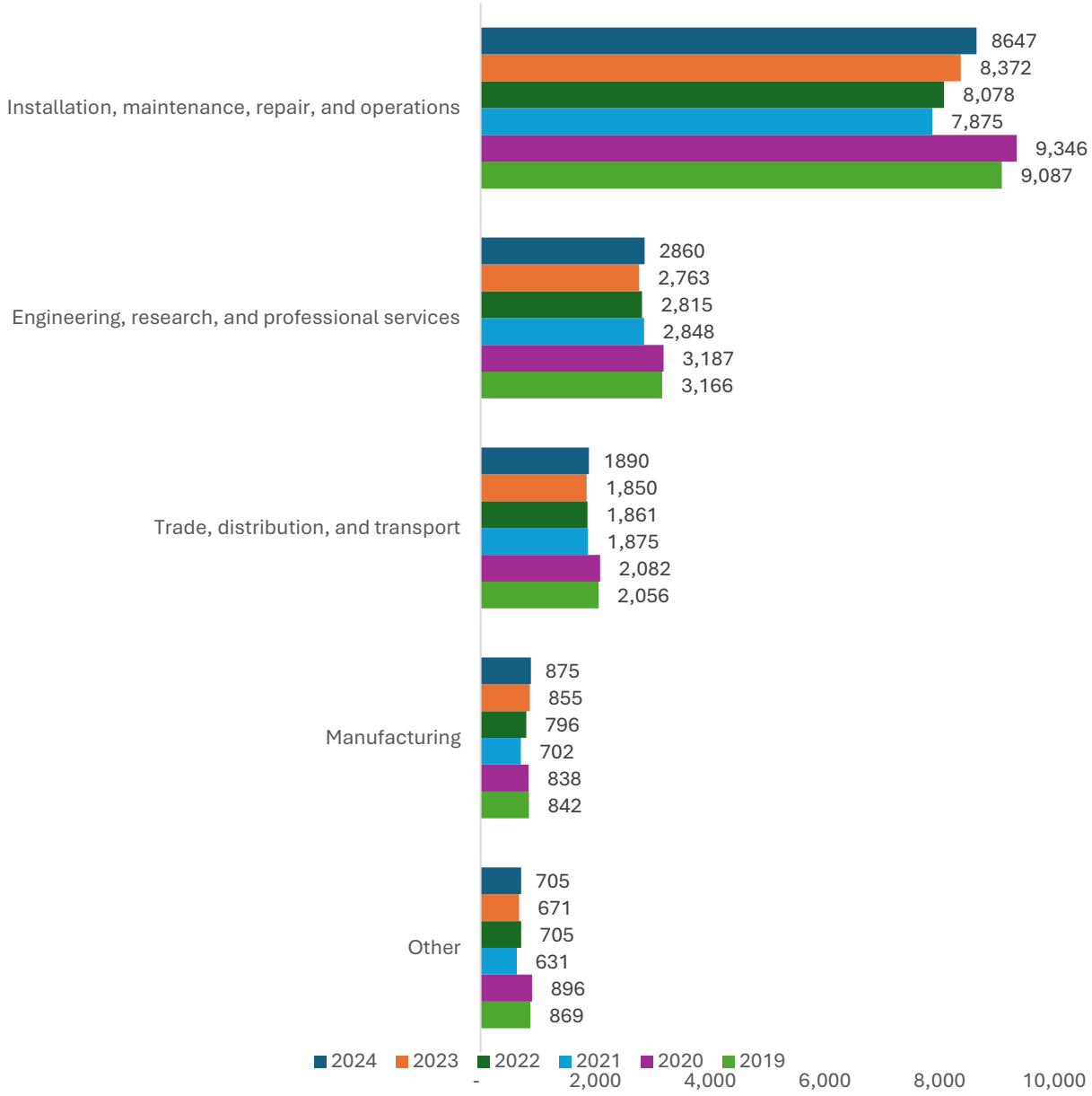


The largest value chain segment[1] of Rhode Island's clean energy economy is the installation, maintenance, repair, and operations segment,[2] with over 8,500 workers in 2024, representing 58% of all clean energy workers in the state. Workers in these segments are highly involved with both energy efficiency and renewable and efficient heating and cooling activities, and commonly include Electricians, HVAC/R Mechanics and Installers, Construction Laborers, and Plumbers, Pipefitters, and Steamfitters. All segments of the value chain experienced growth over the last 2023 to 2024 period, with the "other" category (utilities, organizational and non-profit work such as environment and conservation organizations, business associations, or advocacy organizations), growing at the highest rate of 5% (Figure 3).

[1] Value chain segments refer to the distinct stages of activity involved in producing, delivering, and supporting energy-related goods and services.

[2] Installation, maintenance, repair, and operations is comprised of all workers engaged in residential, commercial, and industrial building construction, contracting and electrical work, insulation and weatherization, or plumbing and heating, air conditioning, and ventilation work.

Figure 3. Clean Energy Employment by Value Chain, 2019-2024[3] [4] [5]



[3] Manufacturing encompasses heating and air conditioning equipment manufacturing, engine and compressor manufacturing, semiconductor manufacturing, and energy efficient product, appliance, or lighting manufacturing, as well as motor vehicle and parts manufacturing.
[4] Trade, distribution, and transport includes motor vehicle and parts wholesalers, electrical equipment and household appliance wholesalers, and other wholesale trade and distribution related to clean energy products and technologies.
[5] Professional services include all finance, legal, consulting, engineering, research, or architectural support.

The clean energy workforce in Rhode Island matches Rhode Island's broader workforce racially, with white workers making up 83% of the clean energy workforce, and 85% of the state's overall workforce.

Rhode Island clean energy workers are younger that the state average. Only 7% of workers in clean energy are 55 and older, compared to 27% in the overall workforce Table 1. This suggests that younger workers are actively entering the industry, which may lessen the impact of an anticipated surge in retirements in the coming decade. Retaining experienced workers will be valuable to mentor and train the next generation.

Table 1. Rhode Island Clean Energy and General Workforce Demographics, 2023Q4[6]

	RI Clean Energy Overall	**RI State Average**
Male	65.0%	47.4%
Female	35.0%	52.6%
Hispanic or Latino	12.7%	13.0%
Not Hispanic or Latino	87.3%	87.0%
American Indian or Alaska Native	0.7%	0.8%
Asian	3.0%	3.9%
Black or African American	10.4%	8.1%
Native Hawaiian or other Pacific Islander	0.1%	0.2%
White	83.0%	84.8%
Two or more races	2.8%	2.2%
Veterans	6.5%	5.2%
55 and over	7.4%	27.3%

[6] Clean energy workforce demographics are sourced from: U.S. Energy & Employment Jobs Report (USEER). U.S. Department of Energy. 2024. Overall workforce demographics are sourced from: U.S. Bureau of Labor Statistics.

The overall clean energy workforce in Rhode Island remains heavily male-dominated. While women make up 53% of the state's overall workforce, they represent only 35% of clean energy workers. This disparity is seen nationwide and highlights an important equity gap in access to clean energy careers—one shaped by historical underrepresentation of women in the skilled trades and technical fields that make up much of the sector. Addressing this imbalance requires intentional strategies to remove systemic barriers and create inclusive pathways into clean energy employment. Advancing gender equity in clean energy not only broadens opportunity but also strengthens Rhode Island's overall workforce capacity to meet its growing climate goals.

Female representation is highest in management roles in clean energy, where women make up 43% of the workforce. Manufacturing roles are 32% female, while in construction women accounting for just 4% of workers (Table 2).

Table 2. Benchmarks for Gender Distribution in Rhode Island Industries[7]

	RI Clean Energy Industry	RI Construction Industry[8]	RI Manufacturing Industry[9]	RI Management Industry[10]
Male	65.0%	95.8%	67.8%	57.3%
Female	35.0%	4.2%	32.2%	42.7%

More than half (57%) of the state's clean energy workforce is based in Providence County with 8,501 clean energy workers. This is unsurprising given that Providence County holds a similar percentage of the total economy-wide workforce. When looking at clean energy workers as a percentage of county's overall workforce, Kent County has the highest concentration of clean energy workers (4% of total workforce), followed by Newport County (3% of total workers) (Table 3).

The relatively balanced access across counties indicates that clean energy employment is relatively well distributed across the state. Assuming growth is consistent with current employment trends, this broad geographic reach provides a durable foundation for equitable workforce development, ensuring that Rhode Islanders in multiple regions can access growing clean energy job opportunities. As the sector expands, maintaining this balance through regionally accessible training programs, transportation options, and local employer partnerships will be critical to sustaining equitable participation in the clean energy transition.

[7] Demographic data is pulled from the United States Energy and Employment Report 2024 (USEER 2024) as well as JobsEQ's "Occupational Diversity" page, 2023Q4, based on place of residence, for workers across all industries in Rhode Island. Obtained July 2024.
[8] Construction industry represents workers whose occupations are in the 49 occupational grouping, installation, maintenance, or repair.
[9] Manufacturing industry represents workers whose occupations are in the 51 occupational grouping, production.
[10] Management industry represents workers whose occupations are in the 11 occupational grouping, management, including occupations like executives and managers.

Table 3. Clean Energy Employment by County, 2024

	2023Q4 Clean Energy Employment	Percent of Clean Energy Workforce	Overall Workforce[11]	Clean Energy Percent of Overall County Employment
Bristol County	397	2.6%	16,866	2.4%
Kent County	2,819	18.8%	80,226	3.5%
Newport County	1,418	9.5%	44,898	3.2%
Providence County	8,501	56.8%	305,867	2.8%
Washington County	1,711	11.4%	61,434	2.8%
N/A	130	0.9%	14,326	0.9%

[11] JobsEq, 2024.

Clean Energy Worker Perspectives

Clean energy workers in Rhode Island are very likely to feel satisfied with their career. More than half (55%) of surveyed clean energy workers reported being very satisfied with their career, while 40% reported being somewhat satisfied. (Figure 4).

Additionally, most clean energy workers see opportunities for advancement within their company or industry, highlighting a low attrition risk for these workers. Nearly two-thirds (63%) of surveyed clean energy workers reported hoping to advance positions within their current company, while 22% hope to advance to another company in the same industry (Figure 5).

Figure 4. How satisfied are you currently with your career?

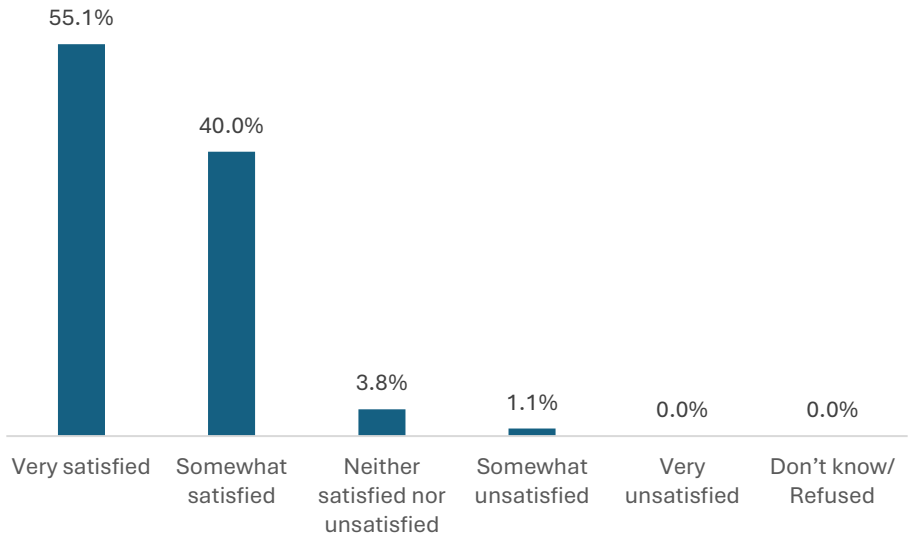
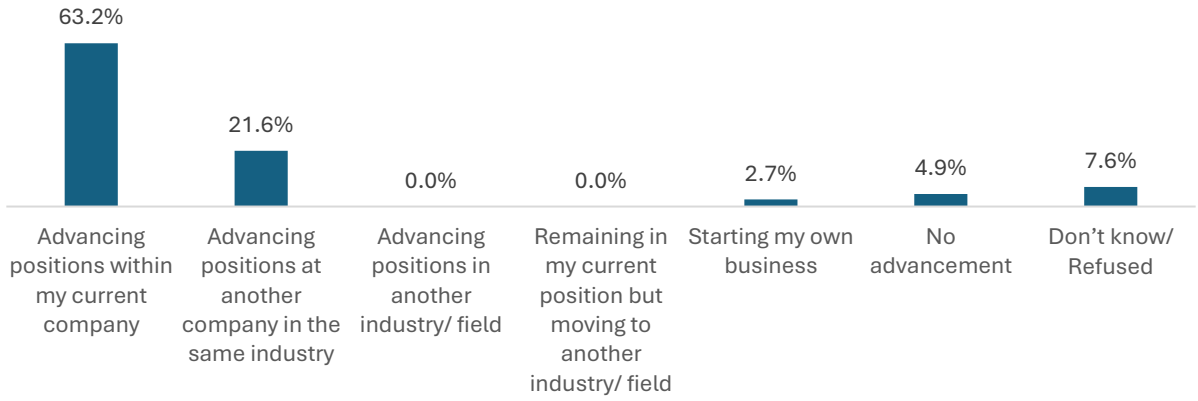


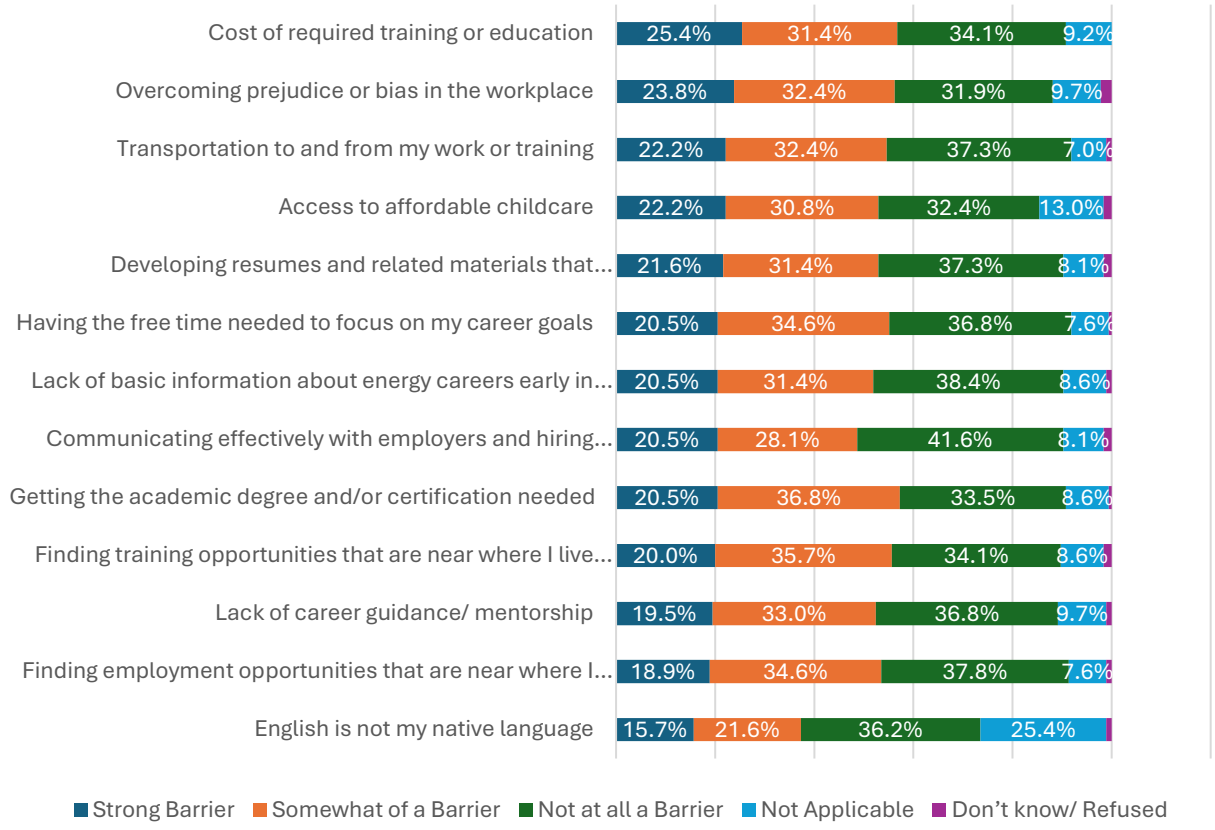
Figure 5. What is the next step or promotion that you see for your career?



While those who are in the clean energy industry are pleased with their career, entrance into the industry can be challenging. At least half of workers surveyed described a range of factors as at least somewhat of a barrier to their entry into their field.

Among surveyed clean energy workers already in the industry, a quarter (25%) labeled the cost of required training or education as a strong barrier into the industry, and 31% labeled this as somewhat of a barrier. Other key barriers included overcoming prejudice or bias in the workplace, transportation, and access to affordable healthcare (Figure 6).

Figure 6. Please tell us if each of the factors below were barriers to your entry into your current career.



Other Industries Viewpoint

While those in the clean energy industry do not report desires to transition to other industries, workers in other industries, such as fossil fuels, reported fearfulness of a clean energy transition. Stakeholders during community sessions shared their concerns regarding legacy fossil fuel occupations and industries most at risk during a transition. These include traditional utility gas workers, mechanics for fossil fuel vehicles, delivery drivers of oil, gas, and petroleum fuels, gas boiler installers, as well as some occupations in fishing with continued industrialization of the ocean. Conversations with traditional energy workers highlight their belief that clean energy

occupations include pay cuts, less hours, and uncertainty about job security. Workers in fossil fuel industries described their deep pride and long-term experience in their industry. These workers do not see how their prior experience can be leveraged to clean energy work. Understanding this dynamic is crucial to exchanging perspectives and information that meets these workers where they are and builds trust. It also highlights the importance of constructive education about clean energy careers, especially promoting awareness of transition opportunities that provide the same attributes as previous occupations.

Projections of the Future Rhode Island Climate and Clean Energy Workforce

The Modeling Process

To better understand the workforce gains and displacement from RI Climate Action Strategy, researchers developed multiple employment models that provide a project of employment change across different technologies, industries, and occupations.

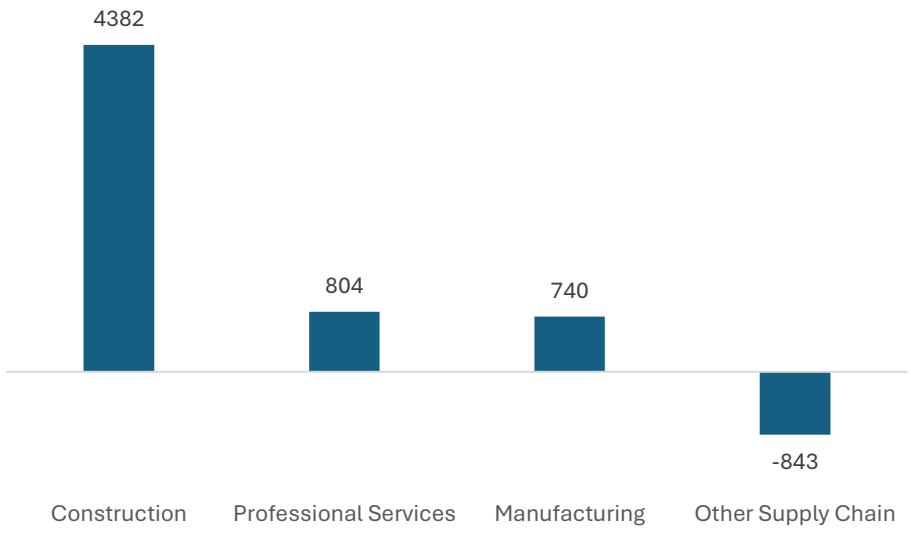
These models were aligned directly with the energy system modeling of the Rhode Island Climate Action Strategy that was conducted by Energy and Environmental Economics (E3) in close coordination with EC4, so that those projected investments factored directly into projected job impacts. Although the analysis covers the entire energy economy, nearly all growth is attributable to the investments driven by the Act on Climate. Insights regarding potential employment hiring and job loss patterns across industries can help support the development of a workforce strategy that meets the needs of Rhode Island's workers and businesses. More detailed methodology information can be found in Appendix A: Modeling Methodology.

Expected Growth in the Clean Energy Economy

Utilizing investment and expenditure patterns driven by modeling of the energy system impacts from the Act on Climate, BW Research projects a net gain of over 6,600 new jobs through 2035, and sustaining a net gain of 3,800 from today to 2050. Construction and maintenance occupations would experience the most significant growth, adding 4,382 workers between 2023 and 2035. Given the large gender divide for construction occupations showcased in Table 2, this projection may widen the gender gap in the clean energy workforce without targeted recruitment and development of female workers.

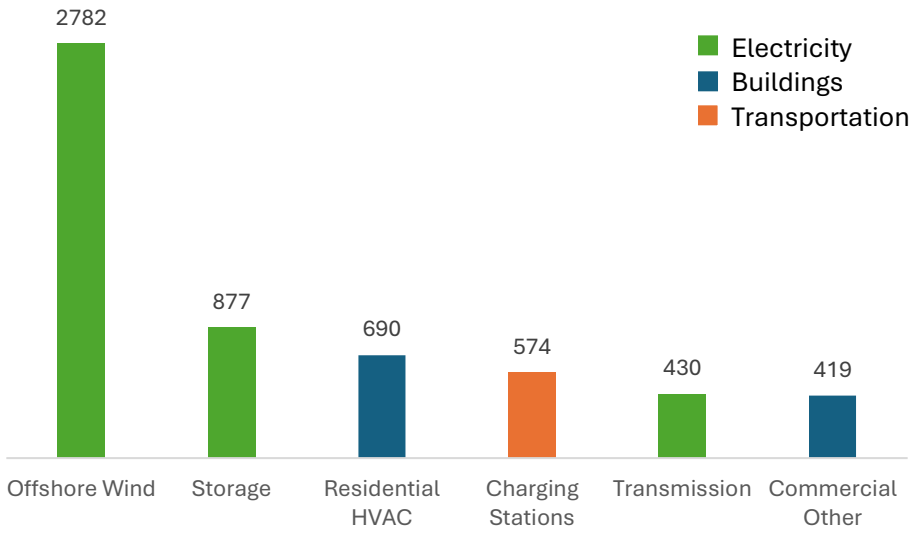
While most segments show strong expansion, employment in other supply chain occupations is expected to decline by about 843 positions (Figure 7). Driven by projections of significant expansion of offshore wind,[12] more than half of total job growth is projected to occur in the offshore wind industry (Figure 8).

Figure 7. Energy Employment Projections in Rhode Island, 2023-2035[13]



[12] Offshore wind capacity projections reflect modeling assumptions made by E3 and the Rhode Island team that the current federal leasing and permitting restrictions would be resolved within the next several years. Under this assumption, new OSW project timelines were shifted approximately five years later than initially planned, rather than eliminated entirely. This approach assumes continued progress toward lifting the federal ban, as well as recent developments such as Ørsted's successful legal challenge allowing work on the Revolution Wind project to proceed.
[13] Figure does not include induced employment and therefore will not sum to the 6,600 figure in the narrative.

Figure 8. Largest Employment Growth within Sub-Sectors of Rhode Island's Energy Economy, 2023-2035

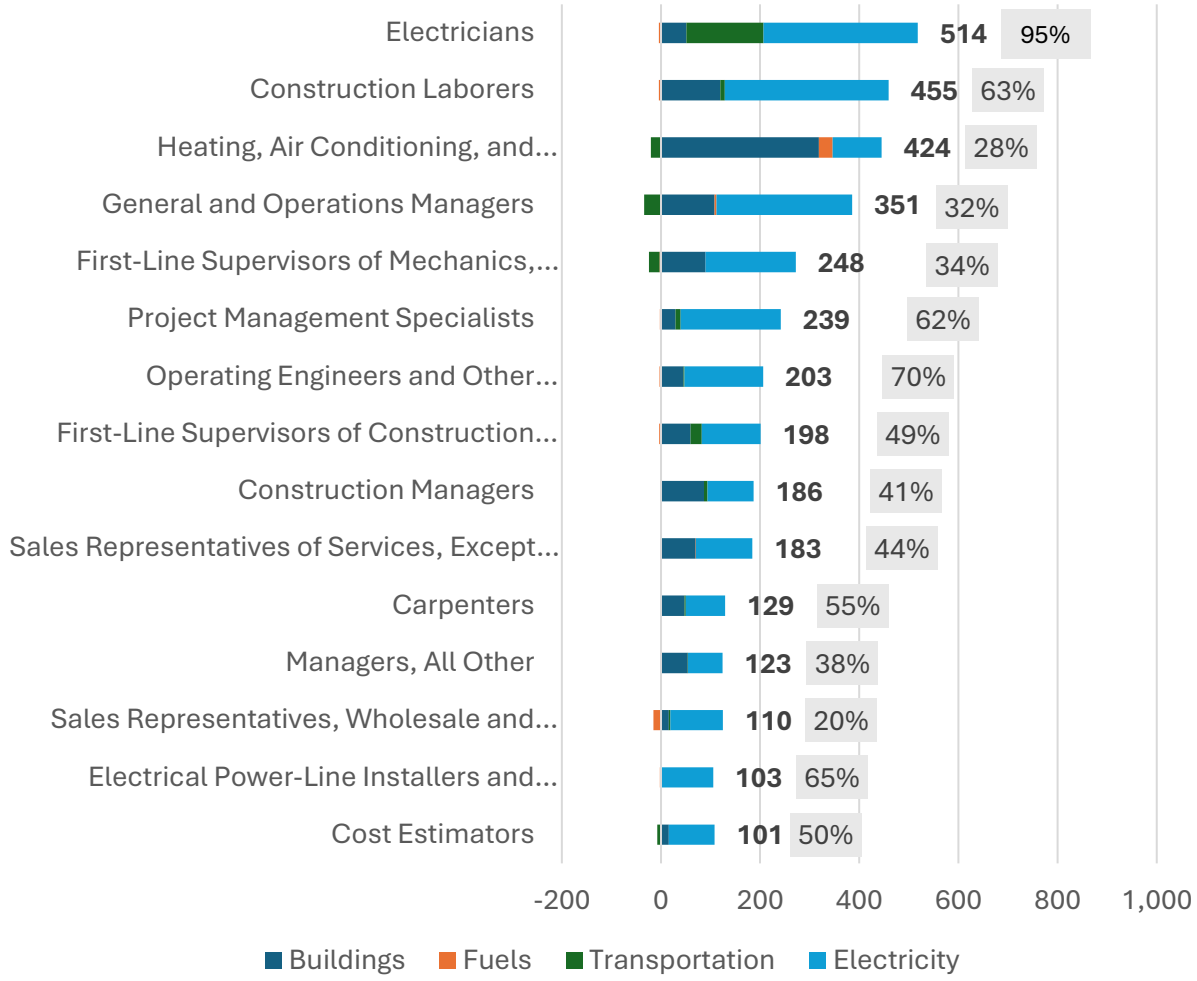


Occupational Impacts[14]

Electricians are projected to see the most job growth by 2035, adding over 500 new jobs and increasing by 95% from energy sector employment of electricians in 2023. This growth is led by the electricity sector with 311 new jobs, followed by transportation at 156 new jobs and buildings at 51 new jobs. Also seeing significant increases are Construction Laborers, adding 514 jobs, and HVAC/R Mechanics and Installers with 424 new jobs (Figure 9).

Figure 9. Top 15 Occupations by Growth 2023-2025

[14] The Rhode Island Secondary Employment Outputs (SEO) provide a more detailed view of modeling outputs, using staffing pattern analyses to identify the types and quantities of occupational employment generated across the state. Appendix A: Modeling Methodology provides a detailed description of the methodology used for these projections.


Electricians
514
95%
Construction Laborers
455
63%
Heating, Air Conditioning, and...
424
28%
General and Operations Managers
351
32%
First-Line Supervisors of Mechanics,...
248
34%
Project Management Specialists
239
62%
Operating Engineers and Other...
203
70%
First-Line Supervisors of Construction...
198
49%
Construction Managers
186
41%
Sales Representatives of Services, Except...
183
44%
Carpenters
129
55%
Managers, All Other
123
38%
Sales Representatives, Wholesale and...
110
20%
Electrical Power-Line Installers and...
103
65%
Cost Estimators
101
50%
-200
0
200
400
600
800
1,000
Buildings
Fuels
Transportation
Electricity

Skills Transfer

Many of the key skills needed for occupations projected to have high demand in 2035 are similar to those found in occupations predicted to have declining employment.[15] The top skills are primarily foundational soft skills, such as active listening, critical thinking, and speaking. Both growing and declining occupations affected by the energy trans3ition in Rhode Island share these same three core skills. This suggests that the need for training in these foundational abilities, like communication and critical thinking, is already well understood across these occupations. As a result, upskilling and retraining efforts for workers moving into growing clean energy occupations should focus particularly on developing technical competencies rather than general transferable skills.

Table 4. Top 10 Key Skills in Most Growing and Declining Occupations[16]

Top Skills in Most Growing Occupations	Top Skills in Most Declining Occupations
Active Listening	Active Listening
Critical Thinking	Speaking
Speaking	Critical Thinking
Coordination	Monitoring
Reading Comprehension	Operation and Control
Monitoring	Service Orientation
Operations Monitoring	Operations Monitoring
Management of Personnel Resources	Quality Control Analysis
Troubleshooting	Reading Comprehension
Operation and Control	Social Perceptiveness

Eight of the twelve occupations modeled to decline the most have closely related occupations that are either among the fastest-growing modeled jobs or are expanding at a rate sufficient to offset the projected declines (Table 5). While workers in declining occupations are unlikely to move into many of these new roles without additional reskilling, the identified transition opportunities highlight occupations where existing knowledge, skills, and interests are most transferable. These overlaps

[15] The 15 occupations modeled to see the most job declines include: Cashiers; Automotive Service Technicians and Mechanics; Automotive Body and Related Repairers; First-Line Supervisors of Retail Sales Workers; Cleaners of Vehicles and Equipment; Chemical Equipment Operators and Tenders; Retail Salespersons; Fast Food and Counter Workers; Automotive and Watercraft Service Attendants; Coating, Painting, and Spraying Machine Setters, Operators, and Tenders; Automotive Glass Installers and Repairers; Counter and Rental Clerks; Food Preparation Workers; Gas Plant Operators; Chemical Plant and System Operators. Fast Food and Counter Workers, along with Food Preparation Workers, were excluded from this and subsequent analysis due to their minimal relation to the energy economy; the workers who are included in the "energy industry" are likely there due to employment at a gas station or other fuel provider.

[16] Skills identified using the O*NET 30.0 Skills Database: https://www.onetcenter.org/database.html#individual-files

indicate where transitions could be most feasible, both in terms of training investment and worker adaptability.

Many pairings link traditional trades and mechanical roles to occupations critical to the clean energy economy, such as Electricians, HVAC/R Mechanics and Installers, and Construction Laborers. Some of these roles require comparable educational backgrounds and similar on-the-job training, suggesting that well-targeted upskilling initiatives could help offset job losses 3while advancing workforce readiness for the state's evolving industries. Additionally, all the transition opportunities provide higher wages for workers than the declining occupations from which they are transitioning.

Table 5. Most Relevant Transition Opportunities for Most Declining Occupations[17]

SOC	Occupation Title	Job Change	Average Wage[18]	Education[19]	Training
49-3021	**Automotive Body and Related Repairers**	**-85**	**$62,330**	**High school diploma**	**Few months to one year**
47-2111	Electricians	514	$70,760	Vocational school, related on-the-job experience, or an associate's degree.	One to two years
47-2061	Construction Laborers	455	$62,670	High school diploma	Few months to one year
41-1011	**First-Line Supervisors of Retail Sales Workers**	**-60**	**$60,270**	**High school diploma**	**Few months to one year**
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	183	$80,180	High school diploma	Few months to one year
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	248	$84,830	Vocational school, related on-the-job experience, or an associate's degree.	One to two years
53-7061	**Cleaners of Vehicles and Equipment**	**-44**	**$36,040**	**High school diploma**	**Few months to one year**
47-2061	Construction Laborers	455	$62,670	High school diploma	Few months to one year
53-6031	**Automotive and Watercraft Service Attendants**	**-17**	**$42,280**	**High school diploma**	**Few months to one year**

[17] Transition occupations identified using O*NET's Related Occupations Database: https://www.onetcenter.org/dictionary/26.3/excel/related_occupations.html.
[18] May 2024 Occupational Employment and Wages Statistics (OEWS), *U.S. Bureau of Labor Statistics,* https://www.bls.gov/oes/tables.htm.
[19] Education and training and based on the corresponding O*NET Job Zones. https://www.onetcenter.org/database.html#individual-files.

SOC	Occupation Title	Job Change	Average Wage[18]	Education[19]	Training
47-2061	Construction Laborers	455	$62,670	High school diploma	Few months to one year
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	424	$63,330	Vocational school, related on-the-job experience, or an associate's degree.	One to two years
51-9124	**Coating, Painting, and Spraying Machine Setters, Operators, and Tenders**	**-13**	**$50,560**	**High school diploma**	**Few months to one year**
47-2141	Painters, Construction and Maintenance	28	$57,200	High school diploma	Few months to one year
47-2061	Construction Laborers	455	$62,670	High school diploma	Few months to one year
49-3022	**Automotive Glass Installers and Repairers**	**-11**	**$61,100**	**High school diploma**	**Few months to one year**
47-2061	Construction Laborers	455	$62,670	High school diploma	Few months to one year
51-8092	**Gas Plant Operators**	**-7**	**$88,400**	**High school diploma**	**Few months to one year**
51-8013	Power Plant Operators	7	$99,260	High school diploma	Few months to one year
51-8091	**Chemical Plant and System Operators**	**-6**	**$79,000**	**High school diploma**	**Few months to one year**
51-8013	Power Plant Operators	7	$99,260	High school diploma	Few months to one year

Four declining occupations show limited alignment with growing roles in the energy industry: Cashiers; Chemical Equipment Operators and Tenders; Retail Salespersons; and Counter and Rental Clerks. For the sales-related positions, workers may find continued employment in other sectors, but these roles are expected to face overall declines across the broader economy. In contrast, Chemical Equipment Operators and Tenders represent a more specialized workforce with skills less easily transferable to other occupations. However, their technical experience aligns most closely with processes in the biomass segment of the clean energy economy, where operational and equipment-handling expertise could be most relevant.

Priority Occupations of the Future in Clean Energy

A number of occupations are expected to play a leading role as the clean energy sector continues to expand. Other occupations, such as Automotive Service Technicians and Mechanics, could see

significant impacts during a clean energy transition that will be crucial to address in workforce planning. Prioritizing these occupations can help the state design more targeted incentives, training programs, and related initiatives to strengthen Rhode Island's clean energy workforce and economic growth. This report examines 14 occupations across four major occupational groups (Table 6).

Table 6. Key Occupations and Corresponding Occupational Groups for Rhode Island's Clean Energy Workforce[20]

Priority Occupation Name	Standard Occupational Classification (SOC) Code	Occupational Group	Description
Electricians	47-2111	Construction and Extraction	Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service streetlights, intercom systems, or electrical control systems.
Plumbers, Pipefitters, and Steamfitters (Plumbers)	47-2152	Construction and Extraction	Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters.
Heating, Air Conditioning, and Refrigeration (HVAC/R) Mechanics and Installers	49-9021	Installation, Maintenance, and Repair	Install or repair heating, central air conditioning, HVAC, or refrigeration systems, including oil burners, hot-air furnaces, and heating stoves.
First-Line Supervisors of Construction Trades and Extraction Workers	47-1011	Construction and Extraction	Directly supervise and coordinate activities of construction or extraction workers.

[20] Occupational descriptions are sourced from May 2023 Occupation Profiles of the U.S. Bureau of Labor Statistics. Accessed October 2025. https://www.bls.gov/oes/current/oes_stru.htm.

Priority Occupation Name	Standard Occupational Classification (SOC) Code	Occupational Group	Description
Construction Laborers[21]	47-2061	Construction and Extraction	Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types…May clean and prepare sites, dig trenches, set braces… May assist other craft workers.
Sheet Metal Workers	47-2211	Construction and Extraction	Fabricate, assemble, install, and repair sheet metal products and equipment…Work may involve…setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts.
Carpenters	47-2031	Construction and Extraction	Construct, erect, install, or repair structures and fixtures; building frameworks; and wood stairways, window and door frames, and hardwood floors.
Welders, Cutters, Solderers, and Brazers (Welders)	51-4121	Production	Use hand-welding, flame-cutting, hand-soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.
Operating Engineers and Other Construction Equipment Operators (Operating Engineers)[22]	47-2073	Construction and Extraction	Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors…to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement.

[21] In all analysis based on BW Modeling Construction Laborers also includes SOC 47-4090 Miscellaneous Construction and Related Workers to account for Weatherization Technicians.

[22] Operating Engineers were added to the priority occupations list after survey efforts due to the modeling analysis showing large growth. As such, this occupation is not included in survey or training inventory findings.

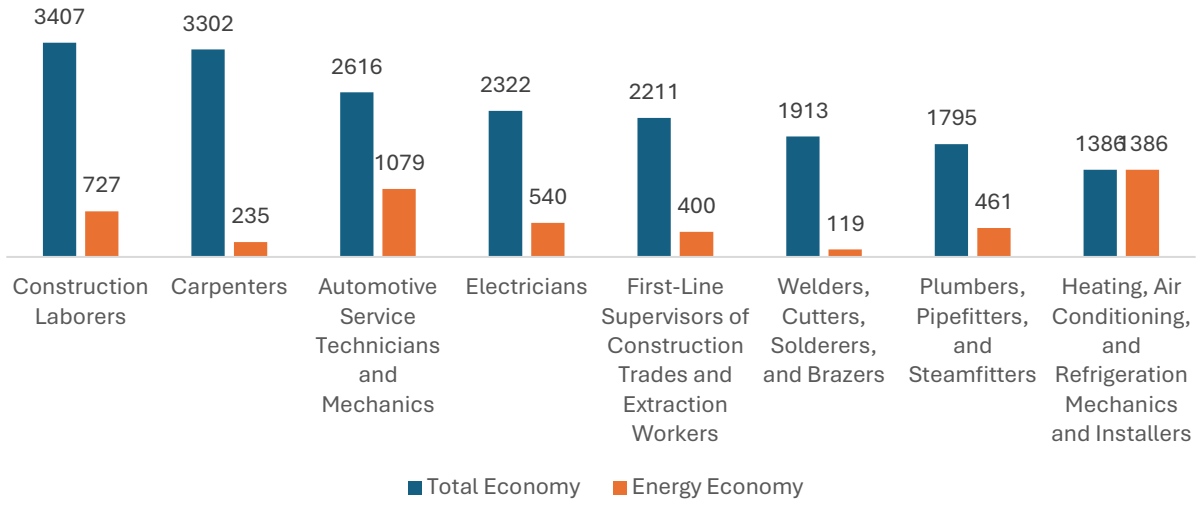
Priority Occupation Name	Standard Occupational Classification (SOC) Code	Occupational Group	Description
Solar Photovoltaic Installers (Solar Installers)[23]	47-2231	Construction and Extraction	Assemble, install, or maintain solar photovoltaic (PV) systems on roofs or other structures…May include measuring, cutting, assembling, and bolting structural framing and solar modules. May perform minor electrical work such as current checks.
Electrical Engineers	17-2071	Architecture and Engineering	Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.
Construction and Building Inspectors	47-4011	Construction and Extraction	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.
Automotive Service Technicians and Mechanics	49-3023	Installation, Maintenance, and Repair	Diagnose, adjust, repair, or overhaul automotive vehicles.
Electrical Power-Line Installers and Repairers (Linemen)	49-9051	Installation, Maintenance, and Repair	Install or repair cables or wires used in electrical power or distribution systems. May erect poles and light or heavy-duty transmission towers.

The most common priority occupation in the state in 2023 was Construction Laborers, with about 3,400 workers. Two in ten (21%), or 727, of these workers are in the energy economy. The next

[23] Electricians perform the wiring and electrical components of installing solar systems. Solar companies often employ Solar Installers for the mechanical installation and licensed Electricians for all electrical components (which must be done by licensed personnel in RI).

largest occupation was Carpenters with about 3,300 workers, of which only 7%, or 235, work in Clean Energy (Figure 10).

Figure 10. Total Economy and Clean Energy Economy Employment of Largest Priority Occupations in Rhode Island, 2023



Family-Sustaining and Livable Wages

Livable wages and benefits are vital to worker recruitment and retention, as well as a just transition. Stakeholders in community sessions and interviews stressed that the clean energy transition must deliver secure, good-paying jobs with benefits, particularly for workers currently employed and transitioning from fossil fuel-related sectors. These workers need reassurance of the benefits to transitioning careers and compensation for their previous work experience in other fields.

Using the MIT Living Wage Calculator,[24] the priority occupations are categorized as having Tier 1, 2, or 3 wages by their average hourly wage. Tier 1 occupations have an average wage above $46 per hour—more than half a standard deviation higher than the average living wage across family sizes ($38.92). Tier 2 occupations fall within half a standard deviation above or below the average living wage, while Tier 3 occupations earn less than half a standard deviation below the average living wage (Table 7).

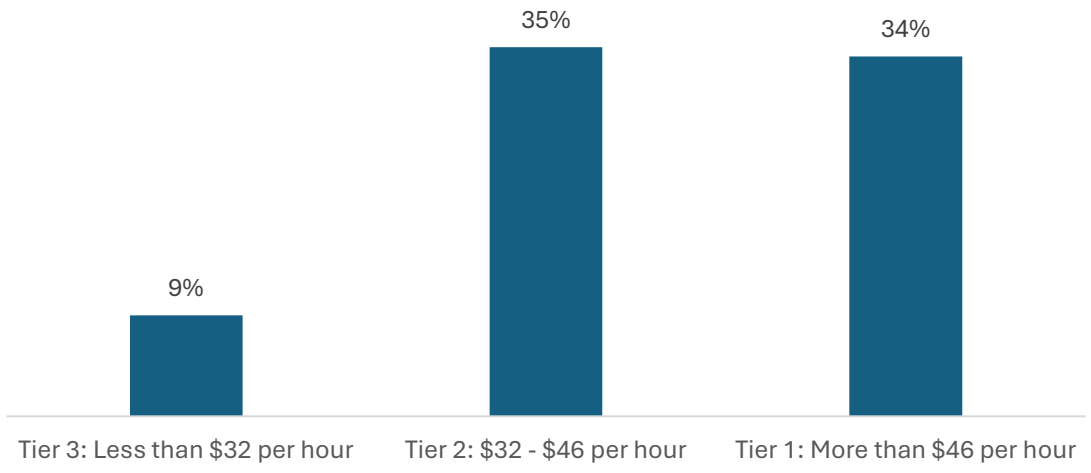
Table 7. Wages Tiers Based on Rhode Island Living Wages

Tier	Hourly Wage
Tier 1	Greater than $46
Tier 2	$32 - $46
Tier 3	Less than $32

[24] https://livingwage.mit.edu/

Between 2023 and 2035, the Act on Climate scenario is estimated to generate significantly more employment growth in jobs earning Tier 1 and Tier 2 wages than Tier 3 wages.[25] This is driven primarily by employment growth in the Electricity and Buildings sectors. Jobs earning Tier 3 wages still experience employment growth, albeit at a slower pace, growing by 9% from 2023 to 2035 compared to 35% in Tier 2 and 34% in Tier 1 (Figure 11).

Figure 11. Total Employment Growth by Wage Tier, 2023-2035



Four of the fourteen occupations have average wages in Tier 1: Electrical Engineers; Electrical Power-Line Installers and Repairers (Linemen); First-Line Supervisors of Construction Trades and Extraction Workers; and Solar Photovoltaic Installers (Solar Installers). In addition to having a Tier 1 wage, Solar Installers have the most employer anticipated demand (see Figure 15), as well as highest rates of hiring difficulties with Linemen (see Figure 5). Solar Installers and Linemen have lower barriers to entry in comparison to occupations like Electrical Engineers, which require a college degree, or First-Line Supervisors which require years of experience. Partnerships with employers of these occupations can help training providers, educators, state agencies, and other local support services better understand the wages and benefits offered in the clean energy industry and communicate this information to job seekers, students, and transitioning workers.

Six occupations have Tier 3 wages: Carpenters; HVAC/R Mechanics and Installers; Sheet Metal Workers; Construction Laborers; Welders, and Automotive Service Technicians and Mechanics. While these wages provide less than a living wage for some workers, the median wage for all occupations, except for Automotive Service Technicians and Mechanics, which is the only occupation included in the priority occupations due to lessening demand (see

[25] https://livingwage.mit.edu/

Potential Gaps section), are higher than the state's median wage. Additionally, when moving to the 75th percentile wage, which is a proxy for senior-level experienced workers, the wages for these occupations (minus Automotive Service Technicians and Mechanics) move into the 2nd Tier, providing a family-sustaining wage for workers, showing an increasing earning potential with time in these occupations.

Table 8. Wages for Priority Occupations in Rhode Island, 2024[26]

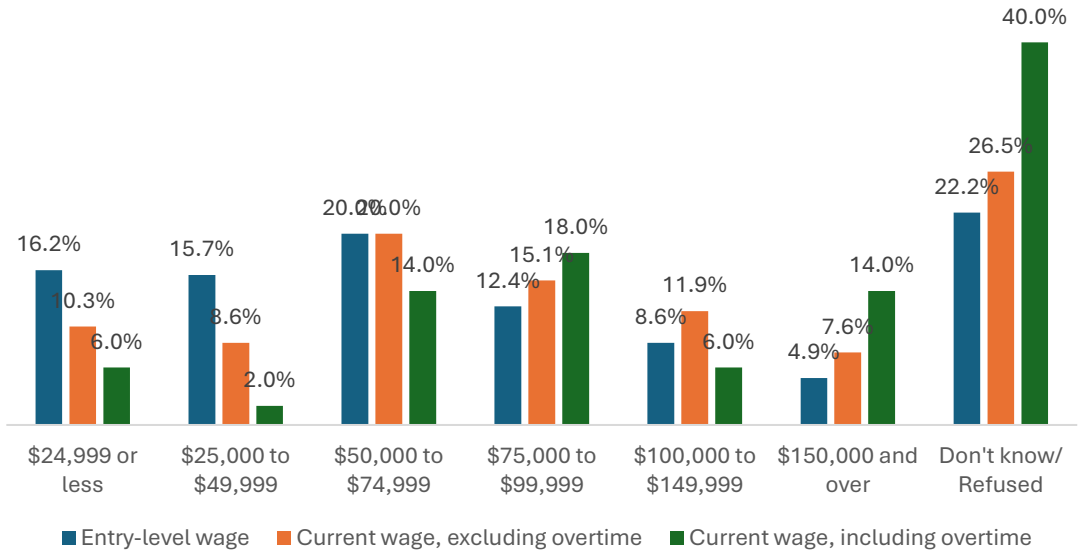
SOC Code	Priority Occupation Name	25th percentile wage	Median wage	75th percentile wage	Average wage	Wage Tier
17-2071	Electrical Engineers	$39.90	$50.26	$61.72	$54.74	Tier 1
49-9051	Electrical Power-Line Installers and Repairers	$41.78	$51.81	$59.23	$50.94	Tier 1
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	$36.31	$46.30	$57.61	$46.01	Tier 1
47-2231[27]	Solar Photovoltaic Installers	$22.65	$49.94	$49.94	$39.50	Tier 1
47-4011	Construction and Building Inspectors	$28.73	$35.00	$43.96	$35.97	Tier 2
47-2073	Operating Engineers and Other Construction Equipment Operators	$28.86	$36.55	$40.26	$35.61	Tier 2
47-2152	Plumbers, Pipefitters, and Steamfitters	$24.31	$31.07	$39.35	$34.98	Tier 2
47-2111	Electricians	$22.85	$33.73	$42.61	$34.02	Tier 2
47-2031	Carpenters	$25.46	$29.09	$37.69	$31.62	Tier 3
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	$22.91	$30.57	$37.90	$30.45	Tier 3
47-2211	Sheet Metal Workers	$23.90	$27.38	$38.43	$30.28	Tier 3
47-2061	Construction Laborers	$23.15	$28.02	$37.49	$30.13	Tier 3
51-4121	Welders, Cutters, Solderers, and Brazers	$23.85	$27.40	$38.18	$29.56	Tier 3
49-3023	Automotive Service Technicians and Mechanics	$17.30	$24.37	$30.64	$25.48	Tier 3
00-0000	**All Occupations**	**$18.51**	**$25.98**	**$39.86**	**$33.30**	

[26] May 2024 Occupational Employment and Wages Statistics (OEWS), *U.S. Bureau of Labor Statistics,* https://www.bls.gov/oes/tables.htm.

[27] While *Bureau of Labor Statistics reports wages for this occupation, the size of the state workforce and other statistics for this occupation are not reported, likely due to low sample size or high margins of error.*

Survey responses from clean energy workers support the notion that there are strong opportunities for wage growth in the sector. When asked about their annual entry-level wage in their current position, 16% reported earning $24,999 or less, while 16% reported earning between $25,000 and $49,999. These percentages drop to 10% and 9%, respectively, when workers report their current salaries excluding overtime. The results also highlight the significant impact of overtime on earnings. Fewer than 10% (8%) of respondents currently earn over $150,000 without overtime, but this share nearly doubles to 14% when overtime pay is included (Figure 12).

Figure 12. What is/was your ____ wage or salary in your current position?



In addition to providing pathways to increasing wages, surveyed clean energy workers reported high rates of healthcare and retirement benefits. Six in ten (62%) clean energy workers reported their company paying for all their health insurance, while an additional third (35%) reported that their company pays for part of their health insurance (Figure 13). As for retirement benefits, 49% have an account with an employer match, and 42% have a retirement account with no employer match (Figure 14). In addition, nearly two-thirds (63%) reported that their employer provides a flexible work schedule/hours.

Figure 13. Does your employer pay healthcare benefits through work?

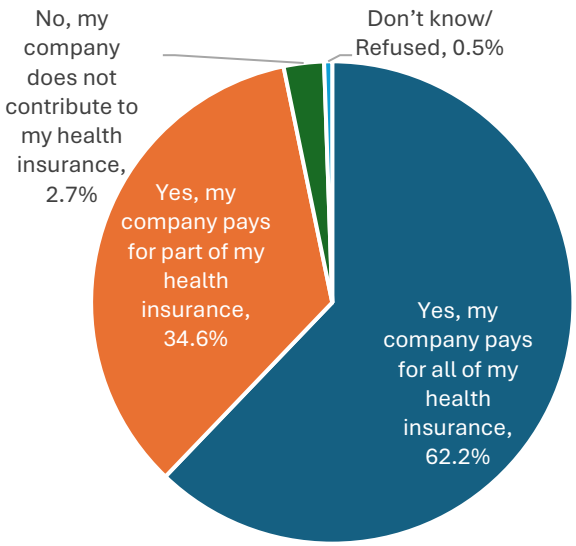
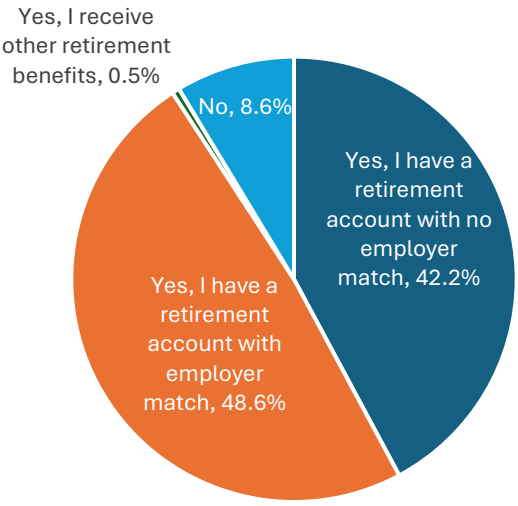


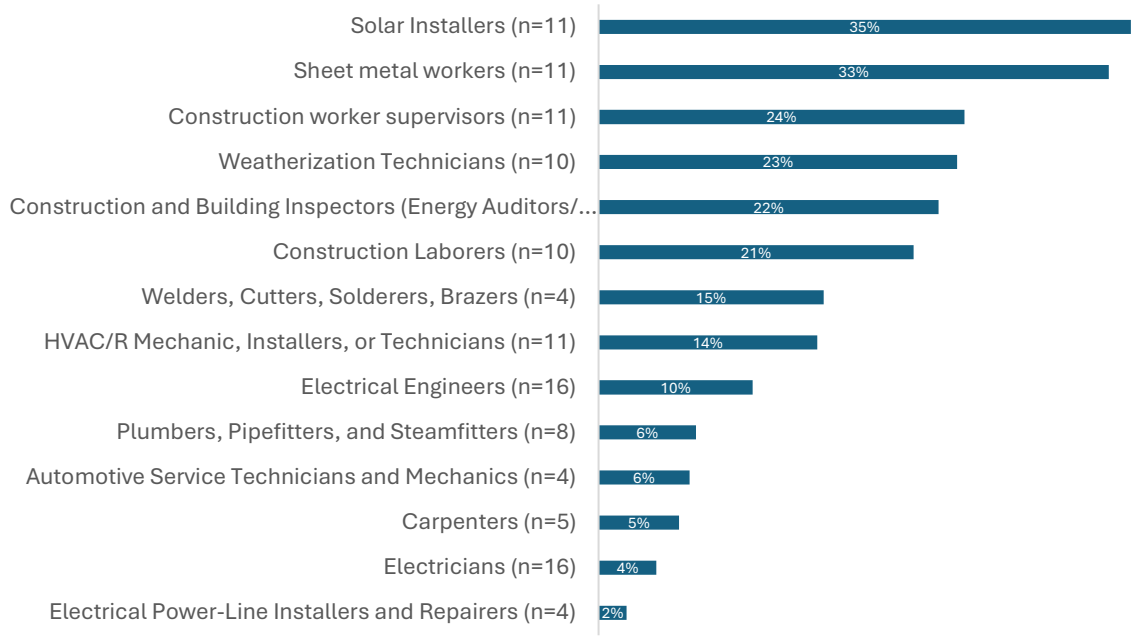
Figure 14. Do you receive any retirement benefits through work?



Anticipated Growth and Hiring Difficulty

Surveyed employers anticipate growth in all priority occupations. Solar Installers have the highest predicted growth rate as employers, on average, expect to increase their solar installer workforce by 35%, followed by Sheet Metal Workers at 33% (Figure 15).

Figure 15. If you currently have [insert occupation selected] at your location, how many do you expect to have at your location one year from now? – Calculated growth rate



The reason for reported hiring difficulty varies among occupations. Competition with other industries related to wages and benefits was the most significant issue reported for Electrical Engineers and Electrical Power-Line Installers and Repairers. A lack of experience/industry-specific knowledge is a key challenge for Electricians, Construction and Building Inspectors, Carpenters, Solar Installers, and Construction Laborers, while a small applicant pool is the most frequently reported issue for Welders, Weatherization Technicians, Sheet Metal Workers, and Construction Worker Supervisors. For HVAC/R Mechanics and Installers, no single issue stands out: high turnover, competition with other industries and insufficient education attainment are all reported at the same rate (

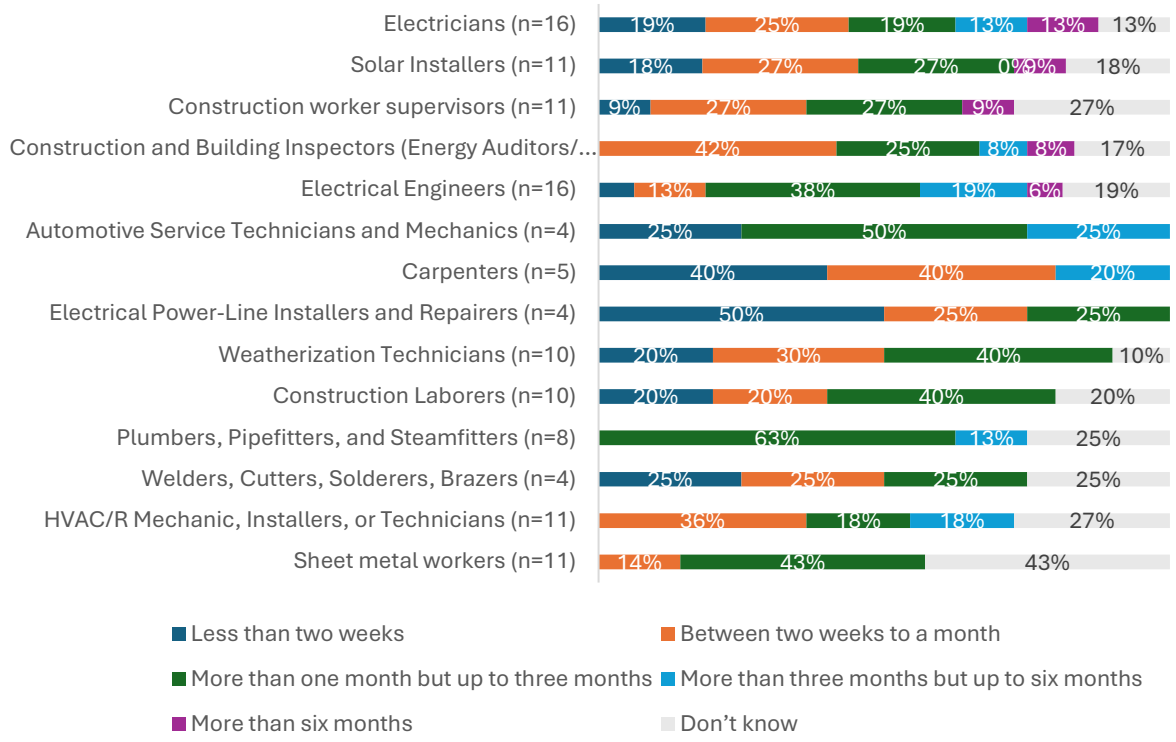
Table 9).

Table 9. Most reported significant reason for hiring difficulty by occupation

Occupation	Most reported significant reason for hiring difficulty
Electrical Engineers (n=16)	Competition with other industries (related to wages and benefits)
HVAC/R Mechanics and Installers (n=11)	Three reasons with same response rate: high turnover, competition with other industries (related to wages and benefits), and insufficient educational attainment
Electricians (n=16)	Lack of experience/industry-specific knowledge
Construction and Building Inspectors (n=12)	Lack of experience/industry-specific knowledge
Welders, Cutters, Solderers, Brazers (n=4)	Two reasons with the same response rate: small applicant pool, and competition with other industries (related to wages and benefits)
Weatherization Technicians (n=10)	Small applicant pool
Plumbers, Pipefitters, and Steamfitters (n=8)	Insufficient certifications
Carpenters (n=5)	Lack of experience/industry-specific knowledge
Electrical Power-Line Installers and Repairers (n=4)	Competition with other industries (related to wages and benefits)
Solar Installers (n=11)	Lack of experience/industry-specific knowledge
Construction Laborers (n=10)	Lack of experience/industry-specific knowledge
Sheet Metal Workers (n=7)	Small applicant pool
Construction worker supervisors (n=11)	Small applicant pool
Automotive Service Technicians and Mechanics (n=4)	Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)

For many priority occupations, most employers reported taking less than one month to find qualified candidates to fill open positions, indicating a high labor supply for many occupations in the current energy workforce ecosystem. Employers of four priority occupations report taking more than a month to hire applicants at rates higher than less than a month: Sheet Metal Workers; Plumbers; Automotive Service Technicians and Mechanics; and Electrical Engineers (Figure 16).

Figure 16. When you have an open [insert occupation] position at your location, how long does it typically take to find and hire a qualified candidate to fill this position?



Potential Gaps in Meeting Demand for Priority Occupations

An occupational gap analysis helps assess the feasibility of expanding Rhode Island's clean energy workforce to meet projected job growth under the scenarios outlined in the state's Climate Action Strategy. This analysis compares modeled occupational outcomes, discussed in previous sections of this study, with historical trends, baseline employment levels, and baseline growth projections for each occupation across the Rhode Island workforce. The results provide a strong foundation for identifying near-term workforce development priorities and allocating resources effectively.

Table 10 presents baseline employment levels for Rhode Island's priority occupations in both the overall economy and the energy economy as of 2023. It also includes baseline growth projections, and additional employment demand associated with the Climate Action Strategy. While some clean energy–related growth is already reflected in baseline projections, most of the additional demand identified through this modeling effort can be attributed to the state's clean energy and climate policies and investments.

Four priority occupations are expected to remain stagnant or see declines in the total economy through 2035: Carpenters, Sheet Metal Workers, Construction and Building Inspectors, and Automotive Service Technicians and Mechanics. For all these occupations besides Automotive Service Technicians and Mechanics, the additional demand expected from the Climate Action Strategy will offset the job losses for this occupation in other industries.

Table 10. Baseline and Projected Employment in Total and Energy Economies, Rhode Island

6-digit SOC Code	Occupation Name	2023 Employment		Baseline Demand Through 2035	Additional Demand Through 2035
		Total Economy	Energy Economy	Total Economy	Energy Economy
Rhode Island Overall Workforce[28]		518,137	24,456	2,780	5,082
17-2071	Electrical Engineers	597	148	65	55
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	2,211	400	142	198
47-2031	Carpenters	3,302	235	-41	129

[28] The baseline projections for occupations across Rhode Island's overall economy are sourced from JobsEQ® as of 2025Q1. The employment change from 2023 to 2024 was incorporated into the JobsEQ® 10-year growth projection, from 2025 to 2035, to estimate the number new workers expected from 2023 to 2035.

6-digit SOC Code	Occupation Name	2023 Employment		Baseline Demand Through 2035	Additional Demand Through 2035
		Total Economy	Energy Economy	Total Economy	Energy Economy
47-2061[29]	Construction Laborers	3,519	729	251	455
47-2111	Electricians	2,322	540	222	514
47-2152	Plumbers, Pipefitters, and Steamfitters	1,795	461	59	91
47-2211	Sheet Metal Workers	433	69	-11	17
47-2231	Solar Photovoltaic Installers	63	63	24	58
47-4011	Construction and Building Inspectors	314	73	-2	6
49-3023	Automotive Service Technicians and Mechanics	2,616	1,079	-108	-155
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	1,386	1,386	110	580
49-9051	Electrical Power-Line Installers and Repairers	196	160	89	103
51-4121	Welders, Cutters, Solderers, and Brazers	1,913	119	69	52
47-2073	Operating Engineers and Other Construction Equipment Operators	1,011	291	29	203

Mild, Moderate, and Severe Gaps in Projected Priority Occupations

The potential gap between current labor supply and projected demand in a region can be shaped by several factors. For each priority occupation, the analysis compares historical and projected growth relative to current employment levels, while also considering factors such as occupation-specific unemployment rates, regional employment concentrations, workforce age distributions, and reported employer difficulties in finding qualified candidates.

Table 11 shows the total new workers expected in Rhode Island based on baseline demand through 2035 in Rhode Island's overall economy, and additional demand from employment projections. Occupational demand gaps are assessed using the below metrics and gaps are classified as "mild," "moderate," or "severe."

Severe	Demand exceeds supply ***and*** this gap is 10% or more of the existing workforce

[29] SOC 47-4090 Miscellaneous construction and related workers has been included in this figure to account for Weatherization Technicians

Moderate	Demand exceeds supply and the gap is more than 2.5% but less than 10% of the existing workforce
Mild	Demand exceeds supply and the gap is 2.5% or less than the existing workforce

This analysis identifies eight priority occupations with significant demand gaps and three with moderate gaps (Table 7). Addressing these projected shortages over the next decade will be critical to avoid workforce constraints that could slow the growth of Rhode Island's clean energy economy.

Table 11. Projected Growth of Priority Occupations Relative to Historical Growth and Baseline Employment, Rhode Island[30]

6-digit SOC Code	Occupation Name	Historical Growth (2015-2025Q1)	Total Projected Demand Through 2035	Total Projected Demand as a % of 2023 Employment	Total Projected Demand as a % of Historical Growth	Status
		Overall Economy				
Rhode Island Overall Workforce		32,967	7,863	1.5%	23.9%	N/A
17-2071	Electrical Engineers	143	120	20.2%	84.2%	Severe
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	629	340	15.4%	54.0%	Severe
47-2031	Carpenters	(16)	88	2.7%	-562.1%	Moderate
47-2061	Construction Laborers	625	709	20.8%	113.5%	Severe
47-2111	Electricians	627	736	31.7%	117.3%	Severe
47-2152	Plumbers, Pipefitters, and Steamfitters	414	150	8.3%	36.2%	Moderate
47-2211	Sheet Metal Workers	9	6	1.5%	67.2%	Mild
47-2231	Solar Photovoltaic Installers	38	81	129.8%	216.3%	Severe
47-4011	Construction and Building Inspectors	86	4	1.2%	4.3%	Mild
49-3023	Automotive Service Technicians and Mechanics	(78)	(263)	-10.1%	337.2%	N/A
49-9021	HVAC/R Mechanics and Installers	466	690	49.8%	148.1%	Severe

[30] Overall economy historical growth and 2023 employment data sourced from JobsEQ® as of 2025Q1. Based on a four-quarter moving average and on Place of Work estimates.

6-digit SOC Code	Occupation Name	Historical Growth (2015-2025Q1)	Total Projected Demand Through 2035	Total Projected Demand as a % of 2023 Employment	Total Projected Demand as a % of Historical Growth	Status
		Overall Economy				
49-9051	Electrical Power-Line Installers and Repairers	58	192	98.2%	333.2%	Severe
51-4121	Welders	476	121	6.3%	25.4%	Moderate
47-2073	Operating Engineers	177	232	23.0%	131.4%	Severe

The eight priority occupations with "severe" projected demand gaps include: Electrical Engineers, First-Line Supervisors of Construction Trades and Extraction Workers, Construction Laborers, Electricians, Solar Photovoltaic Installers, HVAC/R Mechanics and Installers, Electrical Power-Line Installers and Repairers, and Operating Engineers. The most pronounced gap is for Solar Photovoltaic Installers, with a projected demand of 130% higher than its 2023 workforce. This is followed by Electrical Power-Line Installers and Repairers, with a 98% higher projected demand from its 2023 workforce.

Construction Laborers, Electricians, and HVAC/R Mechanics and Installers are projected to add the largest numbers of workers, at nearly or over 700 workers each. Luckily, these occupations already have many established training programs and curricula in the state, as well as immense union backing. Still, focus on recruitment and training clean energy specific skill sets should be monitored.

Automotive Service Technicians and Mechanics represent another key occupation for the state—not because of rising demand, but due to the need for workforce transition. Employment in this occupation is projected to decline by 263 positions by 2035, a 10% decrease from 2023 levels, largely driven by the shift toward electrification and changes in the transportation fleet. To prevent new entrants from being trained for shrinking job opportunities and to support incumbent workers facing displacement, the state should consider targeted transition and reskilling strategies tailored to this occupation. Existing automotive workers and automotive training programs should also be equipped with electric vehicle maintenance and repair skills to remain competitive as the transportation fleet transitions toward electrification. In addition, many core automotive competencies—such as diagnostics, mechanical systems repair, and electrical troubleshooting—are transferable to a wide range of non–clean energy industries, providing displaced workers with broader pathways for reemployment.

Unemployment, Location Quotient, Age, and Hiring Difficulty

Table 12 shows a collection of metrics related to potential labor supply for specific priority occupation demand.

Table 12. Unemployment Rates (UER), Location Quotients (LQ), Ages, and Reported Hiring Difficulty for Priority Occupations[31]

6-digit SOC Code	Occupation Name	Unemployment Rate	Location Quotient	Share of Current Workers Aged 55 Years+	Reported Hiring Difficulty: % of Employers with Great Difficulty'
		2025Q1			
Rhode Island Overall Workforce		4.6%	1.00	26.5%	N/A
17-2071	Electrical Engineers	3.4%	1.04	28.7%	19% (n=16)
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	3.6%	0.84	28.3%	33% (n=11)
47-2031	Carpenters	6.4%	1.16	22.7%	17% (n=5)
47-2061	Construction Laborers	8.5%	0.78	19.7%	27% (n=10)
47-2111	Electricians	3.8%	0.95	22.3%	41% (n=16)
47-2152	Plumbers, Pipefitters, and Steamfitters	3.3%	1.19	23.8%	33% (n=8)
47-2211	Sheet Metal Workers	3.9%	1.10	21.4%	13% (n=11)
47-2231	Solar Photovoltaic Installers	14.8%	0.68	7.2%	42% (n=11)
47-4011	Construction and Building Inspectors	1.2%	0.75	51.8%	36% (n=12)
49-3023	Automotive Service Technicians and Mechanics	3.7%	1.02	19.9%	0% (n=4)
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	2.8%	1.06	17.5%	25% (n=11)
49-9051	Electrical Power-Line Installers and Repairers	2.4%	0.67	14.2%	50% (n=4)
51-4121	Welders, Cutters, Solderers, and Brazers	4.2%	1.43	22.5%	25% (n=4)
47-2073	Operating Engineers and Other Construction Equipment Operators	7.5%	0.68	28.0%	N/A[32]

[31] LQ is the concentration of workers in RI relative to the nation.
Source: JobsEQ®. Data as of 2025Q1. Based on a four-quarter moving average. UER and LQ data are based on Place of Work estimates. Age data are based on Place of Residence estimates.
[32] Operating Engineers were added to the priority occupation list after survey and training inventory efforts.

Overall, Rhode Island had an unemployment rate of 5% in early-2025. Ten of the fourteen priority occupations had unemployment rates below the state average, including six occupations identified with severe demand gaps. As a result, Rhode Island may face greater challenges in meeting workforce needs for these occupations, given the limited pool of available workers.

Despite strong projected growth, the unemployment rate for Solar Installers remains high at nearly 15%. This could reflect growing interest and training activity ahead of sufficient job availability. The situation illustrates a common "chicken-and-egg" challenge in workforce development—whether to train workers early for emerging roles that will soon be in high demand, or wait until job opportunities materialize, risking a shortage of qualified labor. Targeted support can help Solar Installer trainees build complementary electrical skills and gain related experience as the solar market expands.

Seven of the priority occupations have location quotients (LQs) above one, indicating a high concentration of these workers in the state. Of the occupations with severe demand gaps, Electrical Engineers and HVAC/R Mechanics and Installers have LQs above one, indicating (and supported by the training inventory) that these occupations have existing and established workforce training pipelines in the state.

When examining age demographics, Construction and Building Inspectors stands out, with more than half of the workforce aged 55 or older. This occupation offers a valuable opportunity for experienced workers in more physically demanding construction trades to transition into a less strenuous role as they approach retirement. Accordingly, training initiatives for this occupation may be most effective when targeted toward mid-career professionals.

Navigating from the Current to Future Workforce Ecosystem

The Training Ecosystem

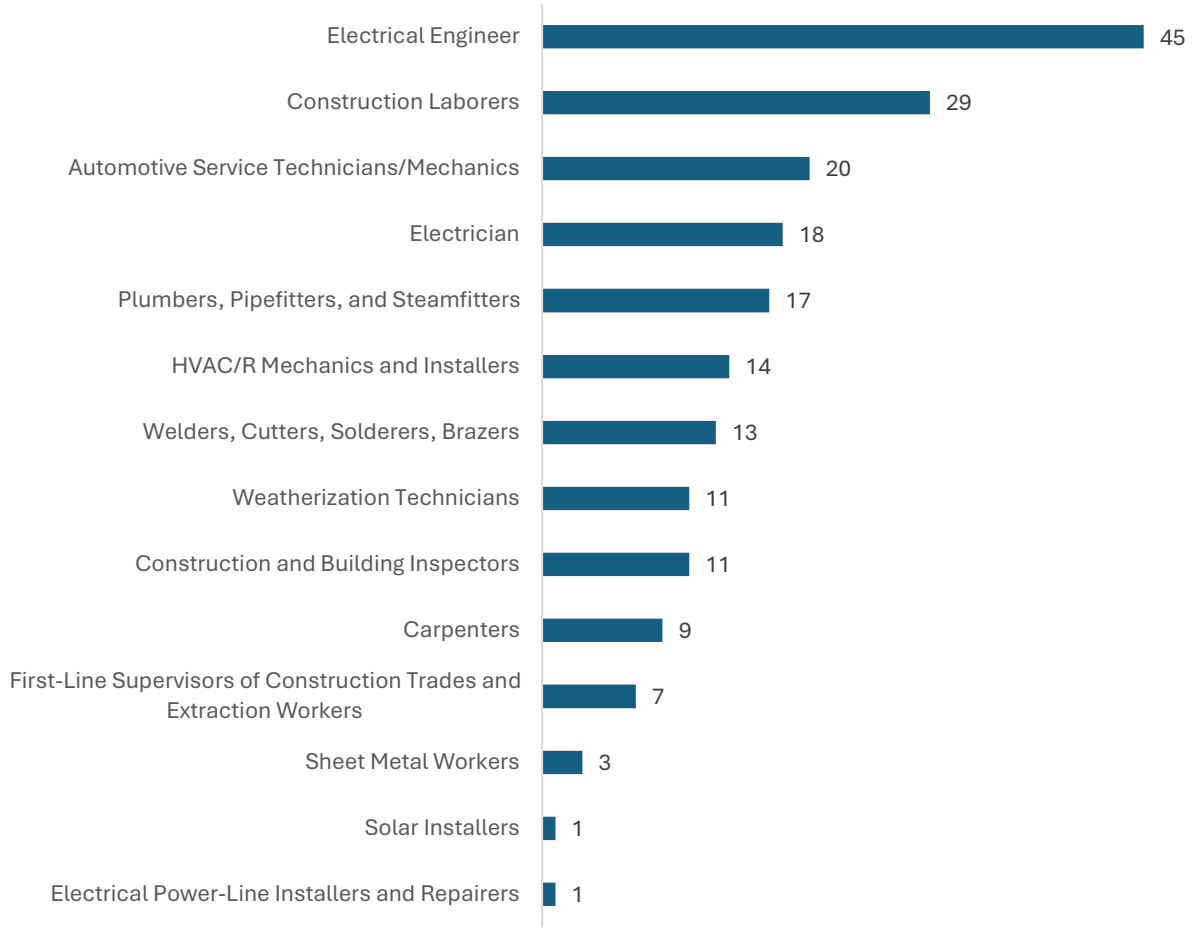
The research team identified almost 200 training programs related to key climate and clean energy occupations in the state. Nearly one-quarter (45 programs) are for Electrical Engineers, largely due to the abundance of pre-engineering CTE pathways and courses at the K-12 level. While these are solid introductions to the career, students need additional four-year university training for this occupation. Opportunities in Electrical Engineering at the college/university level are offered at the Community College of Rhode Island (CCRI), New England Institute of Technology (New England Tech), Providence College (PC), Roger Williams University (RWU), and the University of Rhode Island (URI).

After Electrical Engineers, the most prominent clean energy training available is for Construction Laborers with 29 programs. Similarly, many of these training opportunities are at the high school CTE level. However, unlike Electrical Engineers, students can likely transition right into a Construction Laborer role after completing these CTE programs. For prospective workers, training is available through union apprenticeships, private training companies, and industry associations. Other occupations with more than 10 identified training programs throughout the state include Automotive Service Technicians and Mechanics; Electricians; Plumbers, Pipefitters, and Steamfitters; HVAC/R Mechanics and Installers; Welders, Cutters, Solderers, Brazers; Weatherization Technicians; and Construction and Building Inspectors.

There are three occupations with less than three opportunities throughout the state: Sheet Metal Workers, Solar Installers, and Electrical Power-Line Installers and Repairers. For Sheet Metal Workers, there are two training opportunities in Westerly, and one in Pawtucket. Electrical Power-Line Installers and Repairers only have one identified opportunity, which is an apprenticeship through the Northeastern Joint Apprenticeship & Training program. While only one opportunity was publicly available from online research, many of these positions are directly tied to local utilities and utility unions, where on-the-job training is available, such as through the Utility Workers Union of America Local 310.

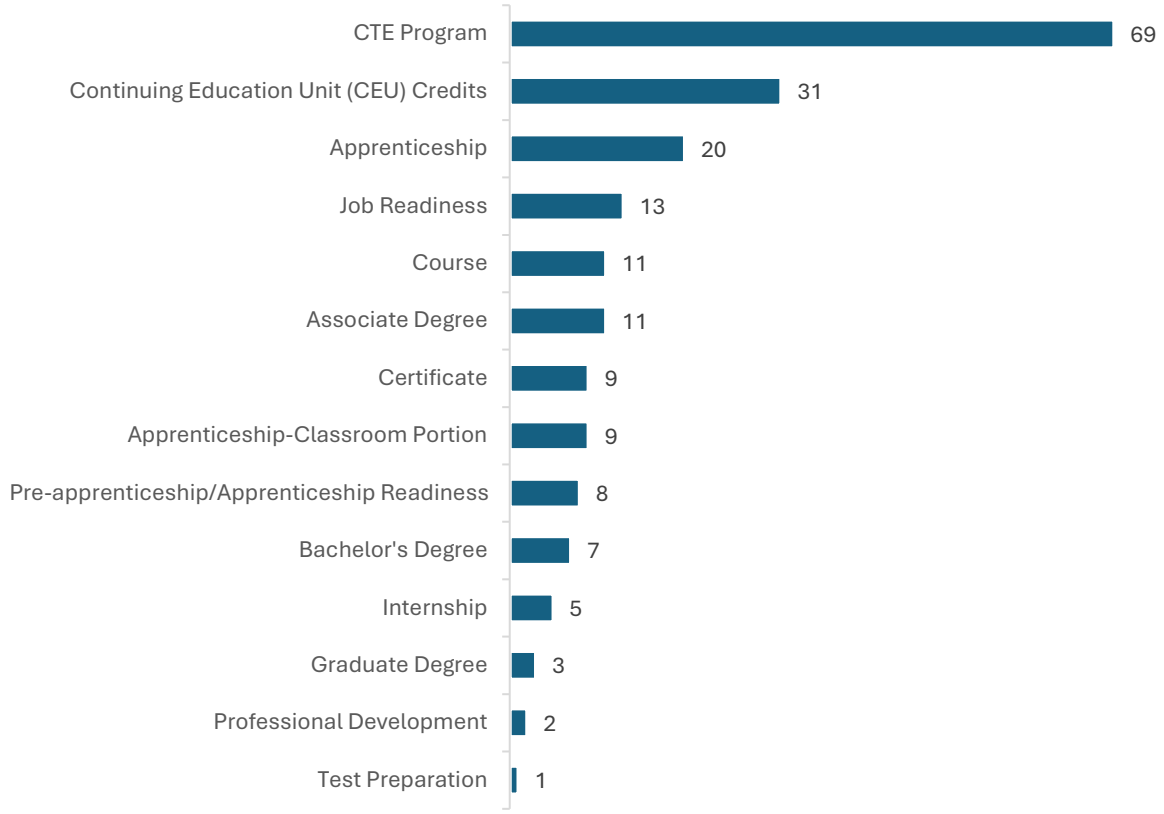
While the training opportunities for Solar Installers are sparse, some of the Electrician training opportunities are applicable to this occupation. For example, New England Institute of Technology offers an associate degree in Electrical Technology with Renewable Energy Systems, teaching students not only the fundamentals of electrical installation, but also preparing students to go directly into solar and wind electricity work. Lastly, online training courses and certifications are extremely common for solar installers, but they are not included in the inventory as they are not specific to Rhode Island.

Figure 17. Occupational Focus by Training Inventory Programs



Rhode Island's strong and robust CTE network is clear by both the training program inventory and survey respondents. More than half (70%) of surveyed clean energy workers reported attending a career or vocational school for longer than six months. In the training inventory, over one-third of the identified programs are CTE programs (Figure 18).

Figure 18. Training Inventory by Program Type



Apprenticeship, internship, and mentorship programs are key entry-points into a clean energy career. Six in ten (60%) of clean energy workers reported participation in an internship program as supporting their entrance into their current occupation, and a similar amount reported the same about both mentorships and apprenticeship programs (Figure 19). Nearly half (48%) of participants in apprentice, mentorship, or internship programs labeled them as very effective for their career, while 42% said somewhat effective, and 10% said neither effective nor ineffective. No respondents labeled these programs as ineffective (Figure 20).

In addition to workers highlighting apprenticeships, six in ten (61%) surveyed clean energy employers reported hiring workers from Rhode Island apprenticeships. Of these employers, nine in

ten (91%) reported that participation in apprenticeship programs improved the performance of their employees.

Apprenticeship opportunities were the third most common type of training identified in the training inventory, with 20 programs across eight of the priority occupations (Figure 18). Additionally, eight pre-apprenticeship or apprenticeship readiness programs were captured. There were an additional five internship opportunities captured in the inventory, through the Governor's Workforce Board's "Real Skills for Youth" program.

Programs with Continuing Education Unit (CEU) Credits, most of which are online programs, also feature in the state's training landscape, with 31 programs. The range of programs available in the state's training ecosystem provide participants multiple options to pursue training and education based on needed commitment, time availability, and prior educational backgrounds.

Figure 19. Did you participate in any of the following programs to support entrance into your current occupation?

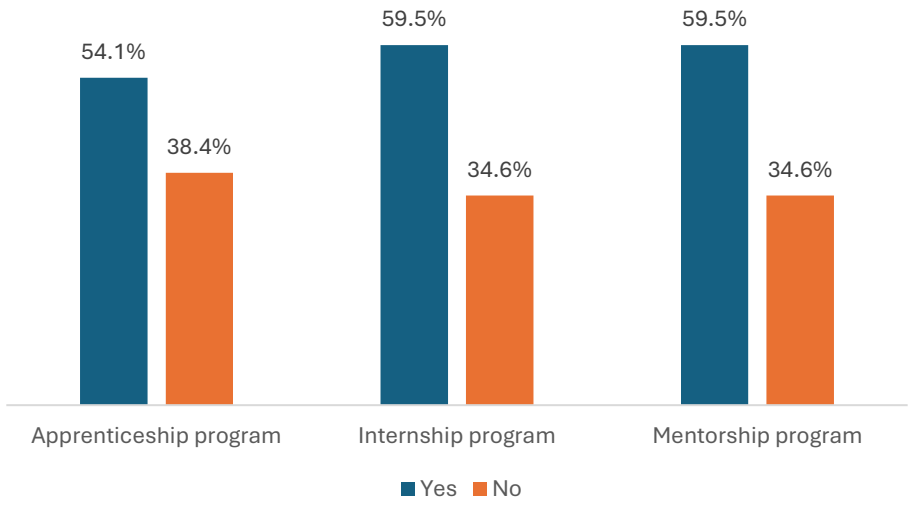
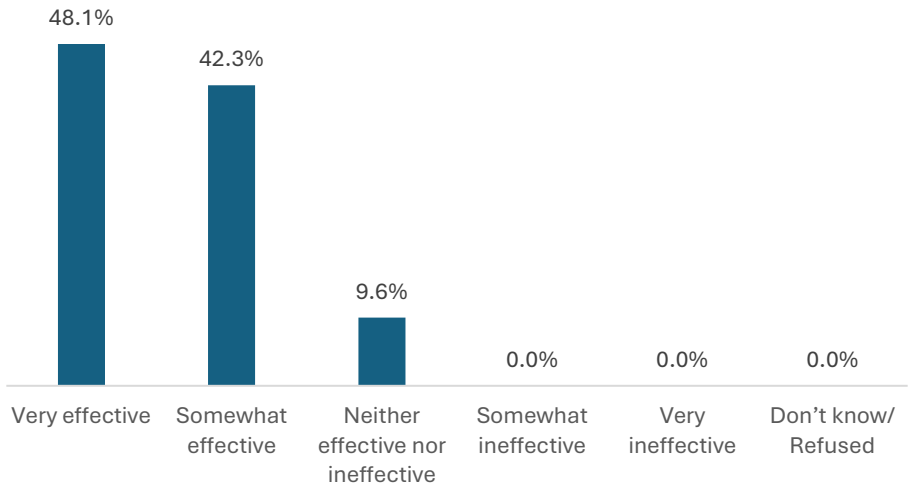


Figure 20. How effective were the apprenticeship, internship, or mentorship programs in preparing you for your current role?

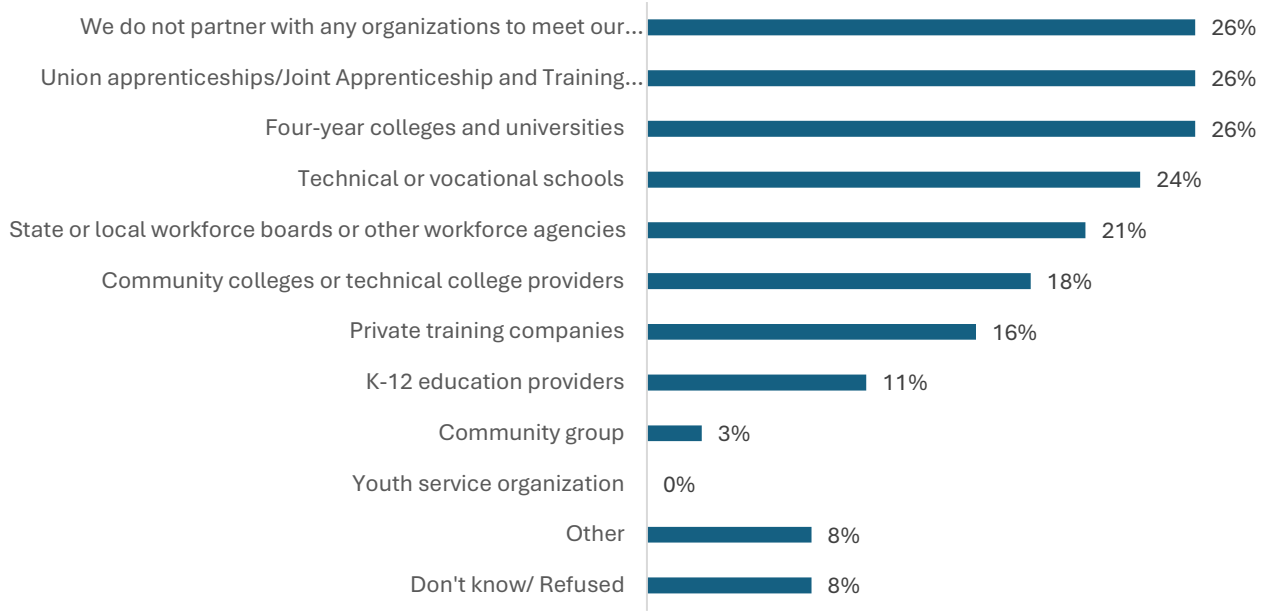


About two-thirds of surveyed employers reported that they actively partner with organization to meet their workforce needs. Over a quarter (26%) of employers reported working with four-year colleges and universities, along with union apprenticeships/joint apprenticeship, and training centers. This is not surprising, given the prominence of these organizations in the state's training landscape. Twenty-six training programs in the inventory are offered by four-year universities or colleges, while ten are offered by unions or joint-apprenticeship training centers.

Similar to colleges and union utilization, 24% of employers reported partnering with technical or vocational schools (compromising 38 programs in the inventory), followed by state or local workforce boards or other workforce agencies (21%), community colleges or technical college providers (18%), private training companies (16%) and K-12 education providers (11%) (

Figure 21).

Figure 21. Please indicate if you partner with any of these types of organizations to meet your workforce needs

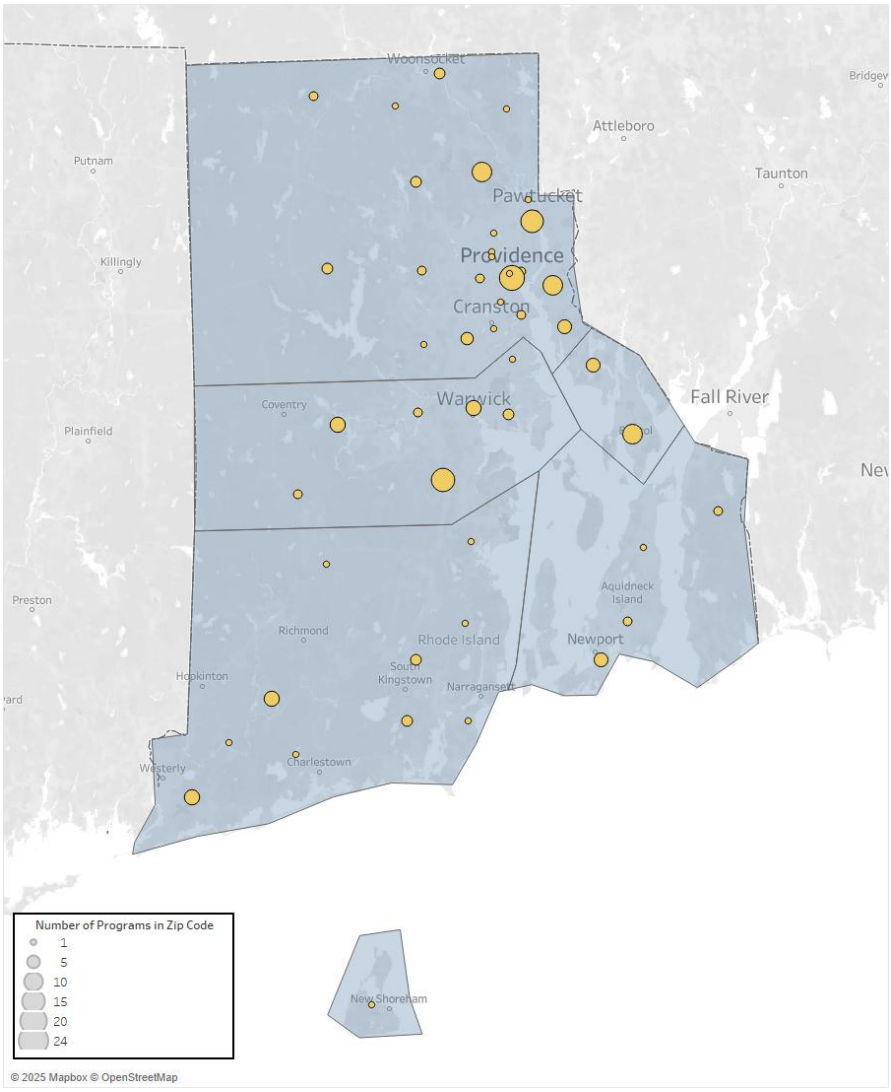


Local-Level Training and Occupation Gaps

Training Availability

There are training opportunities available in all counties in the state. Training opportunities are prominent in Providence County, especially in the cities of Providence, Pawtucket, and Cranston, coinciding well with environmental justice (EJ) communities in those areas. Environmental justice communities in Woonsocket and Newport have less nearby availability to training opportunities (Figure 22).

Figure 22. Training Programs by Location



While training opportunities are available in each county, they are heavily concentrated in Providence County, making up 58% of in-person programming, and Kent County, making up 20% of in-person programming. While together these counties make up 70% of training availability, this proportion is still less than their makeup of the state's workforce at 73%. Opportunities in Bristol and Newport County are more limited, but there are an additional 24 programming opportunities offered by Rhode Island training providers online, accessible to workers in any county (Table 13).

Although training availability is relatively balanced between workforce size and program availability, the state should proactively fill regional gaps to ensure equitable access across all EJ communities. This requires analysis going beyond county level and looking at the town and city level, particular in Providence County.

Table 13. Training Programs by Occupation and County

Occupation	Bristol County	Kent County	Newport County	Providence County	Washington County	Multiple or Online
Automotive Service Technicians and Mechanics	0	8	2	9	1	0
Carpenters	2	1	2	4	0	0
Construction and Building Inspectors (Energy Auditors/ HERS Raters)	0	0	0	3	1	7
Construction Laborers	3	3	3	15	5	0
Electrical Engineers	4	8	4	23	6	0
Electrical Power-Line Installers and Repairers	0	0	0	0	0	1
Electricians	2	4	0	8	3	1
First-Line Supervisors of Construction Trades and Extraction Workers	4	1	0	1	0	1
HVAC/R Mechanics and Installers	0	4	0	6	0	4
Plumbers, Pipefitters, and Steamfitters	1	2	0	9	3	2
Sheet Metal Workers	0	0	0	1	2	0
Solar Installers	0	0	0	0	1	0
Weatherization Technicians	0	1	0	1	0	9
Welders, Cutters, Solderers, Brazers	0	2	1	7	3	0
Total # of Programs	16	34	12	87	25	25
Percent of In-Person Programs	9%	20%	7%	50%	14%	N/A
Percent of Total RI Workforce	3%	15%	9%	58%	12%	N/A

Gap for Occupations with "Severe" Demand Gaps at a County-Level

When comparing the workforce of "severe" demand gap occupations at the county-level, not all counties have occupational concentration levels comparable to their overall makeup of the state workforce. This is most pronounced for Electrical Power-Line Installers and Repairers: despite making up 58% of the state's overall workforce, Providence County contains 81% of the Linemen workforce. This mismatch of regional concentration, coupled with an extreme demand gap, and only one identified training program throughout the state, calls for greater focus on this occupation in future energy workforce development strategies.

Other large concentrations of "severe" demand gap occupations include Electrical Engineers in Washington County, making up 20% of the state's workforce for this occupation, compared to Washington County's makeup of 12% of the workforce. This may be explained by the University of Rhode Island's location in the county, the state's premier institution for engineering, perhaps indicating graduating engineering students are staying in the area for employment. Similarly, the neighboring Newport County has a concentration of 16% of the state's Electrical Engineering workforce, while their total workforce makeup is only 9%. Both these counties have large maritime economies, perhaps attracting more need for Electrical Engineering workers.

Lastly, Kent County accounts for 22% of the state's HVAC/R Mechanics and Installers workforce, as opposed to the 15% of total state workforce the county holds. This is not surprising when looking at the training inventory: Kent County has four training programs for this occupation, the only county with programming aside from Providence (Table 13). Given the severe demand for this occupation in the future of the energy economy, this presents an opportunity to expand HVAC training into other counties.

Table 14. "Severe" Occupation Employment by County, 2025Q1[33]

	Electrical Engineers	First-Line Supervisors of Construction Trades and Extraction Workers	Construction Laborers	Electricians	Solar Photovoltaic Installers	HVAC/R Mechanics and Installers	Electrical Power-Line Installers and Repairers	Operating Engineers	Total Economy-Wide Workforce
Rhode Island Total	635	2,339	3,664	2,429	69	1,457	274	1,048	527,504
Bristol County	14	82	139	98	2	49	3	36	16,904
Kent County	64	314	516	383	12	324	10	140	80,506

[33] JobsEq, 2025Q1

	Electrical Engineers	First-Line Supervisors of Construction Trades and Extraction Workers	Construction Laborers	Electricians	Solar Photovoltaic Installers	HVAC/R Mechanics and Installers	Electrical Power-Line Installers and Repairers	Operating Engineers	Total Economy-Wide Workforce
Newport County	99	195	316	204	5	116	13	80	45,483
Providence County	312	1,288	2,065	1,186	40	815	221	615	306,668
Washington County	125	393	528	465	7	129	20	136	63,738
Unknown Or Undefined[34]	21	66	100	92	4	25	6	41	14,205

Low-Income Disadvantaged Communities (LIDACs)

Low-income disadvantaged communities (LIDACs) are communities with high energy burdens, or a high percentage of gross household income spent on energy costs. There are 13 LIDACs across the state.[35] Table 15 compares employment metrics in LIDAC-designated census tracts to those in other tracts, using economy-wide growth rates for key energy-related occupations (exclusive of our modeled projections). Overall, LIDACs exhibit smaller location quotients and higher unemployment rates across all eight 'severe' occupations analyzed, indicating both lower current concentrations and greater potential labor availability.

Three occupations—Electrical Power-Line Installers and Repairers, HVAC/R Mechanics and Installers, and Construction Laborers—are projected to grow faster in LIDACs than in non-LIDAC areas over the next decade. These roles represent particularly promising pathways for connecting LIDAC residents to the energy transition workforce. Given the combination of high unemployment and an under-utilized labor pool, LIDACs can offer strong workforce opportunities for targeted recruitment and expanded training initiatives, especially if workforce programs are intentionally designed to address the unique needs and requirements of residents.

Electrical Power-Line Installers and Repairers present a critical opportunity. With only one training program currently operating statewide, establishing additional programs—particularly within or

[34] Jobs that cannot be allocated to a specific county

[35] LIDACs are situated in the following communities: Central Falls, Cranston, East Providence, Middletown, Narragansett Reservation, Newport, Pawtucket, Providence, South Kingston, Warren, Westerly, West Warwick, and Woonsocket.

near LIDACs—could both address a statewide workforce shortage and create local economic benefits.

Ultimately, integrating LIDACs into the energy transition is essential for ensuring a just transition—one that not only reduces carbon emissions but also broadens economic participation, strengthens community resilience, and ensures that those most burdened by the current energy system share in the benefits of the clean energy economy.

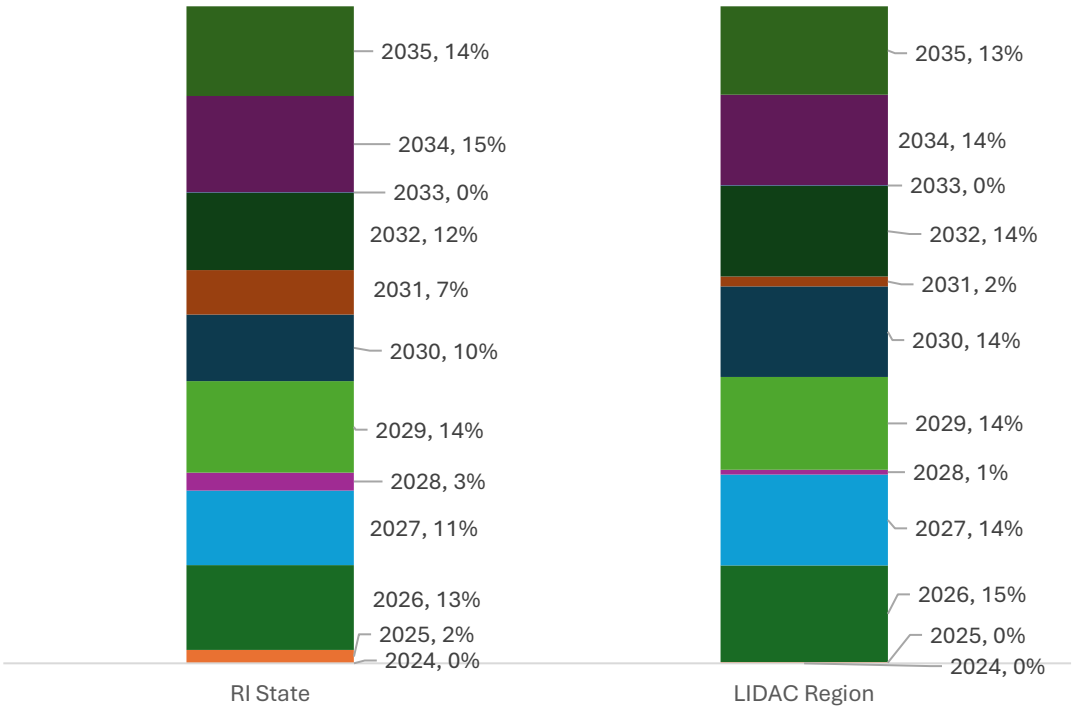
Table 15. Employment, Growth, LQ, and Unemployment Rate for LIDACs and Non-LIDACS

	LIDACs				Non-LIDACs			
Occupation	**Employment**	**10 Year Growth Rate**	**LQ**	**Unemployment Rate**	**Employment**	**10 Year Growth Rate**	**LQ**	**Unemployment Rate**
Solar Photovoltaic Installers	25	19.7%	0.53	15.6%	40	25.0%	0.79	13.6%
Electrical Power-Line Installers and Repairers	121	3.1%	0.61	2.8%	149	2.8%	0.72	2.1%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	552	1.8%	0.87	3.2%	873	1.3%	1.32	2.4%
Electricians	819	3.3%	0.66	4.5%	1552	3.3%	1.21	3.3%
Operating Engineers and Other Construction Equipment Operators	363	-1.6%	0.49	8.4%	649	-1.5%	0.84	6.1%
Construction Laborers[36]	1253	2.1%	0.55	9.7%	2330	1.9%	0.99	7.1%
Electrical Engineers	247	1.7%	0.84	4.5%	379	2.1%	1.24	2.9%
First-Line Supervisors of Construction Trades and Extraction Workers	838	0.0%	0.60	4.2%	1544	0.1%	1.07	3.0%

Beyond job-related effects, the state as a whole—and LIDACs in particular—will experience public health gains as the Climate Action Plan lowers exposure to fine particulate matter (PM2.5). Between 2023 and 2035, the reduction in pollution is expected to prevent roughly $22 million in health-related costs statewide, with LIDAC communities receiving over one-third of those benefits, or about $7 million. These areas also see improvements sooner: their largest single-year decrease in health impacts occurs in 2026, when they achieve 15% of their total projected reduction, whereas the statewide peak does not occur until 2034. By 2030, Rhode Island is expected to have achieved 53% of its total anticipated PM2.5-related health-impact reductions, while LIDAC communities will have reached 57% by that time (Figure 23).

[36] Employment and Growth Rate for this occupation also include Miscellaneous Construction Workers to account for Weatherization Techs.

Figure 23. Total Annual Economic Impacts, 2023-2025 (3% NPV)



Workforce-Focused Policies and Government Agencies

The research team identified nearly 20 workforce policies, programs, and incentives across the state that support the clean energy workforce. The Governor's Workforce Board (GWB), serving as the official entity responsible for statewide workforce policy and planning, plays a central role in shaping strategies for all industry sectors, including renewable energy, overseeing implementation of many of the policies and programs in this inventory. Additionally, many workforce investments made by the GWB are directed through the Real Jobs RI program.

Real Jobs RI, through the RI Department of Labor and Training (RIDOL), is one of the state's premier workforce development programs and serves as a model to many other initiatives. Established in 2015, Real Jobs RI is an employer-driven workforce initiative that collaborates with businesses, training providers, and community organizations to develop tailored strategies that meet industry-specific workforce needs, ranging from job placement and employee upskilling to entrepreneurial support and long-term talent pipeline development. Since its inception, the program has trained over 38,000 individuals, placed over 17,200 jobseekers, and supported more than 6,000 businesses.[37]

The Green Energy Workforce Board (GWAC) is another key driver of Rhode Island's green workforce development policy**.** This board, launched in 2023, coordinates stakeholders from the industry and related sectors to establish guidelines for ensuring access to employment and training opportunities in green industries and related fields. During executive interviews, experts highlighted the importance of cross-industry collaboration for a green workforce transition. Many highlighted Rhode Island's existing capacity for collaboration, with GWAC being a key example of efforts to ensure an equitable and inclusive transition process.

While the GWB directly offers workforce funding in Rhode Island, the state's economic development agency, RI Commerce, also plays a role in the funding landscape of the RI workforce. RI Commerce administers the Qualified Jobs Incentive Tax Credit, which grants companies redeemable tax credits for creating new jobs or relocating them to the state. In addition to workforce funding, the agency provides funding through the Renewable Energy Fund, which provides grants to renewable energy projects in the state.

Clean Energy Workforce Growth Incentives: Findings from Policy Inventory

The Office of Energy Resources and Rhode Island Infrastructure Bank provide funding opportunities and workforce incentives for businesses to adopt clean energy solutions, improve building performance, and support job creation. Through the Commercial Property Assessed Clean Energy (C-PACE) program, businesses can access long-term, fixed-rate financing for

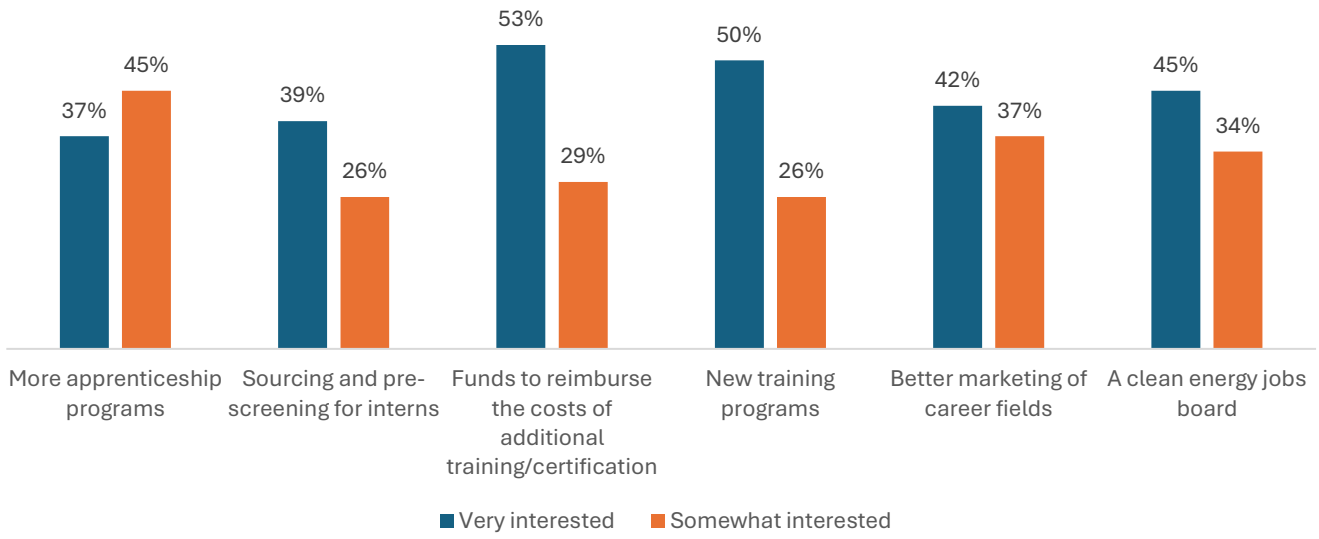
[37] *Governor's Workforce Board*. "Real Jobs RI: Calendar Year 2023 Performance Overview." "https://gwb.ri.gov/sites/g/files/xkgbur746/files/2024-04/Real%20Jobs%20RI%20Performance%20in%20Calendar%20Year%202023.pdf

energy upgrades without upfront costs, allowing for immediate cash flow benefits. The Qualified Jobs Incentive Program rewards companies that create at least 10 new jobs, meeting specific wage standards, by offering up to $7,500 per job annually in tax credits, helping reduce hiring costs and encourage workforce growth. Additionally, the Renewable Energy Fund (REF) supports renewable energy adoption by offering grants for small- and large-scale clean energy projects, using utility fees and compliance payments to promote a more sustainable energy future while creating jobs in the green economy.

Employers reported interest in various resources to support their workforce needs, but reported the highest interest in funds to reimburse the costs of additional training or certification for clean energy employees, with 53% indicating being "very" interested, and 29% being "somewhat" interested (Figure 24). Existing opportunities for entrepreneurial and business support should also be more effectively promoted to clean energy employers, as many remain unaware of these available resources despite their relevance.

Additionally, MWBEs are more likely to have interest in additional workforce development resources compared to other businesses. Three-quarters (75%) of MWBEs expressed strong interest in the creation of *new training programs* for clean energy work that are not currently available in their area, more than double the rate of interest among non-MWBEs (36%). A comparable gap appears in support for *expanded apprenticeship programs* as 67% of MWBEs are very interested, versus only 24% of other businesses.

Figure 24. Please rate your level of interest for each of the following programs, services, or resources to support your firm's workforce needs.



Small Business Support: Findings from Policy Inventory

The State of Rhode Island offers programs to promote equity in public contracting, support small business growth, and boost innovation. These include requirements that a portion of state-funded projects go to minority- and women-owned businesses, along with annual reporting and regular studies to ensure progress. To help small businesses succeed, organizations like the Rhode Island Black Business Association provide business development services, while the Innovate Rhode Island Small Business Fund offers financial support for research and workforce development.

Insights on Rhode Island's Workforce Ecosystem Gathered from Stakeholder Engagement

K-12 and CTE Education

K-12 education is recognized as foundational to developing a green workforce pipeline. K-12 is the starting place for initiatives to bring awareness to the many clean energy occupational pathways available, as well as developing specific skills for success in these fields. In some school districts, industry leaders already engage with elementary schools to teach manufacturing, while URI students teach engineering and provide supporting curriculum to high school classes. This type of programming is crucial to developing interest in clean energy careers. Some organizations in the state recognize the importance of awareness and education for young people, including Groundwork RI, which offers a six-week development employment opportunity with environmental education for teens in Providence, Pawtucket, and Central Falls.

The training inventory identified 30 unique high schools with CTE programming relevant to clean energy careers. This does not include high schools devoted to solely vocational and CTE education. Only 11% of surveyed employers indicated partnerships with K-12 institutions for workforce needs (Figure 26). The substantial number of high schools in the state with existing CTE education serves as a recruitment and pipeline mechanism for clean energy employers.

Rhode Island is a leader in CTE, with various high schools focused specifically on job training, including the Providence Career Technical Academy, Davies Career and Technical High School, and the Regional Career and Technical Center at Coventry High School. Due to the small size of the state, the state operates on "student opportunity," which means if a student wants a CTE program that is unavailable at their school, they are allowed to go to a different district's high school to pursue the program. In other words, CTE opportunities are not limited to students in only certain parts of the state.

"Our CTE landscape is bigger than other, larger states because they are still focused on 'vo-tech.'"

While CTE pathways are plentiful across the state, availability of experienced instructors remains limited. To build a stronger CTE teacher pipeline, Rhode Island must recruit, support, and equip instructors to train students on new energy technologies. Ongoing efforts include a CTE teacher training program at Roger Williams University. This kind of program is important both in increasing number of instructors, and in providing students with the most relevant training and education. Stakeholders highlighted that some CTE teachers may not be up-to-date with technologies in an industry that is rapidly evolving like clean energy, given that many instructors no longer work in the industry, or have experience with newer smart technologies.

"In the next five years the demand for construction workers is going to increase exponentially from retirements. Young workers are going to get snatched up by unions…not teaching."

"We use some of our funding to create a teacher prep program for CTE instructors. We do a lot of training specific to [teacher] staffing."

A strong connection already exists between different communities and the stakeholders who comprise the state's CTE system. Working groups of employers and industry leaders across the state create the CTE curriculum standards. Every state agency focused on workforce development, as well as an urban core CTE institution, highlighted unions as key players in developing curriculum for CTE.

Additionally, multiple interviewees referred to Wind Win RI. Local leaders in North Kingston started the program, supported by Real Jobs RI to create pathways for OSW employment. This program's curriculum provides high school students and education and a direct pathway to offshore wind employment. In addition, the program hosts a "Rhode Island High School Wind Turbine Competition," bringing high schoolers from across the state in both urban and sub-urban communities together to compete building small turbines, enforcing engineering and physics skills, hands-on learning, and interest in the wind industry. One CTE stakeholder in an urban community highlighted sending their educators to Wind Win RI's teacher training programs. This program is quickly working towards a standard of training for CTE students in the state.

Unions and Apprenticeship

Unions are key players in the clean energy workforce and provide workers with strong entry-points into the industry. Unions provide access into trade jobs through "earn while you learn" apprenticeship opportunities, offering firsthand learning, wage progression, and classroom instruction. There are opportunities for young people just entering the workforce, along with mid-career switchers. While these are key opportunities for prospective workers, many unions have long waitlists and limited spots. Union members and training providers suggest this is not necessarily a capacity issue, as they have the resources to train more workers, but instead a demand issue. If there is not a demand for workers, they do not want to train workers who will then have no work. Rapid increases in labor demand, based on ambitious clean energy goals, could require a similarly rapid expansion of trade worker development in order to meet this need.

"In order to meet state apprenticeship ratios, you can only take so many apprentices in. We certainly have room for more, but we don't have one giant job site to put them in. It's not as easy as just taking them in."

"The state can play a big role in ensuring registered apprenticeships are incorporated into policies and goals. We need a structure to train workers."

Apprenticeships offer strong pathways into the climate workforce. Over one quarter of surveyed clean energy employers report actively partnering with unions to meet their workforce needs, while over half of surveyed clean energy workers reported participation in apprenticeship programming. Apprenticeships enable new entrants and career transitioners to learn a trade while earning wages and provide structured advancement opportunities, particularly through union-based programs.

Building Futures is one of the state's premier construction pre-apprenticeship program, preparing participants for careers in the construction trade, which provide valuable exposure to the tasks and skills required for success.

Building Futures boosts a 90% retention rate for participants after apprenticeship placement after one year and 80% after two years. The extensive support services that Building Futures provides to participants are an important feature of its success, including license assistance, housing support, and transportation assistance. This can be especially valuable for construction workers who must frequently changing work sites. Building Futures also integrates an environmental lens into its training through their Building Green Futures program, which partners with clean energy companies such as Ørsted to provide specialized certifications for climate projects.

"Building Futures is very intentional with their outreach and how to enroll pre-apprentices and apprentices into the building and construction trades."

"The importance of registered apprenticeship programs cannot be underestimated."

While unions provide workers for clean energy projects, their interest and engagement in the clean energy space varies. Stakeholders connected to unions identify interest in offshore wind, solar, and energy efficiency work, but highlight the need for predictability when training and planning for the workforce for those projects. Many also stressed the importance of realistic and gradual climate policy. For example, one stakeholder warned that if Rhode Island's electric grid is not ready for full electrification, economic disruption could occur if these plans move too quickly without infrastructure investments.

"We were excited about offshore wind, and we trained a bunch of people. Then when the tariffs hit, our developers' quotes immediately changed. Theres a lot of hesitation right now, hopefully it will pick up more, but everything is on hold now."

"We are focused on the changes coming to the oil and gas industry, we want to be a part of these conversations. If advances are going to benefit our community and local, we want to be the ones on the ground doing that work."

Internships

Internships are another key entry path into professional clean energy jobs. As highlighted in The Training Ecosystem section of this report, six in ten surveyed clean energy workers reported participation in internship programs to support their pathway into clean energy, with 90% indicating the experience as very or somewhat effective for their career. Students in four-year universities specifically are actively interested in internship opportunities. In the Rhode Island College (RIC) environmental studies program, students are required to pursue an internship. The energy fellowship program at URI is extremely popular. One professor stated that students are always looking for exposure into the industry and the university is always exploring more partnerships and opportunities for student internships.

In addition, Rhode Island's Office of Energy Resources, in partnership with RI Commerce, operates the Clean Energy Internship Program to strengthen the professional services side of the climate workforce. This initiative helps build the state's clean energy talent pipeline by connecting students and recent graduates with paid internships at clean energy employers across Rhode Island, supporting their exploration of careers in the industry. This program also partners with the organizations Browning the Green Space and Emerald Cities Collaborative to focus on diversity efforts and provide additional professional development for students. In the second year of this collaboration, students of colors' interest in clean energy have increased, as has connections between employers, colleges, and career offices.

"How do we encourage students to enter non-construction jobs in the energy field? Through training the students we already have with internships."

Training and Retraining

Short reskilling opportunities and retraining using transferrable skills present quick early wins in developing a climate workforce. Workforce development leaders in the state highlight that the clean energy sector does not need to create brand-new occupations for emerging industries but needs to be reskilling and certifying current workers, as well as adding to already existing training programs. Established trades people do not always have clean energy technology skills and knowledge but training them in these emerging technologies can open opportunities for them and expand the industry's workforce. One sustainability coordinator reported having two in-house Electricians but outsourcing for the installation of new rooftop solar panels as the in-house Electricians do not have the training to perform this work. Additionally, newer HVAC technologies in commercial projects may now require computer skills and programming. One workforce development provider in the state explained that they provide training for where workers currently are skill-wise, with targeted reskilling options in short courses. Additionally, many trades people in clean energy need additional safety training.

"We help upskill workers for clean energy. Ørsted has been a large partner, all the global wind certifications we help our students earn is through this organization."

"Transferable skills are key to meeting future demand. For example, painters in offshore wind also need to have rigging skills."

Retraining is particularly important for workers whose industries may be affected by a clean energy transition, such as fossil fuel workers. Stakeholders highlighted the need for transitional support, trust-building, and public recognition of these workers' role in the shift to a clean energy economy. Wraparound services may be especially relevant for these types of workers, who are coming from likely stable, family-supporting wages. Paying new clean energy entrants for their time retraining is non-negotiable, to ensure equitable and sustainable training models for transitioning workers.

"Fossil fuel workers are not going to stop working and go to school. Learn and earn needs to be front and center, with workers earning real wages."

Training providers should directly integrate renewable energy and climate technologies into traditional trades programs. Industry associations and training providers discussed how integration of climate and clean technology training needs to be part of standard, established training programs for tradespeople. For example, IBEW 999 offers in-house training for electric vehicle work, along with electrical principles related to offshore wind and solar technologies. In addition to this in-house training, the union will send workers to learn additional skills and certifications for offshore wind related to working off-land. The industry can adopt this type of training as a common standard across workforce pathways, so that all skilled trades people are equipped to install, maintain, and repair clean energy technologies. Some training providers have started this work.

"We have been on the forefront of training for green technologies."

"Climate and clean energy are embedded throughout our training focus."

Rhode Island's "Ocean State" identity plays an integral role in shaping its climate and clean energy workforce, and the skills associated with ocean activities can be leveraged in the clean energy workforce. The state's economy and culture are deeply tied to the ocean, with strong industries in fisheries, eco-tourism, and oceanography. Across the state's four-year universities, faculty have noted growing student interest in environmental studies, sustainability management, and green business initiatives, reflecting a generational shift toward environmentally focused careers. The University of Rhode Island has cultivated a long-standing reputation as a business school committed to sustainability, helping to build a pipeline of talent for clean energy and climate-related occupations.

This ocean-based foundation provides Rhode Island with a unique advantage in the clean energy transition. Many workers and businesses already possess transferable skills relevant to offshore wind, marine energy technology, and other blue economy sectors. The state's existing expertise in maritime safety, ocean operations, and coastal management—skills embedded across multiple points of the value chain—positions Rhode Island ahead of many other states in preparing its workforce for the growing offshore wind and ocean-based clean energy industries.

"Rhode Island is in a unique position due to its size and proximity to the ocean – we have a unique connectivity to climate. How do we integrate this? How do we say the ocean state led this?"

Employers

Employers are crucial collaborators with training providers and other workforce stakeholders. Employers who are on the ground developing, installing, and operating clean energy technology and infrastructure best understand the required skills and knowledge for the industry. They often communicate these needs and their predicted demand to training providers.

"Training and curriculum have to be employer-driven. Employers have to be at the table, they tell us what are the skill sets that will put our students ahead."

"Our programs are driven by what we hear from the industry."

In addition to entry-level training programs, many occupations require additional training that is most effectively taught on-the-job, whether through an internship, apprenticeship, or other opportunity. Of surveyed employers who indicated required or preferred certifications of their clean energy employees, about two-thirds (65%) indicated their employes look to industry or trade associations to provide this training, while 38% reported the use of apprenticeships, and one third (35%) indicated they use in-house training to provide workers with required certifications (Figure 25), showing those in the industry and employers themselves are core and effective training providers. Many training provider stakeholders in interviews stressed that that employers have a responsibility to provide on-the-job training and apprenticeship opportunities to potential workers to build the worker pipeline.

"People need to understand that it is part of their role to support the workforce pipeline."

This relationship between employer and training/education providers is reciprocal: in interviews, stakeholders reported employers actively on the ground in both high schools and colleges for recruitment and attracting interested and young talent.

"Recruitment at the high school level relies on the employers – they are competing with a lot of other interests and aspirations."

Despite the importance of collaboration, 26% of surveyed clean energy employers indicated they do not partner with any organizations to meet workforce needs. Of these respondents who do not partner with organizations, 50% indicated that they do not experience challenges with workforce needs or need a partner, and 20% indicated they don't know enough about these organizations or who to contact (see

Figure 21). This 20% indicates an opportunity to target specific employers to provide partnership information and resources.

Certifications

Training providers in executive interviews also highlighted that tangible certifications are useful to employment opportunities. These training providers offer certifications such as OSHA, CPR, waste management, LEAD RRP, and the Providence Community Tree Keeper certification. In addition to increasing skill sets through certification, one training provider explains they collaborate with environmental organizations to include hands-on training in certification attainment, introducing participants to, and making connections with, employers from green industries. Another provider who recognizes the need for certifications is currently working with a national

initiative to develop a credential for informal learning. This stakeholder recognized that they are trying to shift their programming from education-only to providing tangible certifications that signal experience or expertise in a certain area to potential employers.

"So many of the skills for clean energy are just added certifications. To reach growing occupation demand we need to efficiently navigate the certification process."

"We want to beta-test more micro-credentialing programs."

More than eight in ten (85%) of surveyed employers indicated certifications are required or preferred for their clean energy employees. As previously mentioned, industry or trade association training programs are the most frequently reported type of program for worker certification, listed by 65% of surveyed employers. This is followed by 50% that identified online/webinars with private training companies, 38% apprenticeship programs, 35% in-house training, 33% community college programs, and 25% technology manufacturer of distributor training program (Figure 25). These associations, along with unions and community colleges, are key partners for employers to tailor training programs to better meet their worker requirements and preferences.

Employees at Minority and Women Business Enterprises(MWBEs) are more likely to access community college programs for certifications than those at other businesses. Over half (58%) of MWBEs report employee participation in community college certification programs, compared to just 24% of non-MWBEs. MWBE employees also engage more frequently in other types of credentialing, including industry or trade association training programs and apprenticeships (Figure 26).

Figure 25. Where do your employees go to earn these kinds of certifications? (SELECT ALL THAT APPLY) – Multiple responses permitted; Percentages may sum to more than 100%.

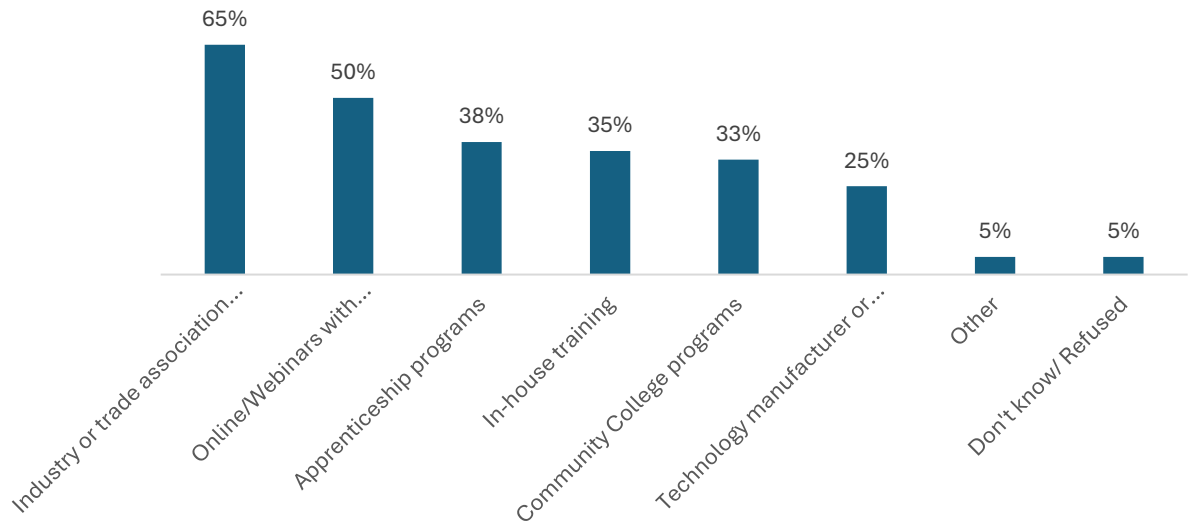
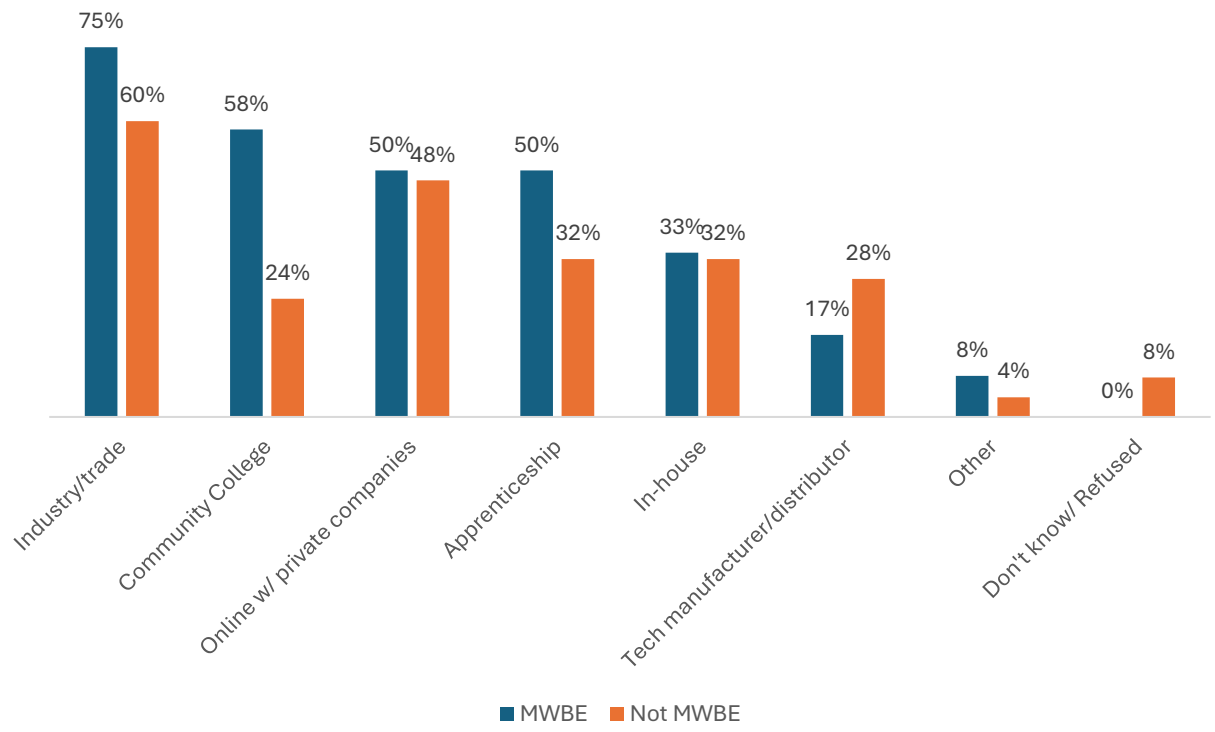


Figure 26. Where do your employees go to earn certifications? (MBWE n=12, Not NWBE n=25)



Community Groups and Equity

Local community members emphasized that equity must be central to workforce planning. Participants called for widespread and accessible wraparound services such as childcare, language access, and transportation assistance to ensure broader participation in training and employment opportunities. There was a consistent demand for green jobs to come with family-sustaining wages and benefits, and for stronger coordination among workforce development boards, municipal governments, labor organizations, and economic development planners to ensure an inclusive and well-aligned transition.

"Earning real wages needs to be front and center."

There are many community groups and organizations in Rhode Island's workforce development ecosystem focused on equity and disadvantaged communities. Community partners, such as Man Up and Amos House, were highlighted by stakeholders as connecting people to workforce development programming. One stakeholder highlighted health equity zones and libraries as a place to build awareness for workforce development and climate opportunities and that someone with a strong tie to a community, like a church leader, is a valuable partner in

spreading information about clean energy work. Community organizations play a critical role in workforce recruitment and training, as disadvantaged communities, in particular, are less trustful and responsive to messaging from outside sources.

"The climate transition has to be a co-creative process with the people most impacted by these issues. If they don't have buy in and it's someone from a university, utility, or government telling them they have to do certain things or care about certain things, it's a challenge."

"We are trying to start a clean energy workforce barrier removal fund. Barrier removal services we could provide across the workforce, for businesses, and to communities include tuition assistance, stipends, certification support, childcare, and toolkits."

Despite an abundance of community organizations in the state's workforce ecosystem, only 3% of employer survey respondents reported partnering with community groups to meet their workforce needs (

Figure 21). While community organizations are abundant in the state and working on the ground with community members, there is a clear opportunity to link these community groups with employers to provide a bridge to clean energy employment for community members.

Many participants in Rhode Island's training infrastructure regularly implement equity initiatives. One provider highlighted that every program they offer (in the hundreds) is accessible to Spanish speakers. This includes a vocational English-as-a-second language pre-apprenticeship program and dedicated Latino outreach workers. Additionally, this training provider houses two training centers in EJ communities. Another training provider stakeholder highlighted that they use community partners who have direct connections with EJ to recruit interested students.

In CTE education, one institution with limited seats ensures that admissions include all races, ethnicities, special education statuses and multi-language learners. The Rhode Island Department of Education (RIDE) also makes sure to give focus to the urban cores of the state when it comes to CTE.

Multiple training providers reported working with formally incarcerated persons for training and support. Specialized support for formally incarcerated persons is especially important, as well over half (61%) of surveyed clean energy employers reported conducting criminal background checks on potential applicants. These background checks may disqualify formally incarcerated people from employment opportunities. Community groups can leverage an employer connection to vouch for a formally incarcerated worker, as well as lessen the stigma surrounding hiring these workers.

Additionally, paying disadvantaged community workers for their time when completing a training or education program for the clean energy industry is important for bolstering opportunities for these workers since they may not seek the training without the compensation. "Train the Trainer" approaches where community leaders and teachers are provided education and training for roles in the industry are also key to disseminating the knowledge and generating trust throughout these communities.

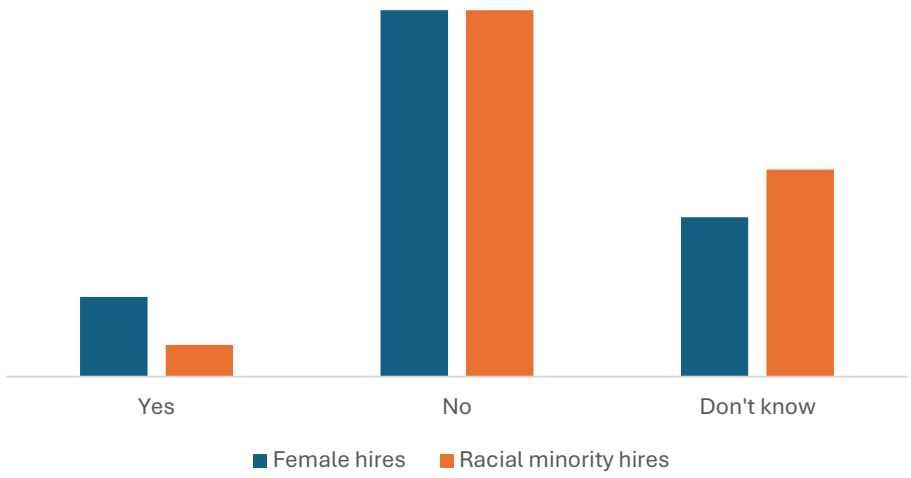
"The efforts of folks to learn need to turn into jobs for those that are underserved, and we can pay them to share knowledge. We can embody a 'Train the Trainer' approach."

Equity Insights from Policy Inventory

Across Rhode Island, a collection of state agencies, nonprofits, and community action programs, support a variety of energy equity initiatives and provide funding opportunities aimed at assisting low-income households across the state. These programs provide critical financial and technical resources through Weatherization Assistance Programs (WAP), Energy Assistance Programs (LIHEAP), and Appliance Management Programs (AMP). The Low-Income Home Energy Assistance Program (LIHEAP) offers direct support to eligible households during the winter heating season by providing grants paid directly to utility or fuel companies. The Weatherization Assistance Program (WAP) complements LIHEAP by delivering whole-home energy efficiency improvements, such as insulation upgrades, ventilation enhancements, and the installation of smoke and carbon monoxide detectors. Additionally, AMP provides in-home energy audits conducted by trained Energy Managers who assess appliance use and offer personalized strategies to reduce electricity consumption. Participants may also receive no-cost energy-saving products, including LED lighting, Energy Star appliances, and water-saving fixtures. These initiatives work in concert to reduce energy burdens, improve home safety, and expand access to energy efficiency solutions for Rhode Island's most vulnerable residents.

Despite state and community interest in equity, surveyed employers do not commonly implement diversity or equity initiatives. When asked if their firm has strategies to increase the number of female hires, only 13% of respondents answered yes, while this share drops to 5% when referring to ethnic and racial minority programming (Figure 27). This disconnect is crucial to workforce planning. Community organizations and state initiatives must provide training support, targeted outreach, and wraparound supports for marginalized communities, as the employer side of the ecosystem may not be as supportive. Additionally, the state can consider initiatives or programming to increase employer interest in equitable hiring practices, ensuring those marginalized workers with training are being connected to and hired by employers.

Figure 27. Has your firm adopted any specific strategies, policies, or programs to increase the number of _____ hires?



Coordination and Collaboration

State agencies are key players and partners in workforce development and providers want to continue those collaborations. Some collaboration between state, education, and community organizations already exists, exemplified by the Green Energy Workforce Advisory Committee (GWAC) and Climate Jobs RI, a coalition of labor, environmental, and community partners built by the Rhode Island AFL-CIO for collaboration to help RI transition to a renewable energy economy with a worker focus. During community listening sessions, stakeholders stressed the need for even more coordination across key sectors like workforce boards, labor groups, utilities, municipalities, and economic development offices to ensure a coherent and equitable clean energy transition. While major workforce players are already coordinating, further coordination with these workforce groups and the broader decarbonization strategy can support a more just transition. Additionally, given Rhode Island's size and relationship to the broader New England area, multiple stakeholders mentioned the opportunity for increased regional collaboration.

"You know I've seen in other states that any number of clean energy entities are getting into this space, and it can feel very crowded and disconnected. A lot of people are doing the same things and not having an awareness that other entities are right down the road. This issue is less pronounced in Rhode Island, especially with the size, but there is still an opportunity to bring more of that coordination and awareness."

"We are a regional economy – not just a state economy."

State agency interview participants highlighted the need for more data sharing between state agencies, industry, and communities. Some efforts already exist with state agencies and industry: for example, the state agency focused on Career and Technical Educational has a process of coming together in advisory groups with industry partners, outlining the need skills for an entry-level worker, and then providing this information to educators at both the secondary and post-secondary level. This information is important to the state's CTE programming to make sure students can seamlessly transition to the workforce equipped with the skills to make them successful. This model of sharing between government, industry, and training providers is one example of how to ensure that information sharing and collaboration across government, industry, and education partners translates into coordinated, data-informed actions that benefits students, employers, and communities alike.

"We are still onboarding the Department of Education into our conversations. We are both probably working on the same things. Also the Department of Transportation."

Stakeholders and community members also highlighted a lack of visibility into clean energy employment opportunities in the state. Workers and training providers are struggling to identify the types of jobs available in clean energy, along with which opportunities are new, and which already have existing pathways. Additionally, the quality of jobs is not always transparent. This presents an opportunity for the state to produce and provide workers with clear guides and pathways to clean energy careers, particularly through the Office of Energy Resources (OER) and their climate dashboard. Much of this information is already available, but workers are struggling to find it and recommend more centralized resources. Additional coordination between the agencies offering existing resources, and community groups can hasten the dissemination of information about clean energy careers.

"The state could identify worker profiles and identify the entry points to careers. It would also be helpful to have some guardrails around who workers are going to be, what skills they need, and in what disciplines."

Funding

Stakeholder certainty around federal funding is mixed. Stakeholders in higher education believe that colleges focused on research efforts are more likely to be affected by lessening federal funding than others. One workforce development provider was awarded several million dollars in federal grant dollars in collaboration with OER, but federal delays or cancellations have stalled this funding. Despite the setback, the provider is continuing to move forward and believes they can still expand training, pointing to other industry funding streams, like state grants. On the other hand, another stakeholder cited that 80-90% of their operations were funded nationally, and this is being drained, leading them to anxiously look for other sources to continue providing services.

Another stakeholder working in a state agency expressed anxiety about the changing federal climate, stating the ability to spend federal money has diminished. While they are disappointed, they are "not looking to make a big fuss and raise any red flags" to the federal government. They plan to keep working on climate workforce development and equity initiatives but want to be tactful and not attract federal attention.

"We are anxious about federal funding – but this differs from one department to the other. We aren't as grant dependent, but we are cautiously waiting to see what happens before making decisions."

"We are federally funded – but we've been slowly decreasing out of federal dependence."

"A lot of national funding is being drained out of the system. A lot of funding went to training people – this will be dried up."

"The industry now has dedicated funding streams – we will move on from federal funding fine."

"Our first funding dollars were from the Trump administration. We expect this funding to continue – we are not worried.

As previously mentioned, the Governor's Workforce Board serves as the key state funding provider for workforce development. Additionally, the Office of Energy Resources serves as a key funder for renewable energy and energy efficiency projects, through the Renewable Energy Fund and Lead by Example Initiative. The Rhode Island Infrastructure Bank and RI Commerce also provide various funding mechanisms for renewable energy projects.

Key State Funders: Findings from Policy Inventory

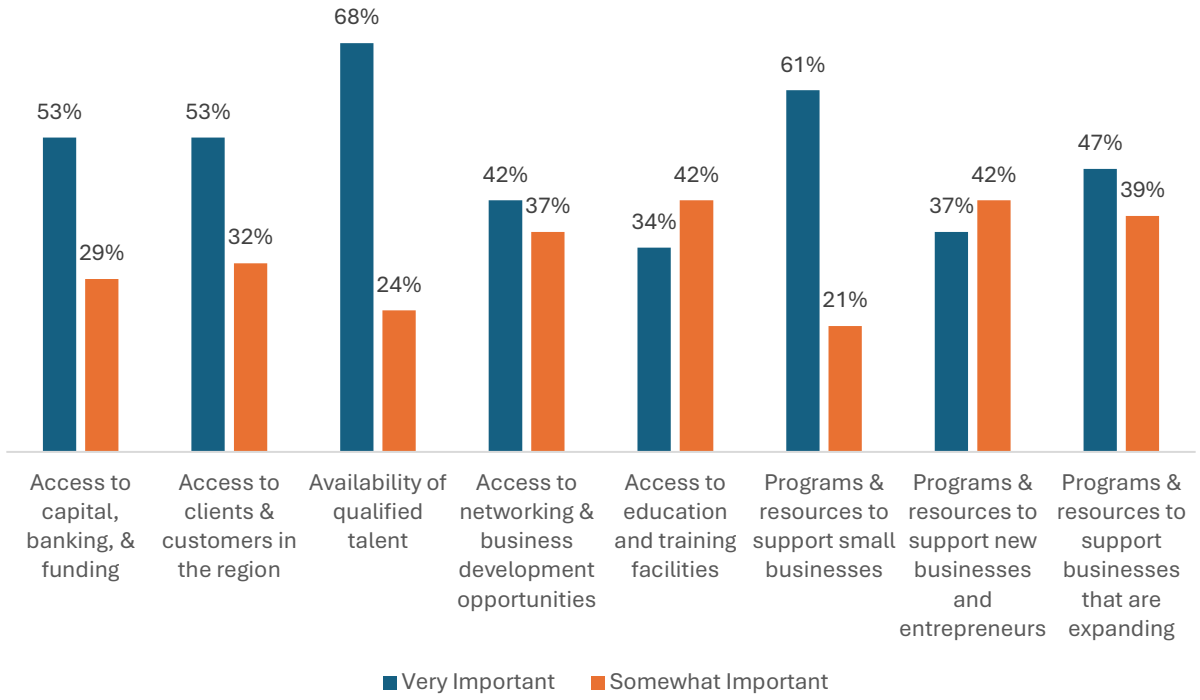
State and quasi-public agencies across Rhode Island are currently offering a range of funding and financing opportunities to support municipalities in upgrading critical infrastructure, enhancing environmental resilience, and advancing clean energy initiatives. The state offers programs such as the Municipal Road and Bridge Revolving to provide affordable financing for transportation infrastructure, wastewater, and stormwater projects, while the Efficient Buildings Fund, Energy Efficiency and Conservation Block Grant, and Stormwater Project Accelerator support energy efficiency upgrades, renewable energy projects, and energy procurement strategies.

Additionally, the Office of Energy Resources' Lead by Example (LBE) Initiative funds clean energy projects in public buildings, with a focus on improving energy efficiency, reducing emissions, and supporting the goals of the Act on Climate. Recent efforts extend to Rhode Island public schools through three targeted programs: the Building Automation System Accelerator, which helps schools install or upgrade HVAC controls for better energy management and indoor air quality; the Heat-Pump Water Heater Accelerator, which replaces outdated water heaters with efficient, cost-saving heat pump models; and the LED Lighting Accelerator, which supports the transition to LED lighting with smart controls to cut energy use and improve classroom lighting. All

programs offer technical support, procurement assistance, and financial incentives to help schools adopt clean energy technologies while saving money and creating local green jobs.

On the employers and business side, as noted earlier, surveyed employers showed strong interest in increased funding for employee training and certification, with 82% indicating they are interested in this type of support (see Figure 24). Additionally, surveyed employers also indicated access to capital, banking, and funding, as well as programs and resources to support small businesses as important at rates of 82% each (Figure 28).

Figure 28. Please rate the importance of each factor for your business



Workforce Development Strategy and Recommendations

K-12 and CTE Education

Strengthening direct pathways into clean energy careers can help build a qualified workforce quickly to meet demand, but it begins with education and awareness-raising programs at the K-12 level. This should start with efforts to education about career pathways that exist in clean energy before students are in high school and have the opportunity to pursue CTE education. Rhode Island can build on its existing CTE and workforce partnerships by developing targeted outreach materials that map key skills, illustrate how foundational abilities transfer into clean energy roles, and highlight local career pathways across the most in demand sectors such as offshore wind, building decarbonization, and electric vehicle infrastructure and maintenance. Coordinated efforts between the Department of Education, the Office of Energy Resources, and workforce development organizations can ensure these initiatives align with the state's long-term clean energy and climate goals.

In addition to clear high school pathways from K-12 into the workforce, one stakeholder suggested more focus on programming to introduce students and gain clean energy related skills during the later years of a K-12 education, when there may not be enough time for a full CTE program. Many schools in the state require entrance into a CTE program in 9th or 10th grade, with limited opportunities to pursue this education in 11th and 12th grade. There is an opportunity to implement more fast-tracked opportunities at the high school level for juniors and seniors, who were not interested in the trades until later in high school. This can provide work-based learning exposure and develop interest in the trades.

Rhode Island state agencies and school districts could explore different efforts to incentivize active tradespeople to transfer their skills to students or existing CTE teachers. Tradespeople with experience in newer, emerging technologies, are crucial to ensuring that students are prepared to work with clean energy and energy efficient technologies.

Transitioning the Workforce

Stakeholders call attention to the desire for clear and coordinated guides and pathways to clean energy jobs. Currently, Wind Win RI, with support from Real Jobs RI, offers a career pathway training system for youth and adults in offshore wind. Community members highlighted the desire for more pathways like this in other occupations and sectors of clean energy work, as well as specialized pathways for economic justice for disadvantaged community members. Career pathways should not be just created for new workers but also targeted pathways for fossil-fuel workers to transition out of this industry. Including information about what certifications and stackable training to obtain, as well as where to obtain these, are other key aspects to developing these guides.

Employers can be better informed of existing financial incentives and programs. Many Rhode Island clean energy employers are eager to invest in workforce development but lack awareness of

the resources already available to them. Enhancing communication and visibility around existing state and regional programs—such as funding that offsets training and certification costs—would enable employers to upskill their workers more effectively and respond to rising labor demand. The state can strengthen outreach and coordination with employers to ensure that available supports are well-publicized, easy to navigate, and aligned with industry workforce needs.

Rhode Island should strengthen coordination and establish shared standards among certification providers. Industry-recognized certifications are a critical entry point into Rhode Island's clean energy workforce and a key measure of job readiness. Most employers in the sector require or prefer certified workers, highlighting the need for consistent, high-quality credentialing opportunities. This should include industry associations, apprenticeship programs, community colleges, and private training organizations to ensure that credentials align with statewide workforce development goals and meet employer demand across emerging clean energy occupations.

, Rhode Island should intentionally align its clean energy and ocean-based workforce strategies to reflect the state's unique size, geography, and maritime heritage. Stakeholders emphasized that the "Ocean State" identity connects nearly every sector of Rhode Island's economy, creating natural pathways to link traditional maritime, construction, and environmental industries with emerging clean energy fields such as offshore wind and marine technology. The state can strengthen this intersection by developing an environmental industrial policy that integrates workforce, safety, and environmental training standards across offshore and onshore clean energy occupations. Building on transferable skills from existing trades—like painting, electrical work, and marine operations—and layering in offshore safety and environmental awareness training, will help Rhode Island prepare workers for growing offshore wind demand while maximizing the strengths of its established ocean economy.

Understanding the clean energy job market and emerging roles is crucial for training providers. Training providers need to understand which jobs are part of the emerging clean energy workforce, especially those with severe demand gaps, along with which roles are newly created or already have well-established curricula. While foundational skills in construction and trades remain relevant across many clean energy sectors, the emergence of new technologies demands specialized knowledge and flexible curricula. Without consistent engagement and collaboration with industry, training providers risk offering programs that are outdated or misaligned with workforce needs.

Potential workers also need a clear sense of long-term job demand, job quality, and security— specifically those coming from fossil fuel industries and the Automotive industry. Many individuals transitioning from long-term roles expressed concerns about pay cuts, reduced hours, or uncertainty about the availability and stability of jobs in the clean energy sector. This underscores the importance of education and awareness: not just about the existence of new job pathways, but about how these roles meet or exceed the stability, compensation, and purpose of previous work.

A centralized, user-friendly resource, such as a "workforce concierge" approach, can standardize how training information is shared and providing direct support to help individuals navigate their options. Navigating opportunities can be difficult for prospective workers. The state currently offers a variety of resources through entities like OER to help prospective workers explore clean energy careers. However, some community members report that these resources are scattered and difficult to navigate. To improve access and participation, the state should look to centralize clean energy workforce information and proactively guide prospective climate workers to it in a way that is coordinated, transparent, and responsive to evolving industry needs.

Internship, Mentorship and Apprenticeship

Expanding on-the-job training opportunities, such as internships and apprenticeships, is essential to opening more pathways into the clean energy workforce. To ensure equitable workforce growth, stakeholders should expand apprenticeships and certification programs that are free, or pay, for new and transitioning workers. Training providers should actively collaborate with union trades to deliver work readiness programs and create clear placement pipelines. Offering free, hands-on training that leads to industry-recognized credentials is critical to building a scalable and just transition.

Private businesses in the clean energy sector should also take an active role in expanding internship, mentorship, and apprenticeship opportunities. Many union apprenticeship programs are already at full capacity and often maintain long waitlists. This is not because the unions do not want to train more workers, but do not have enough projects to support larger numbers of apprentices. Apprenticeships remain highly attractive to prospective workers due to their "earn while you learn" structure, strong job placement, competitive wages, and comprehensive benefits upon completion. By replicating this proven model outside of union settings, private employers can help increase the state's training capacity and open more pathways into clean energy careers.

Mentorship will be especially critical to Rhode Island's clean energy workforce strategy given the sector's relatively young age profile. The state already has experience supporting mentorship through the Office of Energy Resources' Clean Energy Internship Program, which includes dedicated mentorship for students of color as part of its diversity efforts. Building on this successful model, the state could expand structured mentorship opportunities to all participants—while maintaining targeted supports for underrepresented groups—and extend similar frameworks into trades-based training programs. Additionally, incentivizing experienced and retirement-age workers to serve as mentors or instructors would help retain valuable technical expertise and connect new entrants with seasoned professionals, strengthening both the capacity and continuity of Rhode Island's clean energy workforce.

Retraining and Upskilling

Retraining and upskilling existing workers is necessary for those transitioning from traditional, fossil fuel–based industries of which are most at risk during the clean energy transition. Many of these workers bring valuable experience, including both technical and soft skills, which can serve as a solid foundation for new employment. There'd a need to make the connections between their current roles and their relevance to clean energy and climate solutions more explicit. For example, individuals with mechanical or systems experience might not initially recognize how their background could apply to HVAC, heat pumps, or building electrification. Rhode Island should capitalize on shared competencies between declining and emerging occupations by creating coordinated reskilling initiatives that connect at-risk workers to expanding clean energy sectors.

Short-term and accessible retraining programs are key. In many cases, transitioning workers may not need to pursue lengthy certification or degree programs. Instead, targeted, shorter-term retraining and upskilling pathways are often more appropriate—particularly for individuals who cannot afford extended periods of unpaid training due to financial obligations. **These programs should emphasize technical and trade-specific competencies that align with emerging clean energy jobs, rather than focusing primarily on general transferable skills.** Additionally, providing compensation or stipends and other wraparound support for training participation can further ensure that workers are not penalized economically during their transition and can fully engage in preparing for high-demand clean energy occupations.

There needs to be protections in place for workers displaced by a clean energy transition. Supporting legacy fossil fuel workers through career counseling and supplementary training is essential to help them understand what alternative fields are available, what roles match their skillsets, and how much additional training may be needed. While retraining and upskilling opportunities are core aspects of worker transition, older workers close to retirement may will require alternative compensation structures.

Unions

Rhode Island's labor unions must play an expanded role in building and sustaining the state's clean energy workforce by leading targeted recruitment, training, and curriculum development efforts in partnership with state agencies and training providers. Unions are uniquely positioned to communicate skill needs from the field to educators and workforce organizations, ensuring training programs align with job-site requirements—particularly in emerging areas such as electrification, offshore wind, and energy efficiency retrofits. By continuing and expanding their collaborations with the Department of Labor and Training, the Office of Energy Resources, and CTE programs, unions can help integrate soft skills, safety training, and hands-on experience into pre-apprenticeship and apprenticeship pipelines. Unions should also continue outreach in high schools, community colleges, and underserved communities to promote awareness of trade careers and pathways into clean energy work.

Managing Supply and Demand

The most effective approach to clean energy workforce development is to focus on specific, high-growth priority occupations, guided by state-specific data. The clean energy transition is projected to create strong demand for skilled trades—particularly Solar Installers, Lineworkers, HVAC/R Mechanics and Installers, Electricians, and Operating Engineers—whose work is critical to renewable energy deployment, weatherization, and other energy efficiency projects. At the same time, modest declines anticipated in certain supply chain roles underscore the need for targeted transition strategies to ensure balanced and sustainable workforce development. Expanding access to high-quality training programs for these priority occupations across all regions of the state is essential, as is ensuring that these jobs offer competitive wages and benefits that make them attractive career options. Finally, coordinated outreach and recruitment campaigns should highlight the stability, mobility, and long-term opportunity these occupations provide as Rhode Island continues to grow its clean energy economy.

Rhode Island should prioritize targeted investments and coordination to close critical workforce gaps in high-growth clean energy trades, particularly Solar Installers and Electrical Power-Line Installers and Repairers. Demand for these occupations is projected to double or more by 2035, yet the state currently has few dedicated training programs to prepare workers for these roles. Expanding capacity through partnerships among employers, unions, training providers, and state agencies will be essential to scaling the workforce needed to meet the state's electrification and infrastructure goals. Rhode Island should facilitate coordination among training providers, employers, and state agencies to align program timing and capacity with projected industry growth, ensuring a ready and appropriately sized workforce as new clean energy opportunities accelerate.

Additionally, to strengthen clean energy workforce pipelines and avoid supply shortages caused by sudden spikes in demand, Rhode Island can take a phased approach by investing in infrastructure that creates steady opportunities for hands-on experience in decarbonization projects. State-owned facilities can lead by example, undertaking energy retrofit and electrification projects that serve as training grounds while also acting as energy hubs that nearby small businesses and residential areas can connect to. Expanding investment in both pre-apprenticeship and registered apprenticeship programs—particularly in the building trades—will further enhance work-based learning opportunities, preparing Rhode Island's workforce for large-scale deployment in electrification, weatherization, and energy efficiency work as demand continues to grow.

Case Study: Seattle's Priority Hire Program

Seattle's Priority Hire Program is a workforce equity initiative established by Seattle City Ordinance to expand access to construction careers for women, people of color, and economically disadvantaged individuals. The program applies to City public works construction projects of $5 million or more, including public-private partnership projects with significant City investment.[38] Its main goal is to ensure residents from economically distressed areas, particularly in Seattle and King County, have a clear pathway to living-wage construction jobs. To advance this goal, the ordinance set a target that by 2025, at least 40% of all labor hours on covered construction projects must be performed by Priority Workers, defined as residents of economically distressed zip codes.[39] This goal helps create meaningful job opportunities and offset wage gaps among workers of color and women.[40]

To implement the program, the Director of Finance and Administrative Services negotiates a Community Workforce Agreement (CWA) for all covered projects.[41] This binding agreement, negotiated by the Director between the City, labor unions, and contractors, sets workforce goals and project terms. Under the CWA, contractors are required to meet specific hiring targets for hiring priority workers. These targets, which are outlined in bid documents, are based on past hiring performance on similar projects in the past three calendar years and are required to increase by at least two percentage points above that past performance.[42]

The program's success relies heavily on strategic partnerships. The City works closely with local community organizations and pre-apprenticeship programs to train and support workers, especially those from underrepresented groups. These organizations, which receive financial support from the City, serve as trusted outreach partners, connecting individuals to career pathways and offering wraparound support services that address barriers like transportation, childcare, and licensing issues. Priority Hire also collaborates with the City's Office of Sustainability & Environment to align workforce goals with climate action. By supporting climate goals in large-scale building projects, the program demonstrates how workforce equity and sustainability can reinforce one another.

Since its launch in 2015, Priority Hire has grown significantly. Originally limited to City-funded public construction projects, the program expanded in 2020 to include federally funded projects.

[38] *City of Seattle, Department of Finance & Administrative Services,* "Priority Hire." https://www.seattle.gov/purchasing-and-contracting/priority-hire#contractors
[39] Seattle Municipal Code, "Title 20, Planning and Development – Public Works, Utilities and other Infrastructure," https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT20PUWOIMPU_SUBTITLE_IIPUWO_CH20.37PRHI
[40] *City of Seattle, Department of Finance & Administrative Services,* "Prevailing Wage Brochure," https://www.seattle.gov/documents/Departments/FAS/PurchasingAndContracting/Labor/PH_Brochure.pdf
[41] Seattle Municipal Code, "Title 20." https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT20PUWOIMPU_SUBTITLE_IIPUWO_CH20.37PRHI
[42] Ibid.

This broader reach has allowed more workers to benefit from Priority Hire and has posited the program as a model for others. Agencies such as King County, Sound Transit, and Seattle Public Schools have all launched similar initiatives, contributing to a growing regional commitment to equitable workforce development.

By working with these partners, the City has built a more connected and resilient workforce. As of 2021, the program had supported 45 active or completed construction projects totaling over 7.2 million labor hours.[43]

Community Engagement and Equity

To make retraining and upskilling programs more effective, these programs must include strong community and workforce engagement. Workers should not feel blindsided or left behind by the energy transition. They need opportunities to help shape retraining programs so that they reflect real experiences, preferences, and barriers. State-level plans, such as retraining initiatives connected to climate action strategies, should include direct engagement with workers through internal briefings and invitations to participate in workforce strategy meetings, such as those held during the development of the 2025 Climate Action Strategy.

Engaging communities directly in workforce planning, feedback, and recruitment is also essential. Decision-making processes should be community-led, ensuring residents and local organizations have a voice in shaping programs that affect them. To achieve this, stakeholder meetings for future workforce initiatives should be designed for accessibility—offered both in-person and virtually, scheduled at varied times (including evenings and weekends), and hosted in locations across the state. Online surveys can further expand participation by reaching those unable to attend in person. Feedback opportunities should remain open for extended periods, be widely promoted through local partners and community networks, and be used strategically to engage key stakeholder groups, particularly those historically underrepresented in clean energy employment.

Case Study: Vineyard Power Cooperative

Vineyard Power is a community-based energy cooperative dedicated to leading the energy transition on Martha's Vineyard.[44] Representing all six municipalities on the island, the cooperative plays a critical role in advocating for responsible offshore wind development and

[43] *City of Seattle,* "Prevailing Wage Brochure," https://www.seattle.gov/documents/Departments/FAS/PurchasingAndContracting/Labor/PH_Brochure.pdf
[44] Vineyard Power Co-operative. "Vineyard Power." https://www.vineyardpower.org/

strengthening local energy resilience.[45] Its mission is to help the island achieve 100% renewable energy across electricity, transportation, and heating by 2040, a goal formally adopted by all six municipalities. **To support this vision, Vineyard Power engages the community through education, outreach, and personalized support.** A key part of this work is its network of Energy Coaches, local experts who work directly with community members to help them make informed decisions about home energy use, heating systems, and transportation options. The cooperative also supports policy change, advocating for legislation like the Community Empowerment Act, which would give municipalities greater authority to finance and develop local renewable energy projects.[46]

A key component of Vineyard Power's work is its partnership with Vineyard Wind, formalized in 2015 through the nation's first offshore Wind Community Benefits Agreement (CBA). **This agreement ensures that the economic and environmental benefits of offshore wind development remain within the community.** Vineyard Power continues to collaborate with Vineyard Wind to maximize local engagement and community benefit.

These strong partnerships also extend to workforce development. **Vineyard Power has helped establish a comprehensive education pipeline that spans from elementary school to adult learning**. For kids, this includes hands-on engaging programs like solar car building races and participation in national initiatives like the KidWind program, which introduces students to wind energy. Renewable energy topics are also being integrated into local school curricula, helping to build awareness and interest from an early age. At the adult level, Vineyard Power partners with organizations like Adult and Community Education Martha's Vineyard and Bristol Community College to offer offshore wind technician certification and other technical training opportunities. These efforts are creating clean career pathways that benefit the local community while also advancing energy goals. Through its partnerships, advocacy, and community-driven approach, Vineyard Power Cooperative is making important progress toward its goal of a 100% renewable Martha's Vineyard.

To achieve a just transition, Rhode Island must ensure that clean energy training opportunities are accessible to all residents, regardless of where they live. While overall training availability is relatively balanced statewide, gaps in access remain at the local levels—particularly in parts of Providence County, Newport county, and western communities. The state should work proactively to identify and address these gaps by mapping training access at the town and city level and expanding programs in underserved areas, including Woonsocket and Newport.

Community engagement should continue to serve as a direct bridge to opportunity—connecting residents with training programs, apprenticeships, and employment pathways in the

[45] Vineyard Power Co-operative. "Overview — Vineyard Power." https://www.vineyardpower.org/overview
[46] Vineyard Power Co-operative. "Community Partnership — Vineyard Wind." https://www.vineyardwind.com/community-partnership

clean energy sector. Partnering with local organizations and schools can help ensure that recruitment efforts reach diverse communities, and that Rhode Islanders are aware of, and prepared for, emerging clean energy careers.

Rhode Island's clean energy training ecosystem already demonstrates progress toward a more inclusive and accessible workforce system**.** Training providers across the state are expanding participation by offering programs in multiple languages, locating centers within environmental justice communities, and partnering with local organizations to reach diverse residents. Some programs also provide tailored support for formerly incarcerated individuals, recognizing the barriers that background checks can create. **Expanding efforts to compensate trainees from disadvantaged communities and adopting "train-the-trainer" models can further strengthen trust and opportunity within underrepresented groups. Ongoing collaboration among employers, community organizations, and training providers will be vital to ensuring that all Rhode Islanders can equitably share in the benefits of clean energy workforce growth.**

Increasing funding and programs for wraparound services are also fundamental to a just transition. These services, which can range from preparation services like resume help and interview prep to housing, transportation, and childcare support and stipends, ensure that workers facing barriers, as well as those in disadvantaged communities, have the opportunity to pursue training opportunities.

Case study: Breaktime in Boston MA

Breaktime is a non-profit organization dedicated to breaking the cycle of homelessness through employment among young adults ages 18 to 25. Through a multiphase structure that combines paid employment with comprehensive wraparound services, Breaktime equips participants with the tools they need to achieve long-term job placement and housing security.

The core of Breaktime's program is divided into three phases: Launchpad, Liftoff, and Stable Orbit. Launchpad is a three-week paid training phase where participants earn $1,000 while completing over 40 hours of workshops focused on professional development, personal growth, and financial literacy. Through sessions on resume building, communication, goal setting, and housing knowledge, participants begin developing the skills needed to succeed in the workforce.

Following Launchpad, participants enter Liftoff, a three-month paid job placement with one of Breaktime's mission-aligned workforce partners. Since its inception, the program has found trades are the most attractive for students and job mobility, with construction, HVAC and plumbing being a few of the more popular industries for placement. During Liftoff, participants earn $20 per hour for 20-30 hours per week while continuing to receive coaching and other support. Breaktime covers half of these wages, reducing the financial burden on small businesses and community organizations while investing directly in the growth of its

participants. This shared investment helps participants build meaningful work experience and often leads to permanent employment or further education.

While Liftoff aims to lead to long-term employment, Breaktime recognizes that the path to financial stability can vary. That's why the final phase of the program, Stable Orbit, provides long-term support for up to three years. In the first year, participants receive monthly check-ins with a Coordinator of Young Adult Services, credit coaching, and up to 40 hours of additional paid professional development. Then in years 2 and 3, support continues with quarterly check-ins and a $100 quarterly stipend, and referrals to housing, education, and healthcare resources. Whether participants secure full-time employment immediately or need time to find the right opportunity, Stable Orbit ensures they are supported in their progress.

To further promote financial stability, Breaktime's Matched Savings Program encourages consistent saving habits. Participants can set aside up to $75 from each weekly paycheck, and Breaktime matches every dollar saved. Upon completing Liftoff, participants receive an additional match, which allows them to save up to $3,000 in just three months. In moments of urgent need, participants also have access to the Breaktime Community Fund, a pool of resources designed to cover critical, unexpected expenses that could otherwise derail progress.

Through this comprehensive programming, young adults can earn up to $10,000 and receive over 50 hours of job training, which will prepare them for long-term success. The program's success is seen in that 89% of Breaktime alums are employed or in school, and 78% of Breaktime alumni are currently in stable housing.

A coordinated workforce strategy should align closely with Rhode Island's decarbonization plans and commitment to expanding access to opportunities to ensure the state's climate goals can be achieved through a well-prepared, locally rooted workforce. This strategy should be grounded in established just transition principles and build upon the foundational work of groups such as the GWAC. To be effective, the strategy must include a broad coalition of stakeholders, including industry partners, state agencies such as DLT and OER, and worker support organizations like Climate Jobs Rhode Island. Engagement with Black, Indigenous, and People of Color-led community organizations is also essential to ensure equity is embedded in all workforce development efforts. Industry leaders, such as offshore wind developers, should be viewed as critical participants, as their future projects have the potential to drive major employment opportunities and serve as a vehicle for advancing labor priorities in the state's clean energy transition.

Case Study: The Dry Bridge Solar Project

The Dry Bridge Solar Project in North Kingston represents a major milestone in Brown University's sustainability goals, along with large-scale renewable energy projects in Rhode Island. This project consists of four co-located solar installations situated on a 240-acre site that was once a gravel pit, making it one of the largest contiguous solar installations in the state. With a capacity of 40 megawatts AC, Dry Bridge is expected to generate about 66.8 million kilowatt-hours of clean energy annually.[47]

Getting the project permitted and approved required navigating Rhode Island's regulatory landscape, which includes 39 municipalities, which have their own permitting requirements. Fortunately, the site's industrial zoning in North Kingstown allowed the project to avoid rezoning hurdles, streamlining that part of the process. **Community support also played a key role in the project's success.** By repurposing a former industrial site, the project avoids disrupting neighborhoods or requiring large-scale deforestation. In fact, the transformation of the land has improved the quality of life for nearby residents, as the site now supports local biodiversity while producing clean energy.

Even with strong community support and favorable zoning, the project encountered significant challenges that delayed its timeline. Originally expected to be operational by 2022, it was delayed by years of regulatory hurdles, infrastructure demands, and interconnection complexities.[48] Coordinating the design and installation of major infrastructure proved especially difficult. For example, a new power substation had to be constructed near Wickford Junction, along with a dedicated 34.5kV feeder to handle the system's capacity. These developments required extensive coordination with Narragansett Electric and ISO-NE, particularly around complex voltage regulation considerations on the feeder. This process contributed to delays in the project timeline. At one stage, Distribution Adjustment Factor charges were proposed, that if implemented, would have significantly impacted the project's financial viability. While these charges were ultimately withdrawn, their **resolution involved a prolonged and collaborative effort among project partners, regulatory stakeholders, and utility representatives to ensure the project could proceed.**

Successfully overcoming these challenges has not only enabled the completion of Dry Bridge but also set a precedent for future large-scale renewable energy projects in Rhode Island. The impact of this project is substantial; Dry Bridge is expected to eliminate 16,500 metric tons of carbon dioxide emissions annually, which is the equivalent of removing 3,500 gas-powered vehicles from

[47] "With one of Rhode Island's Largest Solar Energy Projects Online, Brown Moves toward Net-Zero Emissions," *Brown University News*, November 20 2024.https://www.brown.edu/news/2024-11-20/dry-bridge.
[48] Tom Li and Julia Vaz, "University-Backed Solar Farm Receives Final Approval," *The Brown Daily Herald*, November 20, 2024. https://www.browndailyherald.com/article/2024/11/university-backed-solar-farm-receives-final-approval

the road.[49] These results support both Brown's climate goals as well as the State's, exemplifying private and public collaboration and ownership of climate goals.

[49] "With one of Rhode Island's Largest Solar Energy Projects Online," *Brown University News*. https://www.brown.edu/news/2024-11-20/dry-bridge

Appendix A: Modeling Methodology

Workforce Analysis

Summary of Input-Output Models

Input-output (I/O) modeling is used to generate employment estimates based on different investments or changes in a given economy over time. The research team will use two different I/O models, **IMPLAN** and the National Renewable Energy Laboratory's (NREL) **JEDI** (Jobs and Economic Development Impact) model software for this purpose. Input-output models illustrate the interdependent relationships between different sectors of a region's economy. Investments or activities in a given sector are used as inputs into the model to estimate the ripple or multiplier effect on business, household, and government expenditures and industry employment.

I/O models are static, and do not incorporate changes to labor and capital productivity over time. They are not dynamic models or equilibrium-seeking models and thus do not incorporate changes to prices due to changes in supply or demand given an economic event. I/O models like IMPLAN and JEDI rely on Social Accounting Matrix (SAM) which uses U.S. Bureau of Economic Analysis (BEA) data and state level economic agency data to track expenditures throughout the economy. Since there are no statistical analyses run in the research team's use of I/O modeling, there is unfortunately no margin of error to be calculated. However, uncertainty can be categorized into two main categories:

1. **Scenario uncertainty:** or uncertainty in assumptions about Rhode Island's energy future. This depends on the realization of the investments and energy activities on the timeline reported in the outputs of the energy system modeling.
2. **Model build uncertainty:** this uncertainty lies in the research teams' decisions on which IMPLAN industries or JEDI models best fit the activities and investments involved in the changes in each energy sub-sector. This relies on the researcher's expertise and understanding of both the energy technologies and the I/O modeling software. The research team seeks to avoid this uncertainty by leveraging decades of experience in the energy economy and I/O economic modeling.

I/O modeling outputs are broken down into direct, indirect, and induced impacts. **Direct effects** show the change in the economy associated with the initial economic activity. An example of a direct job would be a construction worker hired to work on the installation of a new high efficiency heat pump. **Indirect effects** include all the backward linkages or the supply chain responses resulting from the initial direct economic activity. An example of an indirect job added to the local economy would be a new worker at a fabrication company hired to handle the increased demand for construction equipment resulting from the initial investment. **Induced effects** refer to the effects of increased household spending and are the result of direct and indirect workers spending their wages within the local economy. An example of an induced job would be a local restaurant

hiring more staff because construction workers during the construction phase have new disposable income and eat at this local restaurant.

IMPLAN runs user input investment into one or more of IMPLAN's industry codes in a specific region through regional data, mapping economic interactions between industries, households, and governments to estimate job creation associated with the investment. [50] JEDI estimates job creation by running user input of project location facility size and year of construction, in combination with the built-in model defaults and economic multipliers.[51]

Sector Framework

The technical analysis will estimate employment across Rhode Island's Electricity, Fuels, Buildings, and Transportation sectors. Employment outputs do not extend to parts of the employment supply chain that are not connected to the four primary sectors. The Electricity, Fuels, Buildings, and Transportation sectors are further broken down into the following 27 sub-sectors:

I. Electricity
    1. Distributed Solar
    2. Utility Solar
    3. Offshore Wind
    4. Land-based Wind
    5. Hydropower
    6. Other Renewable Generation (biomass, hydrogen, geothermal)
    7. Distribution (local power lines and local smart grid)
    8. Transmission (regional transmission hub)
    9. Storage (batteries, flywheels, thermal energy, pumped hydro)
    10. Natural Gas Generation
    11. Other Fossil Generation (coal, oil, and other fossil fuel burning plants)
    12. Nuclear

II. Fuels
    1. Hydrogen
    2. Biofuels (ethanol, bio-gasification, biomass fast pyrolysis)
    3. Natural Gas
    4. Natural Gas Distribution (natural gas pipelines, liquid natural gas trucks and tankers)
    5. Other Fossil Fuels (oil and gas, coal, kerosene)

III. Buildings

[50] For more information on IMPLAN and its data sources, see https://support.implan.com/hc/en-us/articles/360038285254-How-IMPLAN-Works.

[51] While users have the option of inputting project-specific data (i.e., construction costs, equipment costs, annual operating and maintenance costs, financing parameters, etc.), JEDI provides default values (i.e., "average costs and spending patterns developed from a number of sources") for these categories if nothing is inputted by the user. These inputs are then run through the JEDI multipliers, which are derived from IMPLAN. For more information on the data used in the JEDI model, see https://www.nrel.gov/analysis/jedi/using-data.html.

1. Commercial HVAC (pipes, sheet metal, air conditioning)
2. Commercial Other (lighting fixtures, water heating, cooking appliances)
3. Residential HVAC (sheet metal, air conditioning and heating)
4. Residential Shell (paintings, coatings, insulation, windows, and doors)
5. Residential Other (laundry, refrigerators, lighting fixtures, water heaters, cooking appliances, and other household appliances)

IV. Transportation

1. Vehicle Manufacturing (electric vehicles, conventional vehicles, and dual-use technologies)
2. Wholesale Trade Parts (wholesale of vehicle components)
3. Charging Stations (manufacturing, installation, and maintenance)
4. Vehicle Maintenance
5. Conventional Fueling Stations (fossil fuel fueling stations)

Initial Employment Output Methodology

The Initial Employment Outputs (IEOs) estimate the quantity of jobs by value chain in the baseline year (2023) and then in five-year increments, in 2025, 2030, 2035, 2040, 2045, and 2050. The value chain details the industry area in which direct and indirect jobs are employed, which include Construction, Manufacturing, Professional Services, Other Supply Chain,[52] and Induced employment.[53] IEOs are provided for each sub-sector and scenario and are reported at the state level.

The IEOs generated for this analysis follow the same general methodological approach across the four primary sectors, with the most relevant tools and data sources based on what is appropriate for each sub-sector. Assumptions made within specific sub-sectors vary due to the nature of the different activities, however the general structure remains consistent. The IEO methodology follows six steps:

1. Initially, the research team determines the unit inputs for the model. Unit inputs typically come from the outputs from the upstream Pathways, PLEXOS, and electric cost-of-service models (see Rhode Island Climate Action Strategy for description of full modeling workflow and these models), and take the form of device stocks and sales, MW of electric capacity, and fuel demand over time.
    i. **Example:** For the Storage sub-sector within the Electricity sector, the research team will use storage cost data from PLEXOS outputs.

2. Next, the research team determines the total investments associated with the unit inputs described in Step 1 above. Investment inputs come from the Pathways, PLEXOS, and electric

[52] The Other Supply Chain value chain includes utilities, wholesale trade, repair and maintenance, etc.
[53] While induced employment is broken out into its own category, the Construction, Manufacturing, Professional Services, and Other Supply Chain value chains include both direct and indirect employment.

cost-of-service model outputs where provided from upstream modeling, and additional investments are developed based on secondary sources where needed. For more information on additional input into each sector, see Inputs and Assumptions by Sector.

   i. **Example:** For the Storage sub-sector, the research team will aggregate the storage cost data from the PLEXOS outputs to find total investment for each of the study years.

3. Next, the research team processes the investment data to reduce inter-annual variation as needed.

4. Next, the research team allocates the processed investment data into the relevant industry categories based on the activities associated with the investments by using technical cost data from secondary sources.
   i. **Example:** For the Storage sub-sector, the research team will allocate investment into IMPLAN code 52 - Construction of new power and communication structures. The research team will use technical cost data from NREL's U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020[54] report to create a custom spending pattern within IMPLAN code 52.[55]

5. Next, the research team applies IMPLAN/JEDI industry employment multipliers based on the allocation described in Step 4 to calculate employment outputs.
   i. **Example:** For the Storage sub-sector, the research team runs $1 million of investment into IMPLAN code 52 - Construction of new power and communication structure to find the employment supported per $1 million of investment. These are then multiplied by the investment values for each year (in millions of dollars) from Pathways, PLEXOS, and electric cost-of-service models to estimate employment outputs for each year.

6. Finally, employment outputs are reported by industry category (Construction, Professional Services, Manufacturing, Other Supply Chain, and Induced). The 2023 baseline employment is derived from the 2024 United States Energy and Employment Report (USEER) unless otherwise stated.

Secondary Employment Output Methodology

The Secondary Employment Output (SEO) estimates translate the direct and indirect employment[56] estimated generated by the IEOs into occupational outputs, illustrating how jobs would change by

[54] U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020. National Renewable Energy Laboratory. https://www.nrel.gov/docs/fy21osti/77324.pdf.
[55] Custom spending patterns allow the team to customize IMPLAN codes to better fit the investment being modeled. For example, IMPLAN code 52 covers the construction of new power and communications structures, but the team uses storage cost data from NREL to change the default allocation of spending to different commodities to an allocation specific to storage technologies.
[56] SEO estimates do not include induced employment.

occupation and wage distribution across the region. SEOs are presented for the baseline year (2023) and 2035 by detailed occupations for each sub-sector.

The methodology for conversion of IEO data to SEO outputs includes three steps and both primary (2024 USEER) and secondary (IMPLAN, BLS,[57] OEWS,[58] etc.) data sources. The steps are as follows:

1. Complete a crosswalk of IMPLAN industry categories to 6-digit North American Industry Classification System (NAICS) codes for each of the sub-sectors by each of the value chain categories as defined in the IEOs:
    a. Construction
    b. Professional services
    c. Manufacturing
    d. Other supply chain

2. Run direct and indirect employment from IEOs through proprietary staffing patterns (NAICS to SOC[59]) for each of the value chain categories within each sub-sector for 2023 and 2035. SEO outputs include employment estimates by SOC code and total estimated employment by detailed occupations and aggregated occupational categories in 2023 and 2035 for each of the sub-sectors.

3. Using finalized staffing patterns and proportional employment within sub-sector and value chain categories, wages provided by the BLS OEWS data series are grouped into three tiers: Tier 1, or above a sustaining wage; Tier 2, or at a sustaining wage; and Tier 3, or below a sustaining wage.[60] Proportional employment by wage tier is presented for 2023 and 2035 using 2023 dollars.

LIDAC Analysis

BW Research uses the EPA tool BenMAP-CE (Environmental Benefits Mapping and Analysis Program - Community Edition) to quantify the economic benefits accruing to LIDACs under the modeled Act on Climate scenario. BW Research uses the Rhode Island Department of Environmental Management's (DEM) Environmental Justic Focus Area as the definition for LIDAC and impacts of this modeling will be reported for this region as a whole.[61] BW Research then uses the population proportions of LIDAC census tracts within each county to apportion health and economic impacts to the LIDAC region. These allocations were then applied to the air quality benefits results from the COBRA model (see Technical Appendices for overall health benefits methodology).

[57] Bureau of Labor Statistics
[58] Occupational Employment and Wage Statistics (OEWS)
[59] Standard Occupational Classification (SOC) system is used to classify occupations. Read more: https://www.bls.gov/soc/
[60] Wage tiers are determined using MIT's Living Wage Calculator: https://livingwage.mit.edu/
[61] https://dem.ri.gov/sites/g/files/xkgbur861/files/2023-09/ridem-environmental-justice-policy_0.pdf

Inputs and Assumptions by Sector

The following data sources and assumptions will be used in the modeling of each of the four primary sectors, subject to change based on the availability of data from the upstream Pathways, PLEXOS, and electric cost-of-service models.

Electricity

Solar PV & Storage

Solar PV and storage use

- Cost data for each relevant technology from the Pathways model outputs
- Technical cost data from NREL's U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020[62]

Hydropower

The hydropower sub-sector uses

- Hydropower capacity data from the PLEXOS model outputs2023 baseline employment derived from the 2024 USEER

Transmission & Distribution

The transmission and distribution sub-sectors use

- Transmission and distribution investments from the electric cost-of-service model outputs
- Grid electricity demand data from the Pathways model outputs
- 2023 baseline employment derived from the 2024 USEER

Offshore & Land-based Wind

The offshore and onshore wind sub-sectors use

- Installed capacity from the PLEXOS model
- 2023 baseline employment derived from the 2024 USEER

Natural Gas Generation & Other Fossil Generation

The natural gas generation and other fossil generation sub-sectors use

[62] U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020. National Renewable Energy Laboratory. https://www.nrel.gov/docs/fy21osti/77324.pdf.

- Capacity data from the PLEXOS model outputs
- 2023 baseline employment derived from the 2024 USEER

Other Renewable Generation (Biomass, Hydrogen, Geothermal)

The other renewable generation sub-sectors use

- Biomass, Hydrogen, and Geothermal generation capacity data from the PLEXOS model outputs
- 2023 baseline employment data derived from the 2024 USEER

Nuclear

The nuclear sub-sector uses

- Nuclear capacity data from the PLEXOS model outputs
- 2023 baseline employment data derived from the 2024 USEER

Fuels

Biofuels

For the biofuels sub-sector, the research team uses fuel cost data by relevant fuel type from the Pathways model as input. The research team derives 2024 baseline employment from the 2024 USEER. The research team uses technical cost data from NREL's Biorefinery JEDI model.

Hydrogen Fuels

For the hydrogen fuels sub-sector, the research team uses fuel cost data by relevant fuel type from the Pathways model as input. The research team assumes 2024 baseline employment is zero. The research team uses technical cost data from the US DOE's Hydrogen, Fuel Cells, and Infrastructure Technologies program.

Natural Gas & Other Fossil Fuels

For the natural gas and other fossil fuels sub-sectors, the research team uses fuel demand data by relevant fuel type from the Pathways model as input. The research team scales 2024 baseline USEER employment data proportionately over time based on energy demand from the Pathways model.

Natural Gas Distribution

For the natural gas distribution sub-sector, the research team uses natural gas demand data from the Pathways model as a proxy measure for customer loss, which is then used to scale baseline employment over time. The research team incorporates an employment elasticity metric calculated using data from *Davis and Hausman, 2022*, that details the average operational expenditures at a natural gas distribution company by activity (e.g., administrative, repair and maintenance) and the portion of those expenditures that leave with the customer when they disconnect from gas service. [63] The research team calculates ~41 percent of total operational expenditures leave with the customer, meaning 41 percent of every decrease in pipeline gas demand results in natural gas distribution employment displacement, the other 59 percent remains unchanged. The research team derives baseline 2024 employment in natural gas distribution from the 2024 USEER.

Buildings

The buildings sub-sectors use cost data by relevant building technology from the Pathways model and 2023 baseline employment from the 2024 USEER. The Buildings sector does not include a Commercial Shell sub-sector due to lack of input data.

Transportation

Vehicle Manufacturing

The vehicle manufacturing sub-sector uses

- Vehicle sales by vehicle type data from the Pathways model

To estimate employment for the vehicle manufacturing sub-sector, the research team scales baseline employment from the 2024 USEER by projected vehicle sales data provided by the Pathways model outputs. This approach assumes that vehicle manufacturing employment grows or declines proportionally with sales of the vehicle types served by each manufacturing sector. In applying this approach, the research team distinguishes between vehicle manufacturing related to conventional vehicles, manufacturing related to alternative vehicles, and vehicle manufacturing that is common to both conventional and alternative vehicles.

[63] Lucas W. Davis and Catherine Hausman. *Journal of the Association of Environmental and Resource Economists*, volume 9, number 6, November 2022. https://doi.org/10.1086/719793. https://faculty.haas.berkeley.edu/ldavis/Davis%20and%20Hausman%202022%20JAERE.pdf

In addition, the research team distinguishes between employment related to vehicles sold in the Rhode Island market and employment related to vehicles sold outside the Rhode Island market. The research team assumes that the former scales with Rhode Island vehicle sales and that the latter remains constant over time.

Vehicle Maintenance

The vehicle maintenance sub-sector uses

- Vehicle miles traveled (VMT) by vehicle type data from the Pathways model
- Vehicle maintenance cost per mile by vehicle type data from Argonne National Laboratory[64] and *Propfe et al.*, published by the International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium.[65]

The research team's assessment of employment related to vehicle maintenance reflects differences between the maintenance requirements of alternative vehicles and the maintenance requirements for conventional vehicles. Information on maintenance costs per mile by vehicle type and component category (e.g., engine, braking system, transmission, etc.) were obtained from Argonne National Laboratory and research published at the International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium. The research team calculates total maintenance costs using estimated maintenance costs per mile and projected vehicle miles traveled by vehicle type from the Pathways model. Next, the research team adjusts baseline employment (obtained from the 2024 USEER) by changes in total maintenance expenditures over time to reflect changing needs for maintenance labor.

Wholesale Trade Parts

The wholesale trade parts sub-sector uses

- Vehicle stock data from the Pathways model

The research team estimates changes in employment related to wholesale trade for vehicle parts based on projected changes in the vehicle stock over time. As a starting point for the analysis, the research team obtains baseline employment data from the 2024 USEER. The research team also distinguishes between wholesale employment serving the Rhode Island market and employment serving other markets. To project changes in employment over time, the research team scales

[64] Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains. https://publications.anl.gov/anlpubs/2021/05/167399.pdf
[65] Cost analysis of Plug-in Hybrid Electric Vehicles including Maintenance & Repair Costs and Resale Values. EVS26 International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium. https://elib.dlr.de/75697/1/EVS26_Propfe_final.pdf.

wholesale employment serving the Rhode Island market based on projected changes in Rhode Island's vehicle stocks over time, as obtained from the Pathways model outputs. The research team assumes no change in employment serving non- Rhode Island market and assumes the same employment requirements across vehicle technologies.

Fueling Stations

The fueling stations sub-sector uses

- Transportation sector fuel demand by fuel type data from the Pathways model
- Baseline employment at fueling stations (for fueling stations with and without convenience stores) from BLS data

The research team estimates changes in fueling station employment based on projected changes in fossil fuel and biofuel consumption by the Transportation sector over time. For this segment of the fueling station market, the research team assumes that baseline employment scales proportionately with projected changes in fossil fuel and biofuel consumption over time, based on fuel consumption estimates from the Pathways model. For fueling stations with convenience stores, the research team estimates that 61 percent of revenues are related to fuel sales, based on research from the National Association of Convenience Stores.[66] The other 39 percent of employment for these fueling stations is assumed to remain unchanged over time.

For fueling stations without gas stations, the research team scales all baseline employment with projected changes in fossil fuel and biofuel consumption over time. The research team assumes no gas stations transition to charging stations, which yields a high-end estimate of potential job reductions; to the extent that fueling stations are able to convert to electric charging stations, a portion of the projected employment losses may be mitigated. Additionally, this analysis scales employment proportionally with fuel consumption, without consideration of the need for a threshold level of fueling stations to support fossil fuel vehicles. In reality, fueling stations may experience employment losses at a different rate than decreases in fuel consumption – e.g., at a lower rate in the initial years in order to provide continued support to fossil fuel vehicles, and at a greater rate after a critical threshold of transition to electric vehicles.

Charging Stations

The charging stations sub-sector uses:

- EV charger cost data from the Pathways model

[66] Growth Interrupted. National Association of Convenience Stores. https://www.nacsmagazine.com/issues/june-2020/growth-interrupted#:~:text=Fuel%20sales%20accounted%20for%2061.1,cents%20per%20gallon%20in%202018).

- Electric vehicle charging infrastructure equipment and installation cost data from the International Council on Clean Transportation[67]
- Electric vehicle charging station annual maintenance cost data from the Department of Energy's Alternative Fuels Data Center[68]

The research team assumes medium-duty and heavy-duty vehicles exclusively use DC fast chargers, light-duty vehicles use both DCFC and Level 2 chargers equally, and 100 percent of maintenance and installation labor is in-state.

[67] Estimating electric vehicle charging infrastructure costs across major U.S. metropolitan areas. The International Council on Clean Transportation. https://theicct.org/wp-content/uploads/2021/06/ICCT_EV_Charging_Cost_20190813.pdf.
[68] Operation and Maintenance for Electric Vehicle Charging Infrastructure. U.S. Department of Energy Alternative Fuels Data Center. https://afdc.energy.gov/fuels/electricity-infrastructure-maintenance-and-operation#:~:text=While%20actual%20maintenance%20costs%20vary,for%20an%20additional%20annual%20fee.

Appendix B: Surveys

Worker Survey

Introduction

This survey is being conducted by BW Research, an independent research organization, under a contract with the **Rhode Island Office of Energy Resources (OER)**. We are conducting a statewide survey to understand the interests and preferences of **workers in clean energy**.

Your individual responses will **not** be published; only aggregated information will be used in reporting the survey results.

The survey should take approximately 15 minutes of your time. Your participation will help determine priorities and investments to support and train workers in the clean energy industry.

Screener Questions

1. In which state do you currently live?

RANDOMIZE

30.3%	**Massachusetts**
22.2%	**Rhode Island**
17.3%	**New Jersey**
15.1%	**New York**
10.3%	**Connecticut**
2.2%	**Pennsylvania**
1.1%	**New Hampshire**
1.1%	**Vermont**
0.5%	**Maine**
0.0%	**None of the above**

2. In what year were you born?

0.0%	**Less than 18 years old**
9.2%	**18 to 24 years old**
27.6%	**25 to 34 years old**
40.5%	**35 to 44 years old**
17.8%	**45 to 54 years old**
3.8%	**55 to 64 years old**
1.1%	**65 years and over**

3. Do you work in Rhode Island?

100.0%	**Yes**

0.0% No

4. Do you currently have a job?

94.1% Yes, full-time

5.9% Yes, part-time

0.0% No, I do not work

0.0% Don't know/ Refused

5. Does your job include any work related to clean energy, which includes **energy efficiency** (including installation of LED lighting, insulation, high efficiency heating and cooling systems, energy efficient buildings, etc.), **renewable energy** (including solar, wind, geothermal, biofuels, etc.), **storage** (including batteries, mechanical, and pumped hydro), **clean grid** (including grid modernization), and **electric or other alternative transportation** (including electric vehicles, hybrids, and hydrogen vehicles)*?*

71.9% Yes, all of my work is related to clean energy

25.9% Yes, a majority of my work is related to clean energy

2.2% Yes, less than half of my work is related to clean energy

0.0% No

0.0% Don't know/ Refused

6. What is your occupation?

Coding in progress

7. How many hours do you work in a typical week?

3.7% Less than 10 hours a week

3.0% 10 to 19 hours a week

7.3% 20 to 29 hours a week

68.3% 30 to 40 hours a week

17.1% Over 40 hours a week

0.6% Don't know/ Refused

8. Which industry below best describes your work activities as they relate to clean energy?

33.5% Construction, installation, or repair

24.3% Manufacturing

17.3% Professional services (incl. finance, legal, consulting, and engineering services)

14.6% Research and development

4.9% Retail sales

3.2% Wholesale trade and distribution

2.2% Other (please specify)

9. Which of the following technologies do you work with? [MULTIPLE CHOICE – SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*.

[IF NEEDED: If your work is involved in energy research or professional services for the industry, please select the options that are most relevant for your organization.]

69.2% Energy Efficiency Including Heating, Cooling and Building Envelope

49.2% Electric Power Transmission and Distribution & Grid Modernization

43.8% Energy Storage (batteries, pumped hydro, etc.)

43.2% Electric Power Generation

41.6% Alternative Transportation (including electric vehicle charging stations and batteries)

40.0% Clean Fuels (biofuels and woody biomass)

1.6% Other

0.0% None of the above

IF Q9 COUNT GREATER THAN 1, ASK Q10

10. Which do you consider your **primary** technology focus, based on the majority of your labor hours? (n=145)

45.5% **Energy Efficiency Including Heating, Cooling and Building Envelope**

15.2% **Clean Fuels (biofuels and woody biomass)**

13.8% **Alternative Transportation (including electric vehicle charging stations and batteries)**

11.7% **Electric Power Generation**

10.3% **Electric Power Transmission and Distribution & Grid Modernization**

3.4% **Energy Storage (batteries, pumped hydro, etc.)**

0.0% **Other**

Q10PRIME

45.9% **Energy Efficiency Including Heating, Cooling and Building Envelope**

14.6% **Clean Fuels (biofuels and woody biomass)**

11.9% **Alternative Transportation (including electric vehicle charging stations and batteries)**

10.8% **Electric Power Transmission and Distribution & Grid Modernization**

10.3% **Electric Power Generation**

5.4% **Energy Storage (batteries, pumped hydro, etc.)**

1.1% **Other**

11. Please tell us which type of sub-technology you most closely work with:

A. Electric Power Generation (IF Q9= "Electric Power Generation") (n=19)

[RANDOMIZE]

36.8% **Land-based Wind Generation**

31.6% **Solar Electric Generation**

15.8% **Bioenergy/Biomass Generation**

10.5% **Offshore Wind Generation**

5.3% Geothermal Generation

0.0% Low-Impact Hydroelectric Generation, including Wave/Kinetic Generation

0.0% Other Generation

B. Electric Power Transmission and Distribution (IF Q9= "Electric Power Transmission and Distribution") (n=20)

[RANDOMIZE]

90.0% Smart Grid

5.0% Micro Grids

5.0% Other Grid Modernization

0.0% Other

C. Energy Storage (IF Q9= "Energy Storage") (n=10)

[RANDOMIZE]

40.0% Battery storage, including electric vehicle batteries

30.0% Thermal storage

20.0% Mechanical storage (flywheels, compressed air energy storage, etc.)

10.0% Pumped hydro-power storage

0.0% Other

D. Energy Efficiency, Including Heating, Cooling and Building Envelope (IF Q9= "Energy Efficiency") (n=85)

[RANDOMIZE]

43.5%	**High-Efficiency Heating, Ventilation, and Cooling (HVAC), and/or air-source and ground-source heat pumps**
17.6%	**Renewable Heating and Cooling**
15.3%	**Advanced Building Materials/Insulation**
14.1%	**ENERGY STAR® Certified Appliances & Efficient lighting (not including HVAC)**
9.4%	**Traditional HVAC goods, control systems, and services**
0.0%	**Other**

E. Clean Fuels (IF Q9= "Clean Fuels") (n=27)

[RANDOMIZE]

55.6%	**Woody Biomass/Cellulosic Biofuel**
33.3%	**Other Ethanol/Non-Woody Biomass**
7.4%	**Other Biofuels**
3.7%	**Other**

F. Alternative Transportation, Including Motor Vehicles (IF Q9= "Alternative Transportation) (n=22)

[RANDOMIZE]

63.6%	**Hybrid Electric Vehicles**
22.7%	**Electric Vehicles**
9.1%	**Electric Vehicle Charging Stations**
4.5%	**Fuel Cell Vehicles**

0.0% **Gasoline and Diesel Motor Vehicles (excluding freight transport)**

0.0% **Plug-In Hybrid Vehicles**

0.0% **Natural Gas Vehicles**

0.0% **Hydrogen Vehicles**

0.0% **Other**

[ASK Q12 if **Q9**= "Energy Efficiency"]

12. Which does your business primarily work on? (n=128)

32.0% **Single Family Residential Buildings**

28.9% **Multi-Family Residential Buildings**

39.1% **Commercial/ Industrial Buildings**

0.0% **Other**

Part 1. Education & Experience Profile

13. What is your highest level of education?

25.4%	**High school diploma or less**
11.9%	**Associate's degree**
27.0%	**Bachelor's degree**
35.7%	**Master's degree or higher**
0.0%	**Don't know/ Refused**

14. During your education, did you attend a career or vocational school (also known as a technical or trade school) for a period longer than six months?

69.7%	**Yes**
29.7%	**No**
0.5%	**Don't know/ Refused**

15. Do you have or are you currently working towards professional licenses or certifications?

35.7%	**Yes, I have a license or certification (please specify) – *coding in progress***
8.6%	**Yes, I am working towards a license or certification**
39.5%	**No**
16.2%	**Don't know/ Refused**

[Ask Q16 if Q15 = "Yes, I have a license or certification" or "Yes, I am working towards a license or certification"]

16. Is this license or certification required or preferred by your employer? (n=86)

60.5%	**Yes, it is required**
32.6%	**Yes, it is preferred**

7.0% **No, the license or certification is neither required nor preferred**

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

17. Are you a member of a union?

47.0% **Yes**

50.3% **No**

2.7% **Don't know/ Refused**

18. How many years have you been working in your current job or position?

3.8% **Less than Two years**

12.4% **Two to Four years**

30.3% **Five to Nine years**

31.4% **Ten to Twenty-Four years**

4.3% **Twenty-Five years and over**

17.8% **Don't know/ Refused**

19. How many years of *related* work experience did you have prior to getting your current job?

3.2% **None**

11.4% **Less than a year**

38.9% **One to five years**

30.8% **More than five years but less than ten**

15.7% **More than ten years**

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

Part 2. Compensation & Benefits

19. What was your starting wage or salary in your current position?

16.2%	**$24,999 or less**
15.7%	**$25,000 to $49,999**
20.0%	**$50,000 to $74,999**
12.4%	**$75,000 to $99,999**
8.6%	**$100,000 to $149,999**
4.9%	**$150,000 and over**
22.2%	**Don't know/ Refused**

20. What is your current wage or salary? Please exclude any overtime wages.

10.3%	**$24,999 or less**
8.6%	**$25,000 to $49,999**
20.0%	**$50,000 to $74,999**
15.1%	**$75,000 to $99,999**
11.9%	**$100,000 to $149,999**
7.6%	**$150,000 and over**
26.5%	**Don't know/ Refused**

[IF SCREENER Q7> 40, ASK Q21, OTHERWISE SKIP]

21. What is your current wage or salary, including overtime? (n=50)

6.0%	**$24,999 or less**
2.0%	**$25,000 to $49,999**
14.0%	**$50,000 to $74,999**
18.0%	**$75,000 to $99,999**

6.0% **$100,000 to $149,999**

14.0% **$150,000 and over**

40.0% **Don't know/ Refused**

22. Does your employer pay healthcare benefits through work?

62.2% **Yes, my company pays for all of my health insurance**

34.6% **Yes, my company pays for part of my health insurance**

2.7% **No, my company does not contribute to my health insurance**

0.5% **Don't know/ Refused**

23. Do you receive any retirement benefits through work?

42.2% **Yes, I have a retirement account with no employer match**

48.6% **Yes, I have a retirement account with employer match**

0.5% **Yes, I receive other retirement benefits**

8.6% **No**

24. Does your employer provide any of the following additional benefits? [MULTIPLE CHOICE – SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*.

63.2% **Flexible work schedule/ hours**

47.6% **Company vehicle**

46.5% **Transportation stipend**

40.5% **Ability to work from home**

40.5% **Tuition support (paying for continued education or student loans)**

0.0% **Other**

3.8% **None of the above**

1.1% **Don't know/ Refused**

Part 3. Career Satisfaction & Attraction

25. How satisfied are you currently with your career?

55.1%	**Very satisfied**
40.0%	**Somewhat satisfied**
3.8%	**Neither satisfied nor unsatisfied**
1.1%	**Somewhat unsatisfied**
0.0%	**Very unsatisfied**
0.0%	**Don't know/ Refused**

26. Please select the **two** factors that were most important in attracting you to your job: - *Multiple responses permitted; percentages may sum to more than 100%*.

55.1%	**Opportunity to work in clean energy**
48.1%	**Wages and/or benefits**
43.2%	**Opportunity for advancement**
27.0%	**The type of work**
9.2%	**Attainable education or certification**
0.5%	**Other**
0.0%	**Don't know/ Refused**

Part 4. Barriers and Advancement

27. Please tell us if each of the factors below were barriers to **your entry into your current career.**

RANDOMIZE

	Strong Barrier	Somewhat of a Barrier	Not at all a Barrier	Not Applicable	Don't know/ Refused
A. Getting the academic degree and/or certification needed	**20.5%**	**36.8%**	**33.5%**	**8.6%**	**0.5%**
B. Finding employment opportunities that are near where I live or am willing to live	**18.9%**	**34.6%**	**37.8%**	**7.6%**	**1.1%**
C. Finding training opportunities that are near where I live or am willing to live	**20.0%**	**35.7%**	**34.1%**	**8.6%**	**1.6%**
D. English is not my native language	**15.7%**	**21.6%**	**36.2%**	**25.4%**	**1.1%**
E. Lack of career guidance/ mentorship	**19.5%**	**33.0%**	**36.8%**	**9.7%**	**1.1%**
F. Communicating effectively with employers and hiring managers	**20.5%**	**28.1%**	**41.6%**	**8.1%**	**1.6%**
G. Lack of basic information about energy careers early in my education	**20.5%**	**31.4%**	**38.4%**	**8.6%**	**1.1%**
H. Cost of required training or education	**25.4%**	**31.4%**	**34.1%**	**9.2%**	**0.0%**
I. Access to affordable childcare	**22.2%**	**30.8%**	**32.4%**	**13.0%**	**1.6%**
J. Overcoming prejudice or bias in the workplace	**23.8%**	**32.4%**	**31.9%**	**9.7%**	**2.2%**
K. Developing resumes and related materials that demonstrate my qualifications	**21.6%**	**31.4%**	**37.3%**	**8.1%**	**1.6%**
L. Having the free time needed to focus on my career goals	**20.5%**	**34.6%**	**36.8%**	**7.6%**	**0.5%**
M. Transportation to and from my work or training	**22.2%**	**32.4%**	**37.3%**	**7.0%**	**1.1%**

28. What is the next step or promotion that you see for your career?

63.2% Advancing positions within my current company

21.6% Advancing positions at another company in the same industry

0.0% Advancing positions in another industry/ field

0.0% Remaining in my current position but moving to another industry/ field

2.7% Starting my own business

4.9% No advancement

7.6% Don't know/ Refused

[IF Q28 = "Advancing positions within my current company" OR "Advancing positions at another company in the same industry" OR "Advancing positions in another industry/ field", ASK Q29 OTHERWISE SKIP]

29. Please tell us if each of the factors below are a barrier to **advancement in your current career.** (n=157)

RANDOMIZE

	Strong Barrier	Somewhat of a Barrier	Not at all a Barrier	Not Applicable	Don't know/ Refused
A. Getting the academic degree and/or certification needed	**23.6%**	**28.7%**	**33.1%**	**12.1%**	**2.5%**
B. Finding employment opportunities that are near where I live or am willing to live	**21.0%**	**31.2%**	**35.7%**	**10.2%**	**1.9%**
C. Finding training opportunities that are near where I live or am willing to live	**21.7%**	**29.9%**	**33.1%**	**14.0%**	**1.3%**
D. English is not my native language	**16.6%**	**20.4%**	**36.9%**	**24.2%**	**1.9%**
E. Lack of career guidance/ mentorship	**22.3%**	**31.8%**	**34.4%**	**9.6%**	**1.9%**
F. Communicating effectively with employers and hiring managers	**24.2%**	**27.4%**	**37.6%**	**8.9%**	**1.9%**
G. Lack of basic information about energy careers early in my education	**17.8%**	**35.0%**	**36.3%**	**10.2%**	**0.6%**
H. Cost of required training or education	**23.6%**	**28.7%**	**37.6%**	**8.9%**	**1.3%**
I. Access to affordable childcare	**17.8%**	**24.8%**	**46.5%**	**8.9%**	**1.9%**
J. Overcoming prejudice or bias in the workplace	**14.0%**	**33.1%**	**42.7%**	**10.2%**	**0.0%**
K. Developing resumes and related materials that demonstrate my qualifications	**21.7%**	**35.0%**	**31.2%**	**9.6%**	**2.5%**
L. Having the free time needed to focus on my career goals	**17.8%**	**38.2%**	**34.4%**	**9.6%**	**0.0%**
M. Transportation to and from my work or training	**19.1%**	**31.2%**	**38.9%**	**8.3%**	**2.5%**

Part 5. Career Navigation

30. When searching for your current job, how often did you use the following resources?

RANDOMIZE

	Always	Often	Sometimes	Never	Don't know/ Refused
A. LinkedIn	**26.5%**	**29.2%**	**30.8%**	**10.8%**	**2.7%**
B. Social Media (Facebook, Instagram, etc.)	**27.6%**	**33.5%**	**26.5%**	**11.4%**	**1.1%**
C. Headhunter	**18.4%**	**28.1%**	**30.3%**	**18.4%**	**4.9%**
D. Staffing Agency	**22.2%**	**31.4%**	**34.6%**	**9.7%**	**2.2%**
E. Online job sites (Indeed, Monster, CareerBuilder)	**29.2%**	**35.7%**	**23.8%**	**10.3%**	**1.1%**
F. Word of mouth	**21.1%**	**33.0%**	**33.5%**	**10.3%**	**2.2%**
G. Apprenticeships and related union training programs	**22.2%**	**38.4%**	**21.1%**	**17.8%**	**0.5%**
H. Applying for an internship program	**25.4%**	**27.0%**	**26.5%**	**18.9%**	**2.2%**
I. Employer/company websites	**29.7%**	**36.2%**	**26.5%**	**7.0%**	**0.5%**
J. Back to Work Rhode Island	**23.8%**	**31.4%**	**29.7%**	**13.5%**	**1.6%**
K. Working directly with educational institutions and training providers	**23.2%**	**32.4%**	**29.7%**	**13.5%**	**1.1%**

31. Have you used any career navigation tools to find employment in the clean energy industry?

7.0% **Yes**

70.8% **No**

22.2% **Don't know/ Refused**

32. Did you participate in any of the following programs to support entrance into your current occupation?

RANDOMIZE

	Yes	No	Don't know/ Refused
A. Apprenticeship program	**54.1%**	**38.4%**	**7.6%**
B. Internship program	**59.5%**	**34.6%**	**5.9%**

C. Mentorship program	**59.5%**	**34.6%**	**5.9%**

ASK Q33 IF Q32 a, b, OR c = "Yes", OTHERWISE SKIP

33. How effective were the apprenticeship, internship, or mentorship programs in preparing you for your current role?

48.1% **Very effective**

42.3% **Somewhat effective**

9.6% **Neither effective nor ineffective**

0.0% **Somewhat ineffective**

0.0% **Very ineffective**

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

Part 5. Closing & Demographics

34. Please select your gender.

70.3%	**Male**
29.7%	**Female**
0.0%	**Gender Non-Binary**
0.0%	**Other**

35. Are you Hispanic or Latino/a/x?

23.2%	**Yes**
76.8%	**No**

36. Which of the following best describes your race?

74.6%	**White**
17.8%	**Black or African American**
2.2%	**Asian**
1.6%	**Two or more races**
1.1%	**American Indian or Alaskan Native**
0.5%	**Native Hawaiian or other Pacific Islander**
2.2%	**Other**

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

13.5%	**Yes**
86.5%	**No**

38. Please tell us in which zip code you reside: _____

100.0%	**Please enter zip code**
0.0%	**Don't know/ Refused**

39. Do you live in:

58.9% The City/ Urban Area

36.8% A Suburban Area/ Outside the City

4.3% The Country/ Rural Area

Since it sometimes becomes necessary for the project manager to call back and confirm responses to certain questions, I would like to verify your contact information.

a. First and Last Name_____

b. Position_____

c. Phone_____

d. Email _____

e. Company Name_____

Those are all of the questions I have for you.

Thank you very much for participating!

Employer Survey

Introduction

This survey is being conducted by BW Research, an independent research organization, under a contract with the **Rhode Island Office of Energy Resources (OER)**. We are conducting a statewide survey to better understand the existing and future workforce and staffing needs of clean energy businesses and support the development of future training and education programs.

Your individual responses will **not** be published; only aggregated information will be used in the reporting of the survey results. This survey should take approximately 15 to 20 minutes of your time.

Please complete this survey and provide your email address to be entered into a raffle to win one of five $100 Visa gift cards.

Screener Questions

A. Is your firm involved with any activity related to clean energy, which includes **energy efficiency** (including installation of LED lighting, insulation, high efficiency heating and cooling systems, energy efficient buildings, etc.), **renewable energy** (including solar, wind, geothermal, biofuels, etc.), energy **storage** (including batteries, mechanical, and pumped hydro), **clean grid** (including grid modernization), or **electric or other alternative transportation** (including electric vehicles)?

94% **Yes**

6% **No**

0% **Don't know/ Refused**

IF SA = "No" or "Don't know/ Refused" ASK SB OTHERWISE SKIP

B. Is your firm involved with any activity related to oil and other petroleum products (including petroleum products wholesale, home heating fuels delivery, propane, etc.)?

100% **Yes**

0% **No**

0% **Don't know/ Refused**

C. Does your organization conduct any energy work in Rhode Island?

100% **Yes**

0% **No**

D. How much of your energy work, by revenue, takes place in Rhode Island?

30% **All of it (100% of revenue)**

40% **Half to nearly all (50% to 99% of revenue)**

28% **Limited to less than half (1% to 49% of revenue)**

2% Don't know / Refused

E. Please answer the following questions based only on your current business location. What is the zip code of your current location?

100% Please enter zip code:

0% Don't know/ Refused

F. How many years has your firm been in business?

4% Less than 2 years

2% 2 to 4 years

17% 5 to 9 years

45% 10 to 19 years

32% 20 years and over

G. Which of the following technologies is your firm involved with? [MULTIPLE CHOICE – SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*.

[IF NEEDED: If your organization is involved in energy research or professional services for the industry, please select the options that are most relevant for your organization.]

70% Energy Efficiency Including Heating, Cooling, and Building Envelope

38% Energy Storage (batteries, pumped hydro, etc.)

38% Electric or other Alternative Transportation (including electric vehicle charging stations and batteries)

36% Electric Power Transmission and Distribution & Grid Modernization

32% Electric Power Generation

11% Fuels (hydrogen, biofuels, woody biomass, petroleum, etc.)

9% Other

0% None of the above

H. Which do you consider your firm's **primary** technology focus, based on the majority of labor hours performed at your location? (n=30)

43% **Energy Efficiency Including Heating, Cooling and Building Envelope**

33% **Electric Power Generation**

10% **Electric Power Transmission and Distribution and Grid Modernization**

7% **Electric or other Alternative Transportation (including electric vehicle charging stations and batteries)**

3% **Fuels (hydrogen, biofuels, woody biomass, petroleum, etc.)**

0% **Energy Storage (batteries, pumped hydro, etc.)**

3% **Other**

SHPRIME

55% **Energy Efficiency Including Heating, Cooling and Building Envelope**

23% **Electric Power Generation**

6% **Electric Power Transmission and Distribution & Grid Modernization**

6% **Electric or other Alternative Transportation (including electric vehicle charging stations and batteries)**

4% **Fuels (hydrogen, biofuels, woody biomass, petroleum, etc.)**

0% **Energy Storage (batteries, pumped hydro, etc.)**

4% **Other**

I. Please tell us which type of technology your company works most closely with:

G. Electric Power Generation (IF SH= "Electric Power Generation") (n=11)

[RANDOMIZE]

91% **Solar Electric Generation**

9% Low-Impact Hydroelectric Generation, including Wave/Kinetic Generation

0% Land-based Wind Generation

0% Offshore Wind Generation

0% Geothermal Generation

0% Bioenergy/Biomass Generation

0% Natural Gas

0% Other Generation

H. Electric Power Transmission and Distribution (IF SH= "Electric Power Transmission and Distribution and Grid Modernization") (n=3)

[RANDOMIZE]

100% Smart Grid

0% Micro Grids

0% Other Grid Modernization

0% Natural Gas

0% Other

I. Storage (IF SH= "Energy Storage") (n=0)

[RANDOMIZE]

a. Pumped hydro-power storage
b. Battery storage, including electric vehicle batteries
c. Mechanical storage (flywheels, compressed air energy storage, etc.)
d. Thermal storage
e. Other (Specify)

J. Energy Efficiency, Including Heating, Cooling and Building Envelope (IF SH= "Energy Efficiency") (n=26)

[RANDOMIZE]

38% **High-Efficiency Heating, Ventilation, and Cooling (HVAC), and/or air-source and ground-source heat pumps**

19% **Advanced Building Materials/Insulation**

15% **ENERGY STAR® Certified Appliances & Efficient lighting (not including HVAC)**

12% **Traditional HVAC goods, control systems, and services**

12% **Renewable Heating and Cooling**

4% **Other**

K. Fuels (IF SH= ”Fuels”) (n=2)

[RANDOMIZE]

50% **Other Biofuels**

50% **Petroleum**

0% **Other Ethanol/Non-Woody Biomass**

0% **Woody Biomass/Cellulosic Biofuel**

0% **Other**

L. Transportation Vehicles, Including Motor Vehicles (IF SH= “Electric or Other Alternative Transportation”) (n=8)

[RANDOMIZE]

67% **Electric Vehicle Charging Stations**

0% **Gasoline and Diesel Motor Vehicles (excluding freight transport)**

0% **Hybrid Electric Vehicles**

0% **Plug-In Hybrid Vehicles**

0% **Electric Vehicles**

0% **Natural Gas Vehicles**

0% **Hydrogen and Fuel Cell Vehicles**

33% **Other**

J. Which of the following industries describes your firm's focus as it relates to clean energy? [MULTIPLE CHOICE – SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*.

60% Installation, maintenance, and repair

40% Professional services (incl. finance, legal, consulting, and engineering services)

17% Manufacturing

13% Research and development

9% Wholesale trade and distribution

9% Retail sales

6% Other

[ASK SK IF SJ>1]

K. Which do you consider your firm's **primary** focus, based on the majority of labor hours performed at your location? (n=14)

57% Installation, maintenance, and repair

14% Professional services (incl. finance, legal, consulting, and engineering services)

14% Research and development

7% Manufacturing

0% Wholesale trade and distribution

0% Retail sales

7% Other

SKPRIME

53% Installation, maintenance, and repair

23% Professional services (incl. finance, legal, consulting, and engineering services)

6% Manufacturing

6% Research and development

4% Retail sales

2% Wholesale trade and distribution

4% Other

[ASK SL if SH= "Energy Efficiency"]

L. If your firm works within the building sector, which does your business primarily work on? [MULTIPLE CHOICE – SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*. (n=26)

54% Single Family Residential Buildings

62% Multi-Family Residential Buildings

65% Commercial Buildings

23% Industrial Buildings

4% Other

[ASK SM IF SL>1]

M. Which do you consider your firm's **primary** building focus, based on the majority of labor hours performed at your location? (n=17)

41% Single Family Residential Buildings

29% Multi-Family Residential Buildings

12% Commercial Buildings

12% Industrial Buildings

6% Other

SMPRIME

38% Single Family Residential Buildings

27% Multi-Family Residential Buildings

23% Commercial Buildings

8% Industrial Buildings

4% Other

N. Please indicate which of the following occupations are employed at your location. [SELECT ALL THAT APPLY] – *Multiple responses permitted; percentages may sum to more than 100%*.

RANDOMIZE

36% Electricians

34% Electrical Engineers

26% HVAC/R Mechanic, Installers, or Technicians

26% Construction and Building Inspectors (Energy Auditors/ HERS Raters)

26% Solar Installers

26% Construction worker supervisors

23% Construction Laborers

21% Weatherization Technicians

19% Plumbers, Pipefitters, and Steamfitters

17% Sheet metal workers

13% Carpenters

9% Welders, Cutters, Solderers, Brazers

9% Electrical Power-Line Installers and Repairers

9% Automotive Service Technicians and Mechanics

Section 1: Employment & Occupation Composition

1. Including all full-time and part-time employees, how many **permanent** employees work at your current location? Please include any employees working remotely who report out of this location. [DO NOT ACCEPT 0 AS A RESPONSE]

Average	Median
19.4	12.0

27%	Less than 5 Employees
12%	5 to 9 employees
37%	10 to 24 employees
12%	25 to 49 employees
10%	50 to 99 employees
2%	100 or more employees

2. Including all full-time and part-time employees, how many **permanent** employees work at your current location in the **following occupations**? Please include any employees working remotely who report out of this location.

[PIPE IN SN OCCUPATIONS SELECTED]

	Average	Median	Less than 5 Employees	5 to 9 employees	10 to 24 employees	25 to 49 employees	50 to 99 employees	100 or more employees
A. Electrical Engineers (n=14)	7	3	57%	14%	14%	14%	0%	0%
B. HVAC/R Mechanic, Installers, or Technicians (n=10)	5	5	50%	30%	20%	0%	0%	0%
C. Electricians (n=14)	6	5	50%	14%	36%	0%	0%	0%
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=10)	2	1	90%	0%	10%	0%	0%	0%
E. Welders, Cutters, Solderers, Brazers (n=2)	2	2	100%	0%	0%	0%	0%	0%

F. Weatherization Technicians (n=8)	**9**	**8**	**38%**	**25%**	**25%**	**13%**	**0%**	**0%**
G. Plumbers, Pipefitters, and Steamfitters (n=8)	**4**	**3**	**75%**	**13%**	**13%**	**0%**	**0%**	**0%**
H. Carpenters (n=5)	**4**	**5**	**40%**	**60%**	**0%**	**0%**	**0%**	**0%**
I. Electrical Power-Line Installers and Repairers (n=3)	**12**	**8**	**33%**	**33%**	**0%**	**33%**	**0%**	**0%**
J. Solar Installers (n=10)	**5**	**3**	**60%**	**10%**	**30%**	**0%**	**0%**	**0%**
K. Construction Laborers (n=10)	**3**	**2**	**70%**	**20%**	**10%**	**0%**	**0%**	**0%**
L. Sheet metal workers (n=7)	**1**	**1**	**100%**	**0%**	**0%**	**0%**	**0%**	**0%**
M. Construction worker supervisors (n=10)	**5**	**3**	**80%**	**10%**	**10%**	**0%**	**0%**	**0%**
N. Automotive Service Technicians and Mechanics (n=3)	**7**	**2**	**67%**	**0%**	**33%**	**0%**	**0%**	**0%**

3. If you currently have [**INSERT Q2**] **[PIPE IN SN OCCUPATIONS SELECTED]** at your location, how many do you expect to have at your location one year from now?

	Employer Projected Growth	**More Employees**	**Same Number of Employees**	**Fewer Employees**
A. Electrical Engineers (n=16)	**10%**	**63%**	**19%**	**19%**
B. HVAC/R Mechanic, Installers, or Technicians (n=12)	**14%**	**33%**	**50%**	**17%**
C. Electricians (n=17)	**4%**	**41%**	**47%**	**12%**
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=11)	**22%**	**45%**	**45%**	**9%**
E. Welders, Cutters, Solderers, Brazers (n=4)	**15%**	**50%**	**50%**	**0%**
F. Weatherization Technicians (n=10)	**23%**	**70%**	**10%**	**20%**
G. Plumbers, Pipefitters, and Steamfitters (n=9)	**6%**	**44%**	**44%**	**11%**
H. Carpenters (n=6)	**5%**	**17%**	**83%**	**0%**
I. Electrical Power-Line Installers and Repairers (n=4)	**2%**	**50%**	**50%**	**0%**
J. Solar Installers (n=12)	**9%**	**11%**	**67%**	**22%**
K. Construction Laborers (n=11)	**21%**	**55%**	**36%**	**9%**
L. Sheet metal workers (n=9)	**22%**	**22%**	**78%**	**0%**
M. Construction worker supervisors (n=12)	**24%**	**42%**	**42%**	**17%**
N. Automotive Service Technicians and Mechanics (n=4)	**6%**	**25%**	**75%**	**0%**

Section 2. Hiring Profile

4. How much difficulty does your company have in finding **qualified entry applicants** who meet the organization's hiring standards?

15% Little to no difficulty

45% Some difficulty

23% Great difficulty

17% Don't Know/Not Applicable

5. Please indicate your level of difficulty hiring qualified workers for the following occupation(s):

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

	Little to no difficulty	Some difficulty	Great Difficulty	Don't know/ Refused
A. Electrical Engineers (n=16)	31%	50%	19%	0%
B. HVAC/R Mechanic, Installers, or Technicians (n=12)	17%	25%	25%	33%
C. Electricians (n=17)	29%	18%	41%	12%
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=11)	0%	9%	36%	55%
E. Welders, Cutters, Solderers, Brazers (n=4)	50%	25%	25%	0%
F. Weatherization Technicians (n=10)	20%	70%	10%	0%
G. Plumbers, Pipefitters, and Steamfitters (n=9)	22%	22%	33%	22%
H. Carpenters (n=6)	50%	33%	17%	0%
I. Electrical Power-Line Installers and Repairers (n=4)	25%	25%	50%	0%
J. Solar Installers (n=12)	25%	25%	42%	8%
K. Construction Laborers (n=11)	18%	45%	27%	9%
L. Sheet metal workers (n=8)	13%	50%	13%	25%
M. Construction worker supervisors (n=12)	25%	42%	33%	0%
N. Automotive Service Technicians and Mechanics (n=4)	50%	25%	0%	25%

6. Please indicate your level of agreement with each of the following statements:

[PIPE IN ALL OCCUPATIONS SELECTED AT SN] [RANDOMIZE]

Electrical Engineers (n=16)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	19%	31%	25%	13%	6%	6%
B. There are enough applicants, but they do not have the training or education needed for the job	25%	38%	13%	6%	13%	6%
C. There are enough applicants, but they do not have the prior work experience needed for the job	19%	44%	19%	6%	6%	6%
D. There are enough applicants, but they are unwilling to work for the wages we pay	25%	31%	13%	6%	19%	6%

HVAC/R Mechanic, Installer, or Technicians (n=11)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	9%	18%	9%	27%	9%	27%
B. There are enough applicants, but they do not have the training or education needed for the job	0%	27%	18%	9%	18%	27%
C. There are enough applicants, but they do not have the prior work experience needed for the job	0%	36%	18%	9%	9%	27%
D. There are enough applicants, but they are unwilling to work for the wages we pay	18%	9%	27%	9%	9%	27%

Electricians (n=16)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**50%**	**25%**	**6%**	**0%**	**13%**	**6%**
B. There are enough applicants, but they do not have the training or education needed for the job	**31%**	**13%**	**31%**	**6%**	**13%**	**6%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**38%**	**19%**	**19%**	**6%**	**13%**	**6%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**31%**	**13%**	**19%**	**0%**	**31%**	**6%**

Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=12)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**33%**	**42%**	**8%**	**17%**	**0%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**8%**	**42%**	**33%**	**8%**	**8%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**0%**	**67%**	**17%**	**0%**	**8%**	**8%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**8%**	**8%**	**25%**	**25%**	**25%**	**8%**

Welders, Cutters, Solderers, Brazers (n=4)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**25%**	**25%**	**0%**	**0%**	**50%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**25%**	**25%**	**0%**	**25%**	**25%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**0%**	**75%**	**0%**	**0%**	**25%**	**0%**

D. There are enough applicants, but they are unwilling to work for the wages we pay	**0%**	**25%**	**25%**	**0%**	**50%**	**0%**

Weatherization Technicians (n=10)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**30%**	**30%**	**10%**	**20%**	**10%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**10%**	**50%**	**30%**	**0%**	**10%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**0%**	**40%**	**20%**	**30%**	**10%**	**0%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**0%**	**10%**	**60%**	**10%**	**10%**	**10%**

Plumbers, Pipefitters, and Steamfitters (n=8)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**25%**	**25%**	**13%**	**13%**	**0%**	**25%**
B. There are enough applicants, but they do not have the training or education needed for the job	**25%**	**13%**	**0%**	**25%**	**13%**	**25%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**13%**	**25%**	**13%**	**13%**	**13%**	**25%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**38%**	**13%**	**0%**	**13%**	**13%**	**25%**

Carpenters (n=5)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused

A. There are not enough applicants for my firm's open positions	**40%**	**20%**	**20%**	**20%**	**0%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**40%**	**40%**	**20%**	**0%**	**0%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**20%**	**60%**	**20%**	**0%**	**0%**	**0%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**40%**	**20%**	**20%**	**0%**	**20%**	**0%**

Electrical Power-Line Installers and Repairers (n=4)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**25%**	**25%**	**0%**	**0%**	**25%**	**25%**
B. There are enough applicants, but they do not have the training or education needed for the job	**50%**	**0%**	**0%**	**25%**	**0%**	**25%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**25%**	**25%**	**0%**	**0%**	**25%**	**25%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**25%**	**25%**	**0%**	**0%**	**25%**	**25%**

Solar Installers (n=11)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**27%**	**18%**	**9%**	**27%**	**0%**	**18%**
B. There are enough applicants, but they do not have the training or education needed for the job	**36%**	**9%**	**27%**	**0%**	**18%**	**9%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**18%**	**18%**	**27%**	**18%**	**9%**	**9%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**9%**	**9%**	**36%**	**0%**	**36%**	**9%**

Construction Laborers (n=10)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**30%**	**20%**	**20%**	**20%**	**10%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**0%**	**50%**	**50%**	**0%**	**0%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**0%**	**50%**	**50%**	**0%**	**0%**	**0%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**10%**	**0%**	**50%**	**10%**	**20%**	**10%**

Sheet Metal Workers (n=8)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**50%**	**0%**	**0%**	**13%**	**13%**	**25%**
B. There are enough applicants, but they do not have the training or education needed for the job	**25%**	**0%**	**0%**	**25%**	**25%**	**25%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**13%**	**13%**	**0%**	**0%**	**38%**	**38%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**13%**	**0%**	**0%**	**25%**	**25%**	**38%**

Construction Worker Supervisors (n=11)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**36%**	**18%**	**36%**	**0%**	**9%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**45%**	**9%**	**27%**	**9%**	**9%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**27%**	**45%**	**18%**	**0%**	**9%**	**0%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**27%**	**18%**	**18%**	**18%**	**9%**	**9%**

Automotive Service Technicians and Mechanics (n=4)

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Don't know/ Refused
A. There are not enough applicants for my firm's open positions	**50%**	**50%**	**0%**	**0%**	**0%**	**0%**
B. There are enough applicants, but they do not have the training or education needed for the job	**50%**	**25%**	**0%**	**25%**	**0%**	**0%**
C. There are enough applicants, but they do not have the prior work experience needed for the job	**75%**	**0%**	**25%**	**0%**	**0%**	**0%**
D. There are enough applicants, but they are unwilling to work for the wages we pay	**50%**	**25%**	**25%**	**0%**	**0%**	**0%**

7. What are the two most significant reasons for the reported hiring difficulty with [INSERT OCCUPATION]? – *Multiple responses permitted; Percentages may sum to more than 100%*.

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

Electrical Engineers (n=16)

56%	**Competition with other industries (related to wages and benefits)**
25%	**Small applicant pool**
25%	**Lack of experience/industry-specific knowledge**
25%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
19%	**High turnover**
19%	**Insufficient certifications**
6%	**Insufficient educational attainment**
0%	**Other**
0%	**Don't know/ Refused**

HVAC/R Mechanic, Installer, or Technicians (n=11)

27%	**High turnover**
27%	**Competition with other industries (related to wages and benefits)**
27%	**Insufficient educational attainment**
18%	**Small applicant pool**
18%	**Lack of experience/industry-specific knowledge**
18%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
9%	**Insufficient certifications**
0%	**Other**
27%	**Don't know/ Refused**

Electricians (n=16)

38%	**Lack of experience/industry-specific knowledge**
31%	**Small applicant pool**
31%	**Insufficient certifications**
25%	**Competition with other industries (related to wages and benefits)**
25%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
19%	**Insufficient educational attainment**
13%	**High turnover**
0%	**Other**
6%	**Don't know/ Refused**

Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=12)

67%	**Lack of experience/industry-specific knowledge**
42%	**Small applicant pool**
25%	**Insufficient educational attainment**
17%	**High turnover**
17%	**Competition with other industries (related to wages and benefits)**
17%	**Insufficient certifications**
17%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Other**
0%	**Don't know/ Refused**

Welders, Cutters, Solderers, Brazers (n=4)

50%	**Small applicant pool**
50%	**Competition with other industries (related to wages and benefits)**
25%	**High turnover**
25%	**Lack of experience/industry-specific knowledge**
25%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Insufficient educational attainment**
0%	**Insufficient certifications**
0%	**Other**
0%	**Don't know/ Refused**

Weatherization Technicians (n=10)

50%	**Small applicant pool**
30%	**Insufficient certifications**
30%	**Lack of experience/industry-specific knowledge**
20%	**High turnover**
20%	**Competition with other industries (related to wages and benefits)**
20%	**Insufficient educational attainment**
20%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Other**
0%	**Don't know/ Refused**

Plumbers, Pipefitters, and Steamfitters (n=8)

63%	**Insufficient certifications**

25%	**Small applicant pool**
25%	**Insufficient educational attainment**
13%	**High turnover**
13%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Competition with other industries (related to wages and benefits)**
0%	**Lack of experience/industry-specific knowledge**
0%	**Other**
25%	**Don't know/ Refused**

Carpenters (n=5)

40%	**Lack of experience/industry-specific knowledge**
20%	**Small applicant pool**
20%	**High turnover**
20%	**Competition with other industries (related to wages and benefits)**
20%	**Insufficient educational attainment**
20%	**Insufficient certifications**
20%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Other**
0%	**Don't know/ Refused**

Electrical Power-Line Installers and Repairers (n=4)

75%	**Competition with other industries (related to wages and benefits)**

50% **Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**

25% **Small applicant pool**

25% **High turnover**

25% **Insufficient educational attainment**

0% **Insufficient certifications**

0% **Lack of experience/industry-specific knowledge**

0% **Other**

0% **Don't know/ Refused**

Solar Installers (n=11)

45% **Lack of experience/industry-specific knowledge**

36% **High turnover**

36% **Insufficient certifications**

27% **Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**

18% **Competition with other industries (related to wages and benefits)**

9% **Small applicant pool**

9% **Insufficient educational attainment**

0% **Other**

9% **Don't know/ Refused**

Construction Laborers (n=10)

50%	**Lack of experience/industry-specific knowledge**
40%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
30%	**Small applicant pool**
20%	**Competition with other industries (related to wages and benefits)**
20%	**Insufficient educational attainment**
10%	**High turnover**
10%	**Insufficient certifications**
0%	**Other**
0%	**Don't know/ Refused**

Sheet Metal Workers (n=7)

57%	**Small applicant pool**
57%	**High turnover**
14%	**Competition with other industries (related to wages and benefits)**
14%	**Insufficient certifications**
0%	**Insufficient educational attainment**
0%	**Lack of experience/industry-specific knowledge**
0%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
0%	**Other**
29%	**Don't know/ Refused**

Construction Worker Supervisors (n=11)

55%	**Small applicant pool**
45%	**Competition with other industries (related to wages and benefits)**
45%	**Lack of experience/industry-specific knowledge**
27%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
18%	**Insufficient certifications**
0%	**High turnover**
0%	**Insufficient educational attainment**
0%	**Other**
0%	**Don't know/ Refused**

Automotive Service Technicians and Mechanics (n=4)

50%	**Insufficient non-technical skills (problem solving, critical thinking, communication, teamwork, adaptability, etc.)**
25%	**Small applicant pool**
25%	**High turnover**
25%	**Competition with other industries (related to wages and benefits)**
25%	**Insufficient certifications**
25%	**Lack of experience/industry-specific knowledge**
0%	**Insufficient educational attainment**
0%	**Other**
0%	**Don't know/ Refused**

When you have an open [INSERT OCCUPATION] position at your location, how long does it typically take to find and hire a qualified candidate to fill this position?

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

	Less than two weeks	Between two weeks to a month	More than one month but up to three months	More than three months but up to six months	More than six months	Don't know/ Refused
A. Electrical Engineers (n=16)	**6%**	**13%**	**38%**	**19%**	**6%**	**19%**
B. HVAC/R Mechanic, Installers, or Technicians (n=11)	**0%**	**36%**	**18%**	**18%**	**0%**	**27%**
C. Electricians (n=16)	**19%**	**25%**	**19%**	**13%**	**13%**	**13%**
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=12)	**0%**	**42%**	**25%**	**8%**	**8%**	**17%**
E. Welders, Cutters, Solderers, Brazers (n=4)	**25%**	**25%**	**25%**	**0%**	**0%**	**25%**
F. Weatherization Technicians (n=10)	**20%**	**30%**	**40%**	**0%**	**0%**	**10%**
G. Plumbers, Pipefitters, and Steamfitters (n=8)	**0%**	**0%**	**63%**	**13%**	**0%**	**25%**
H. Carpenters (n=5)	**40%**	**40%**	**0%**	**20%**	**0%**	**0%**
I. Electrical Power-Line Installers and Repairers (n=4)	**50%**	**25%**	**25%**	**0%**	**0%**	**0%**
J. Solar Installers (n=11)	**18%**	**27%**	**27%**	**0%**	**9%**	**18%**
K. Construction Laborers (n=10)	**20%**	**20%**	**40%**	**0%**	**0%**	**20%**
L. Sheet metal workers (n=7)	**0%**	**14%**	**43%**	**0%**	**0%**	**43%**
M. Construction worker supervisors (n=11)	**9%**	**27%**	**27%**	**0%**	**9%**	**27%**
N. Automotive Service Technicians and Mechanics (n=4)	**25%**	**0%**	**50%**	**25%**	**0%**	**0%**

8. How often do you use the following resources to find potential workers? (n=43)

RANDOMIZE

	Always	Often	Sometimes	Rarely or Never	Don't know/ Refused
A. LinkedIn	**9%**	**21%**	**28%**	**28%**	**14%**
B. Social Media (Facebook, Instagram, etc.)	**9%**	**14%**	**14%**	**47%**	**16%**
C. Headhunter	**7%**	**16%**	**14%**	**49%**	**14%**
D. Staffing Agency	**12%**	**14%**	**19%**	**44%**	**12%**
E. Online job sites (Indeed, Monster, CareerBuilder)	**28%**	**19%**	**21%**	**19%**	**14%**
F. Working directly with educational institutions and training providers	**12%**	**23%**	**26%**	**30%**	**9%**
G. Word of mouth	**16%**	**26%**	**23%**	**23%**	**12%**
H. Industry association job board	**9%**	**16%**	**30%**	**33%**	**12%**
I. Training providers	**9%**	**19%**	**30%**	**26%**	**16%**
J. Apprenticeship program	**9%**	**23%**	**30%**	**28%**	**9%**
K. Community groups	**7%**	**14%**	**19%**	**47%**	**14%**

9. Are a majority of the **[PIPE IN ALL OCCUPATIONS SELECTED AT SN]** workers at your firm covered by a Collective Bargaining Agreement or Project Labor Agreement or are otherwise members covered by a labor union?

	Yes, the majority are covered by a Collective Bargaining, Project Labor Agreement, or covered by a labor union	No, the majority are not covered by a Collective Bargaining, Project Labor Agreement, or covered by a labor union	Don't Know/ Refused
A. Electrical Engineers (n=16)	**44%**	**50%**	**6%**
B. HVAC/R Mechanic, Installers, or Technicians (n=11)	**45%**	**27%**	**27%**
C. Electricians (n=16)	**50%**	**38%**	**13%**
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=12)	**58%**	**33%**	**8%**
E. Welders, Cutters, Solderers, Brazers (n=4)	**50%**	**50%**	**0%**
F. Weatherization Technicians (n=10)	**60%**	**40%**	**0%**
G. Plumbers, Pipefitters, and Steamfitters (n=8)	**63%**	**25%**	**13%**
H. Carpenters (n=5)	**80%**	**20%**	**0%**
I. Electrical Power-Line Installers and Repairers (n=4)	**100%**	**0%**	**0%**
J. Solar Installers (n=11)	**27%**	**45%**	**27%**
K. Construction Laborers (n=10)	**50%**	**40%**	**10%**
L. Sheet metal workers (n=7)	**29%**	**57%**	**14%**
M. Construction worker supervisors (n=11)	**64%**	**36%**	**0%**
N. Automotive Service Technicians and Mechanics (n=4)	**75%**	**0%**	**25%**

Section 3. Skill & Education Profile (Occupation-Specific)

10. [Pipe in occupations > 0] What certifications are **required** or preferred for these occupations? [require response]

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

Verbatim will be provided

11. Where do your employees go to earn these kinds of certifications? (SELECT ALL THAT APPLY) – *Multiple responses permitted; Percentages may sum to more than 100%.* (n=40)

65%	**Industry or trade association training programs**
50%	**Online/Webinars with private training companies**
38%	**Apprenticeship programs**
35%	**In-house training**
33%	**Community College programs**
25%	**Technology manufacturer or distributor training program**
5%	**Other**
5%	**Don't know/ Refused**

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

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

	No education requirement	High school diploma or equivalent	Associate's Degree	Bachelor's degree	Master's degree or higher	Don't know/ Refused
A. Electrical Engineers (n=16)	**6%**	**13%**	**0%**	**38%**	**38%**	**6%**
B. HVAC/R Mechanic, Installers, or Technicians (n=9)	**0%**	**33%**	**0%**	**11%**	**22%**	**33%**
C. Electricians (n=16)	**6%**	**44%**	**13%**	**0%**	**25%**	**13%**
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=10)	**20%**	**30%**	**10%**	**0%**	**20%**	**20%**
E. Welders, Cutters, Solderers, Brazers (n=3)	**33%**	**33%**	**0%**	**0%**	**0%**	**33%**
F. Weatherization Technicians (n=10)	**20%**	**30%**	**20%**	**0%**	**20%**	**10%**
G. Plumbers, Pipefitters, and Steamfitters (n=7)	**0%**	**43%**	**0%**	**0%**	**14%**	**43%**
H. Carpenters (n=5)	**20%**	**60%**	**0%**	**0%**	**0%**	**20%**
I. Electrical Power-Line Installers and Repairers (n=4)	**0%**	**75%**	**0%**	**0%**	**0%**	**25%**
J. Solar Installers (n=11)	**9%**	**36%**	**18%**	**9%**	**18%**	**9%**
K. Construction Laborers (n=10)	**20%**	**40%**	**10%**	**0%**	**20%**	**10%**
L. Sheet metal workers (n=6)	**17%**	**17%**	**0%**	**17%**	**0%**	**50%**
M. Construction worker supervisors (n=11)	**0%**	**45%**	**27%**	**9%**	**9%**	**9%**
N. Automotive Service Technicians and Mechanics (n=4)	**0%**	**25%**	**25%**	**0%**	**25%**	**25%**

13. Please indicate the minimum *required* level of prior work experience you expect entry-level [INSERT OCCUPATION] applicants to possess?

[PIPE IN ALL OCCUPATIONS SELECTED AT SN]

	No formal work experience in comparable positions required	Pre-Apprenticeship or other short term job training	Up to 12 months in a comparable position	One to three years in a comparable position	More than three years in a comparable position	Don't know/ Refused
A. Electrical Engineers (n=16)	**13%**	**0%**	**44%**	**31%**	**13%**	**0%**
B. HVAC/R Mechanic, Installers, or Technicians (n=9)	**0%**	**22%**	**22%**	**11%**	**22%**	**22%**
C. Electricians (n=16)	**6%**	**13%**	**25%**	**31%**	**13%**	**13%**
D. Construction and Building Inspectors (Energy Auditors/ HERS Raters) (n=10)	**10%**	**10%**	**10%**	**10%**	**40%**	**20%**
E. Welders, Cutters, Solderers, Brazers (n=3)	**0%**	**33%**	**33%**	**0%**	**33%**	**0%**
F. Weatherization Technicians (n=10)	**10%**	**50%**	**20%**	**0%**	**20%**	**0%**
G. Plumbers, Pipefitters, and Steamfitters (n=7)	**14%**	**0%**	**43%**	**0%**	**14%**	**29%**
H. Carpenters (n=5)	**0%**	**20%**	**40%**	**20%**	**20%**	**0%**
I. Electrical Power-Line Installers and Repairers (n=4)	**0%**	**25%**	**50%**	**0%**	**25%**	**0%**
J. Solar Installers (n=11)	**0%**	**27%**	**36%**	**9%**	**18%**	**9%**
K. Construction Laborers (n=10)	**20%**	**30%**	**20%**	**10%**	**20%**	**0%**
L. Sheet metal workers (n=6)	**17%**	**0%**	**33%**	**0%**	**17%**	**33%**
M. Construction worker supervisors (n=11)	**0%**	**9%**	**9%**	**36%**	**36%**	**9%**
N. Automotive Service Technicians and Mechanics (n=4)	**0%**	**0%**	**25%**	**25%**	**25%**	**25%**

14. Please indicate if you partner with any of these types of organizations to meet your workforce needs. – *Multiple responses permitted; Percentages may sum to more than 100%*. (n=38)

26% **Four-year colleges and universities**

26% **Union apprenticeships/Joint Apprenticeship and Training Centers (JATC)**

24% **Technical or vocational schools**

21% **State or local workforce boards or other workforce agencies**

18% **Community colleges or technical college providers**

16% **Private training companies**

11% **K-12 education providers**

3% **Community group**

0% **Youth service organization**

8% **Other**

26% **We do not partner with any organizations to meet our workforce needs**

8% **Don't know/ Refused**

IF 14 = "We do not partner with any organizations to meet our workforce needs" ASK 15 OTHERWISE SKIP

15. Why do you not partner with any organizations to meet your workforce needs? (n=10)

50% **Do not need to partner/do not experience challenges with meeting our workforce needs**

20% **Do not know enough about these organizations or who to contact**

0% **Do not have time or resources to commit to partnerships on workforce**

30% **Don't know/ Refused**

16. Please rate your level of interest for each of the following programs, services, or resources to support your firm's workforce needs. (n=38)

RANDOMIZE

	Very interested	Somewhat interested	Not at all interested	Don't know/ Refused
A. More apprenticeship programs that offer a pipeline of future employees	**37%**	**45%**	**8%**	**11%**
B. Sourcing and pre-screening for interns	**39%**	**26%**	**26%**	**8%**
C. Funds to reimburse the costs of additional training or certification for your clean energy employees	**53%**	**29%**	**13%**	**5%**
D. New training programs that do not currently exist in your area for clean energy activities	**50%**	**26%**	**18%**	**5%**
E. Better marketing of career fields in clean energy to young people	**42%**	**37%**	**13%**	**8%**
F. A clean energy jobs board for employers to post jobs and for job seekers to use to find positions	**45%**	**34%**	**13%**	**8%**

Section 4. Company/Organization Profile

17. The following is a list of factors that may contribute to the profitability of your business. Please rate the importance of each factor for your business. (n=38)

RANDOMIZE

	Very Important	Somewhat Important	Not at all Important	Don't know
A. Access to capital, banking, & funding	**53%**	**29%**	**13%**	**5%**
B. Access to clients & customers in the region	**53%**	**32%**	**11%**	**5%**
C. Availability of qualified talent	**68%**	**24%**	**5%**	**3%**
D. Access to networking & business development opportunities	**42%**	**37%**	**16%**	**5%**
E. Access to education and training facilities	**34%**	**42%**	**16%**	**8%**
F. Programs & resources to support small businesses	**61%**	**21%**	**13%**	**5%**
G. Programs & resources to support new businesses and entrepreneurs	**37%**	**42%**	**16%**	**5%**
H. Programs & resources to support businesses that are expanding	**47%**	**39%**	**8%**	**5%**

18. Do you face any challenges in accessing capital or funding for your business? (n=38)

42% **Yes**

50% **No**

8% **Don't know/ Refused**

[IF Q18 = "Yes", ASK Q19]

19. What are the biggest challenges your business encounters when seeking capital or funding? Please select all that apply. – *Multiple responses permitted; Percentages may sum to more than 100%*. (n=16)

38% **Limited access to bank loans**

38% **High interest rates**

38% **Market or economic instability/uncertainty**

25% **Lack of credit history**

25% Complex application or approval process

25% Limited knowledge of funding opportunities

13% Other

0% Don't know/ Refused

20. Is your firm a Minority, Women, or Disadvantaged Business Enterprise (MWBE)? (n=38)

32% Yes

66% No

3% Don't know/ Refused

IF Q20 = "Yes", ASK Q21 OTHERWISE SKIP

21. Do you currently possess certification regarding your status as a minority, women, or disadvantaged business (MWBE certification) from the state of Rhode Island, or a city within the state of Rhode Island? (n=12)

83% Yes

17% No

0% Don't know/ Refused

22. Does your organization hire workers from Rhode Island apprenticeship programs? (n=38)

61% Yes

26% No

13% Don't know/ Refused

[IF Q22 = "Yes", ASK Q23]

23. Do you feel that participation in apprenticeship programs improved the job performance of these workers within your organization? (n=23)

91% Yes

0% No

9% Don't know/ Refused

24. 1Thinking of your [Take Q1] energy employees, how many: (n=38)

	Average	Median
A. Are Veterans of the U.S. Armed Forces?	**6%**	**0%**
B. Have a disability that requires accommodation?	**2%**	**0%**
C. Were formerly incarcerated?	**4%**	**0%**

25. Does your company conduct substance use testing for potential applicants? (n=38)

29% Yes

58% No

13% Don't know/ Refused

26. Does your company conduct a criminal background check for potential applicants? (n=38)

61% Yes

37% No

3% Don't know/ Refused

27. Has your firm adopted any specific strategies, policies, or programs to increase the number of female hires? *If so, please specify what these strategies, policies, or programs look like.* (n=38)

13% Yes

61% No

26% Don't know/ Refused

28. Has your firm adopted any specific strategies, policies, or programs to increase the number of ethnic or racial minority hires? *If so, please specify what these strategies, policies, or programs look like.*

5% Yes

61% No

34% Don't know/ Refused

Thank you for completing the survey. We would like to verify your contact information. Providing this information is also required to be eligible for the Visa gift card raffle.

a. First and Last Name _____
b. Position/Title _____
c. Phone Number_____
d. Email _____
e. Name of Company _____
f. Company Address (including City) _____

Those are all the questions I have.
Thank you very much for your time.

Appendix C: Executive Interview Discussion Guides

For Education and Workforce Development

1. What are your organization's goals connected to workforce development, and building a strong Rhode Island workforce?

2. Do you offer any training or other workforce development initiatives focused on climate or clean-energy industries? *[prompt as needed: "climate or clean-energy industries could include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in protecting forests or land use"]*

   [If yes – capture as much of this as possible]

   a. How does the program operate?
   b. Do you focus on a specific industry?
   c. Do you provide any other workforce support services as part of these initiatives or work with partners/other agencies/programs?
   d. Where do you get your instructors, trainers, or teachers?
   e. Are you trying to reach disadvantaged populations with your training (e.g., people of color, women, veterans, young, rural, etc., etc.)?
   f. What challenges are you seeing in successfully implementing workforce training programs?

   [If no]

   a. Are you interested in working on climate or clean-energy training or workforce development initiatives? What would make you more likely to participate?

3. Do you provide any incentives, wages, or other financial supports to participants? What resources work best in what circumstances?

4. What are your main sources of funding? What are specific gaps in these resources? Have you received (or expect to receive) any funding connected to climate or clean-energy economy related needs?

5. Are there any state resources, assets or programs that have been useful for your organization

a. [probe on climate or clean-energy workforce development specifically]

6. Do you partner with any other organizations (e.g., training providers, labor unions, community groups, etc.) on any climate or clean-energy initiatives [or more broadly]? Why or why not?

7. What is the best role for career and technical education programs in particular in supporting climate or clean-energy workforce development in the state of Rhode Island?

8. What specific occupations are you most focused on, and why? How are you measuring the quality of these jobs in terms of wage potential, career advancement potential, and better safety protocols?

9. Are there any occupations in the climate or clean-energy workforce that you are concerned about not meeting future demand for?

10. For occupations that you consider a priority, are there well-established foundational training curricula and certifications? What additional training resources and programming will be needed to meet future workforce demand?

11. Do you prioritize or otherwise support apprenticeship/pre-apprenticeship programs? What about other work-based learning opportunities? (e.g., internships)

12. What have been effective ways in Rhode Island or other states to reach qualified workers that we can adopt for climate or clean-energy economy job recruitment?

13. How do we better reach and inform future potential workers about occupations connected to the climate or clean-energy economy? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?

14. How can Rhode Island and all workforce stakeholders help ensure training and curriculum developments meets employer needs in clean energy and climate-related industries?

15. How do you approach tracking results of your initiatives, programs, and/or funding?

a. Do you track the number of completions among the total starting participants each year? What is your average completion rate? Do you foresee this rate changing improving or remaining the same over the next several years?
b. Do you collect any data on the job placement activities of the participants who completed your program/s? Are you comfortable with sharing this data with us?
c. Do you have any sense of whether you have higher or lower rates of completions and job placement compared to other training provider organizations? If higher, are there any assets you have that you feel support this success?

For Community Groups and Wraparound Service Providers

1. How would you describe your organization's role in workforce development? Do you see your role as similar or different from other organizations in Rhode Island?

2. What primary support or wraparound services does your organization offer?

3. Are you providing or have you previously provided support services to help individuals looking to enter or return to the workforce in any climate or clean-energy related training / workforce program? *[prompt as needed: "climate or clean-energy industries could include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in protecting forests or land use"]*
    a. If yes:
        i. What kind of services/resources?
        ii. Are you experiencing any challenges providing these services?
    b. If no:
        i. Would your organization be willing to establish partnerships with workforce development programs and training programs?
        ii. What resources would your organization find most useful in thinking about how to support workers seeking climate or clean-energy careers?

4. Out of the services/resources your organization currently offers, how do you prioritize for workers or people trying to enter/re-enter the workforce, and what tend to be the most helpful or impactful?

5. Do you prioritize or otherwise support apprenticeship/pre-apprenticeship programs?

6. Do you partner with any other workforce organizations (e.g., local educational institutions, training providers, labor unions) on any clean energy and climate-related initiatives [or more broadly]? Why or why not?

7. What can the state of Rhode Island do to create a process where existing community-based organizations play an integral role in workforce development efforts?

8. How do we better reach and inform future potential workers about occupations connected to climate or clean energy industries? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?

9. What does an ideal partnership between training/workforce development programs and your organization look like?

For Industry and Employers

1. What are your company's/organization's goals in recruiting, hiring, and retaining workers, especially in connection to climate or clean energy? How are you measuring success? *[prompt as needed: "climate or clean-energy industries could include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in protecting forests or land use"]*

2. Do you have/are seeing a growing demand for specific occupations and if so, how are you responding? Are there any occupations that you are concerned about not meeting future demand for?

3. What are the best ways to integrate industry and individual employers into programs that address workforce needs and help ensure training and curriculum developments meet employer needs?

4. Is there a history of collaboration and engagement with and among Rhode Island employers in developing the state's workforce? What lessons can be leveraged here?

5. For occupations that you consider a priority, are there well-established foundational training curricula and certifications? What additional training resources and programming will be needed to meet future workforce demand?

6. Do you offer apprenticeship programs or host interns/hire apprentices, and has that changed over the past 5 years? How are government policies connected to apprenticeship or prevailing wage impacting your hiring and workforce strategy?

7. What programs or resources at the state or federal level have been or would be helpful in supporting your needs in workforce development?

8. What have been effective ways in Rhode Island or other states you work in to reach qualified workers that we can adopt for climate or clean energy job recruitment?

9. How do we better reach and inform future potential workers about occupations connected to climate or clean energy industries? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?

10. Do you partner with any other workforce organizations (e.g., local educational institutions, training providers, labor unions, community groups) on any clean energy and climate-related initiatives [or more broadly]? Why or why not?

For Organized Labor

1. Could you describe how your apprenticeship model works and what makes it successful? Have there been any changes in the past 5 years brought on by COVID, federal legislation, or increasing focus on diverse workforces?

2. Do you offer any specific training modules connected to climate or clean energy industries? *[prompt as needed: "climate or clean-energy industries could include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in protecting forests or land use"]*

3. Do you provide any funding or programs that offer support services outside of training or education to help apprentices complete their training? If so, what kinds and how do you prioritize offerings and access?

4. Where do most of your trainees recruited from? How are you finding pre-apprenticeship programs and sourcing candidates?

5. Do you partner with any local educational institutions, training providers, community groups or other support service providers, or other workforce development-related organization? Why or why not?

6. How do unions expand apprenticeship capacity within the constraints of their need to match union supply with demand? How long are your current waiting lists?

7. Would your union consider fast tracking candidates who complete a pre-apprenticeship program through your entry process?

8. Within the context of your union, how are you and your members thinking about opportunities in climate or clean energy?

9. What data and information are most helpful in supporting unions interested in pursuing opportunities in climate or clean energy industries?

10. Are there other relevant/important stakeholders we should speak with?

For Government

1. How would you describe your agency's role in workforce development for climate or clean-energy industries? Do you see your role as similar or different from other government agencies in Rhode Island? *[prompt as needed: "climate or clean-energy industries could include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in protecting forests or land use"]*

2. Do you offer any specific climate or clean-energy workforce programs or funding?
    a. If Yes - are there any challenges you are experiencing in effectively implementing workforce programs?
    b. If no – what would you need to see/learn to offer climate or clean-energy - specific programs or funding?

3. What elements of the Rhode Island workforce system need to be prioritized and what elements should be improved/created to meet gaps and needs in building a future Rhode Island climate or clean-energy workforce?

4. Do you feel that there are enough programs and resources in the state for climate or clean-energy workforce development?

5. What future federal and state policy and resources are needed to maximize workforce opportunities in those bills? What does that look like for you in our current moment?

6. What have been effective ways in Rhode Island to reach qualified workers that we can adopt for climate or clean-energy job recruitment?

7. How do we better reach and inform future potential workers about occupations connected to climate or clean-energy? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?

8. What are the best ways to integrate industry and individual employers into programs to address climate or clean-energy workforce needs and develop comprehensive career pathways?

9. Is there a history of collaboration and engagement with and among Rhode Island employers in developing the state's workforce? What lessons can be leveraged here?

10. What is the role of organized labor in preparing Rhode Island's climate or clean-energy workforce?