GROWING GREEN JOBS

THE OPPORTUNITIES FOR NEW JERSEY'S WORKFORCE

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CONTENTS

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GLOSSARY

ENTITIES	
BILT	Business and Industry Leadership Team (of NJDOL)
CBOs	Community-based organizations
CGE	Council on the Green Economy
GCIT	Gloucester County Institute of Technology
GOCAGE	Governor's Office of Climate Action and Green Economy
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJDOL	New Jersey Department of Labor and Workforce Development
NJEDA	New Jersey Economic Development Authority
OSHA	Occupational Safety and Health Administration
BLS	U.S. Bureau of Labor Statistics
USDOL	U.S. Department of Labor
LEGISLATION, PROGRAM, OR GRANT	
BRIDGE	Building our Resilient, Inclusive, and Diverse Green Economy (NJDEP's grant program)
EMP	Energy Master Plan
GAINS	Growing Apprenticeship in Nontraditional Sectors (NJDOL's grant program)
IRA	Inflation Reduction Act
IIJA	Infrastructure Investment and Jobs Act
PACE	Pre-Apprenticeship in Career Education (NJDOL's grant program)
OCCUPATION	
HVAC Technicians	Heating, Air Conditioning, and Refrigeration Mechanics and Installers
Plumbers	Plumbers, Pipefitters, and Steamfitters
Solar PV Installers, or Solar Installers	Solar Photovoltaic Installers
Welders	Welders, Cutters, Solderers, and Brazers
MISCELLANEOUS	
AI	Artificial Intelligence
CTE	Career and Technical Education
CBA	Collective Bargaining Agreement
CEU	Continuing Education Unit
EV	Electric Vehicle
HVAC	Heating, Air Conditioning, and Refrigeration
IEOs	Initial Employment Outputs
JATC	Joint Apprenticeship Training Center
K-12	Kindergarten through 12th grade education

LGBTQ+	Lesbian, gay, bisexual, transgender, queer, and additional gender and sexual identities
LQ	Location Quotient
MW	Megawatts
NAICS	North American Industry Classification System
OSW	Offshore Wind
PV	Photovoltaic
PBS	Professional and Business Services
PLA	Project Labor Agreement
STEM	Science, Technology, Engineering, and Mathematics
SEOs	Secondary Employment Outputs
SOC	Standard Occupational Classification
UER	Unemployment Rate

EXECUTIVE SUMMARY

Since the publication of the New Jersey Council on the Green Economy's (CGE) first report, *Green Jobs for a Sustainable Future*, the State of New Jersey has experienced a striking evolution in its green economy. Billions of dollars in investments in clean energy technologies and new infrastructure have poured in, while the State has sought national leadership in solar, energy efficiency, offshore wind (OSW) and electric vehicles (EVs). This has driven thousands of new jobs in this sector, with the promise of many more to come.

As the State continues expanding our clean energy resources and navigates a dramatically changed federal policy environment, now is the time to assess the impacts of the last four years on the State's green economy workforce and explore what the future may look like for New Jersey workers. Building on modeling scenarios and research findings for New Jersey's Energy Master Plan (EMP) update,[1] this new report – *Growing Green Jobs: The Opportunities for New Jersey's Workforce* – is another step forward in New Jersey's ongoing journey to build a world-leading green economy.

KEY FINDINGS

New Jersey's Current Green Economy

1. **New Jersey's green economy continues to expand and create jobs. Since 2021, the state's green economy has seen over one hundred new clean energy projects built, and its workforce has increased by 12%, or 6,000 jobs.** Through 2024, funding for deployment of green technologies and related infrastructure increased significantly, both federally and at the state level, with the White House reporting over $13 billion in investment through the Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA). Much of this funding could support job creation and workforce development directly (through funding) or indirectly (through project development that leads to new jobs). Perceptions of the green economy around the state continue to evolve especially in those regions seeing expanded deployment of green technologies and/or employment.

   All major technologies within the green economy have seen employment growth in the past three years, with the highest growth rate seen in alternative vehicles, which grew by 27%, incentivized through various charging infrastructure policies, as well as vehicle rebates and incentives. The largest net employment gains occurred in energy efficiency, with its workforce increasing by over 3,600 jobs. New and emerging developments both within the green economy, such as early-stage hydrogen deployment, and outside of the green economy, such as the expansion of artificial intelligence (AI) and data centers, add uncertainty and workforce opportunity in equal measure to New Jersey's green economy.

2. **The workforce in the green economy is similar to New Jersey's overall workforce racially and ethnically but lacks gender balance. There has been little meaningful change in these demographics since 2021.** While the state's overall workforce is split evenly between males and females, the green

1 More information on the State of New Jersey's Energy Master Plan can be found here: https://www.nj.gov/emp/

economy employs significantly more men, with green technology sectors employing between 71% and 81% men. The green economy has a higher concentration of white workers. 70% of New Jersey's total workforce is white, compared to 83% of the green infrastructure workforce, and 77% of both the energy efficiency and alternative vehicles workforces.

3. **12 occupations were developed through the research process as priority occupations in the state's green economy. These occupations represent many, but not all, of the most important occupations necessary for the State to meet its green economy goals.** These priority occupations include Carpenters; Construction Laborers; Construction Managers; Electricians; First-Line Supervisors of Construction Trades and Extraction Workers; General Maintenance and Repair Workers; Heating, Air Conditioning, and Refrigeration (HVAC) Mechanics and Installers; Operating Engineers and Other Construction Equipment Operators; Plumbers, Pipefitters, and Steamfitters (Plumbers); Sheet Metal Workers, Solar Photovoltaic Installers; and Welders, Cutters, Solderers, and Brazers (Welders). Two-thirds (66.7%) of the selected priority occupations are part of the construction and extraction occupational group, while the remaining are installation, maintenance, and repair; production; and management jobs.

4. **All 12 priority occupations found in the green economy have higher wages than the national average.** The average wage in New Jersey for all workers is 13% higher than the national average, while the priority occupations have wages anywhere from 17% to 76% higher than these occupations' national average. Construction Managers across New Jersey tend to earn the highest wage and have the greatest female representation of the 12 priority occupations, while General Maintenance and Repair Workers earn the lowest wage and have one of the most racially diverse workforces of the 12 occupations.[2]

5. **Many priority occupations are accessible in terms of education and training entry-requirements, as 10 out of 12 occupations only require a high school diploma or equivalent.** Among the priority occupations included in this study, the only occupations requiring greater than a high school diploma for entry-level roles are HVAC Mechanics and Installers, who need post-secondary training, and Construction Managers, requiring a bachelor's degree. While degree-granting programs are not commonly required, New Jersey employers often prefer that applicants have hands-on experience, according to surveys conducted for this report. Additional credentials and training are important for further advancement in these occupations.[3]

Projected Growth in New Jersey's Green Economy

6. **Approximately 14,300 to 42,400 net new workers will be needed in New Jersey's broader energy economy, primarily in the green economy sectors, based on modeled investments of New Jersey's EMP Current Policy Scenario and High Electrification Scenario, respectively.**[4] These new workers represent a net gain of jobs from 2022 through 2035. Of these new jobs, an overwhelming majority are expected to be created in the Construction and Maintenance value chains.

7. **Approximately 87% of the gross employment growth modeled within New Jersey's broader energy economy is from green sectors.** Excluding green infrastructure, the overall energy economy in New Jersey is projected to add 27,900 direct and indirect jobs under the policies and investments used in modeling the EMP *Current Policy Scenario*, while losing 16,400 jobs. Jobs added in the dedicated green energy sectors – including solar, OSW, energy storage, charging and hydrogen stations for vehicles, and building technologies – collectively comprise 87% of the total added 27,900 energy jobs. The remaining 13% of gross employment growth is from mixed green/non-green energy subsectors, and they cannot be disaggregated into green and non-green jobs.

8. **Electricians are projected to see the largest growth in new jobs, followed by Plumbers and HVAC Mechanics and Installers. Solar Installers will also see high growth, although they account for fewer new workers than these occupations.** Of the 12 priority occupations in this report, five occupations have a demand gap assessed as "severe" that should be a focus of future workforce development policy and investments. These occupations include the four occupations above, along with Sheet Metal Workers.

9. **Energy transition impacts are limited to specific sectors and occupations, under both EMP scenarios modeled for employment impacts.** Sectoral impacts are confined to the transportation and fuels sectors, which could see net decreases in employment of 7,100 and 4,700 jobs, respectively. Occupations impacted the most significantly include Heavy and Tractor-Trailer Truck Drivers; Customer Service Representatives; Janitors and Cleaners, except Maids and Housekeeping Cleaners; Security Guards; and Hand Laborers and Freight, Stock, and Material Movers who are involved in petroleum fuel production, transportation, and fueling or service stations. The State has begun to integrate programming into funding that supports workers who will be transitioning from specific industries into green industries. Further proactive planning for impacted workers, industries, and communities will be crucial to maximizing a more equitable approach to New Jersey's energy transition.

Assessing the Role of New Jersey's Green Workforce Ecosystem

10. **Government agencies, including the New Jersey Department of Labor and Workforce Development (NJDOL) in particular, are perceived as a connector between employers, training providers, and New Jersey's workforce.** The New Jersey Economic Development Authority (NJEDA) has played a similar role for specific technologies like OSW and EVs. The seeming absence of New Jersey workforce intermediaries (who can bridge and build relationships between workforce stakeholders) has pushed state agencies into more of a leadership role in this capacity than is seen in other states.

11. **Stronger coordination and connections are needed between employers in green industries and the many entities in the New Jersey workforce ecosystem such as educators, unions, training providers, and community groups.** Green employers, especially in newer green industries, tend to be less involved in New Jersey's workforce ecosystem than other employers (with exceptions) and bring more limited experience and understanding of their future workforce needs. Increasing communication and partnership between employers and workforce stakeholders is vital to recruiting, training, and retraining a skilled green workforce.

2 Please refer to the Occupational Profiles section for more information on the wage and demographic data for each priority occupation.

3 Please refer to the Occupational Profiles section for more information on the education and training requirements for each priority occupation.

4 Please refer to Appendix A: Report Methodology for more details on the employment projections. Additional information on the Energy Master Plan and Current Policy and High Electrification scenarios can be found here: https://www.nj.gov/emp/about/committee.html

12. **There remains a lack of understanding about opportunities in clean energy and the green economy, particularly among workers, students, and under-resourced and underserved populations in overburdened communities.** Public information available on occupations in the green economy has increased over the last few years, based on interviews conducted for this report. However, misinformation and a general lack of awareness of the green economy, and its many available occupations, continue to fuel negative perceptions in overburdened communities. Overall, workers remain unaware of many employment opportunities in the green economy. Community organizations can be an ongoing leverage point in addressing this gap but require more funding and better coordination to offer education, guidance, and resources. Training providers and employers looking to recruit or hire from overburdened communities can partner with existing community groups and wraparound service providers to support these efforts. Two recently launched resources to support awareness of training programs include the NJ Training Explorer, which provides information on a broad range of trainings, and the NY/NJ Offshore Wind Training website, which provides information specific to OSW in the region.[5]

Inventorying New Jersey's Training Assets

13. **Training providers and programs exist for all priority occupations in New Jersey, especially those that require more specialized skill sets.** Training capacity in New Jersey for Electricians is the most available of the priority occupations, with 89 programs across the state, followed by HVAC Mechanics and Installers, and then Welders. While only five programs are identified for General Maintenance and Repair workers, training is less essential to enter this occupation, given its minimal education and experience requirements for entry-level positions.
14. **There are more training programs for high-growth occupations in the northern region of the state, albeit with variation in availability among occupations.** The largest share (40%) of the programs hosted in-person are in North Jersey.[6] The southern and central regions of New Jersey have more training opportunities for Carpenters and Operating Engineers and Other Construction Equipment Operators. Among all the training programs inventoried, 11% are offered online by New Jersey institutions.
15. **Pre-apprenticeships and other hands-on, job readiness programs are vital to developing New Jersey's green economy workforce pipeline.** When job seekers participate in pre-apprenticeships and other work experience-centered programs, they can gain familiarity with construction and manufacturing sites and better identify their interest in pursuing full-time or permanent jobs in these industries. The best pre-apprenticeships offer individualized support to participants, such as mentorships and stipends, which increase completion rates. These programs typically include focused outreach workers, who collaborate with communities and organizations to recruit candidates from underserved backgrounds. New Jersey has taken the initiative to increase these opportunities through funding streams such as the NJDOL's Pre-Apprenticeship in Career Education (PACE) grant program. Increased union direct entry programs can further maximize the impact and opportunity that pre-apprenticeship programs provide.

Ensuring Access to Green Employment Opportunities in New Jersey

16. **Providers across the state offer many types of wraparound services, including childcare, transportation, career coaching, youth and family services, education, and training, and financial, disability, addiction, and behavioral health services. However, overburdened communities in the southern part of the state do not have as much proximity to these services.** The northern counties of Bergen, Hudson, and Middlesex have providers located throughout the counties and within overburdened communities located in those counties, whereas counties like Burlington, Atlantic, and Cumberland have few providers throughout. These counties in South Jersey also have large regions containing overburdened communities without any providers nearby. Only 35 of the total 85 identified organizations (41%) currently offer some sort of workforce development program and/or partner with a workforce organization to provide supportive services.
17. **New Jersey employers, workers, and students seek better communication about how to tap into available resources and funding opportunities in the green economy.** Only one-fourth of the companies surveyed utilize incentives and rebates available for clean energy, while two-thirds reported they do not utilize these incentives and rebates, with the most common reason being that they are unaware of programs. Meanwhile, according to research interviews, workers and students would benefit from increased communication and better marketing, as well as more clarity, of career paths and opportunities within the green economy.
18. **Companies continue to emphasize the ongoing skills deficit found in workers that they seek to hire.** A common criticism from employers in the green economy is that incoming workers are not being trained or educated to their current industry's skill requirements. Career and technical training providers are also seeking more partnerships with employers and other industry stakeholders in the green economy. Priority areas of overlapping concern include curriculum design and instruction, and greater vocational training. Digital and technological literacy is a foundational skill need emerging in many new roles (such as EV repair and charging maintenance).
19. **OSW still has the potential to be a significant part of New Jersey's green economy and workforce, but ongoing uncertainty has increased significantly over the past two years.** During the research process, the State received praise from a range of stakeholders in education, organized labor, and the business community for its commitment, resources, and strategic support in boosting OSW in New Jersey. While federal political developments are likely to hinder further development in the short term, the State remains fully invested in the industry's development.

5 "Offshore Wind Training New York & New Jersey," NYSERDA and NJEDA, https://www.offshore-windtraining.org/ and "NJ Training Explorer," My Career NJ, https://mycareer.nj.gov/training.

6 For the purposes of this report, North Jersey includes Bergen, Essex, Hudson, Morris, Passaic, Sussex, and Warren Counties; South Jersey includes Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Salem Counties; and Central Jersey includes Hunterdon, Mercer, Middlesex, Monmouth, Somerset, and Union Counties.

RECOMMENDATIONS

These recommendations expand on *workforce-specific* recommendations from the CGE's 2022 report. These recommendations are grouped by stakeholders who are critical to New Jersey's green workforce development and can serve as an initial foundation for strategy development and work-planning among those focused on the future of New Jersey's workforce.

Educational Institutions

1.1 The state's innovative climate curriculum in kindergarten through 12th grade education (K-12) should also include information on employment opportunities in the green economy, as well as explore and support students' interest in the trades. Introducing future workers to careers in the green economy can have a long-term impact on their career decision-making. Greater exposure to green career opportunities through collaboration with employers, unions, and educational institutions can help build a strong pipeline of skilled workers.

1.2 Community colleges and technical schools can support graduates entering entry-level jobs through direct outreach and expanded partnerships with green industry employers that inform and enhance their training and vocational programs. This collaboration ensures students gain relevant skills, enhances entry-level job readiness, boosts employer confidence in graduates, and creates post-graduation employment pipelines.

1.3 New Jersey undergraduate and graduate students need targeted exposure to career-centered experiences, relevant to their field of study, which facilitate entry into clean energy and other green economy industries. New graduates in New Jersey often lack the industry-specific skills needed for the green economy, highlighting the importance of career-focused education during post-secondary studies. Universities can address this by offering career exploration, internships, and certification programs, among other programs to enhance students' employability, especially in Science, Technology, Engineering, and Mathematics (STEM) fields.

1.4 The shortage of career and industry professionals in Career and Technical Education (CTE) programs can be partly addressed by expanding pathways and resources for them to enter teaching and training positions. Instructors with significant professional experience can be valuable trainers but often need support to transition into teaching effectively. Encouraging their participation can bridge the instructor gap in green and trade-related programs, which can also indirectly enhance student employability and educational quality.

Employers

1.5 Industry partnerships that focus on employers in New Jersey's green economy can be a foundation of successful statewide green economy workforce initiatives. Effective green industry partnerships involve collaboration among workforce boards, educational institutions, employers, and community groups, among others, to achieve long-term, system-wide green workforce goals in New Jersey. These partnerships, currently led by NJDOL, integrate employer perspectives to align workforce development with anticipated occupational demands and required skills.

1.6 New Jersey's manufacturing sector is a critical component of the state's green workforce strategy, especially within more emerging green industries. Producing and exporting green economy technologies creates jobs in New Jersey, benefiting the state's workforce. The State can support this growth through tax incentives, grants to retool plants, connections with green technology developers, and partnerships with well-established training organizations to strengthen supply chains and promote businesses.

1.7 Green economy employers should join other stakeholders in recruiting, hiring, and retaining workers from overburdened New Jersey communities. Workers from underrepresented and overburdened communities offer untapped potential for New Jersey's green economy but face significant employment barriers such as education gaps, transportation, childcare, and, in some instances, justice system involvement. Addressing these challenges requires tailored employer strategies and collaboration with a comprehensive set of workforce stakeholders to create a suite of inclusive recruiting, hiring, and retention programs.

1.8 Employers should pursue greater access to opportunities for women in the New Jersey green economy and integrate gender-specific barrier-reduction strategies as an essential element of success. Women are significantly underrepresented in New Jersey's green economy, requiring targeted efforts to address barriers to their participation. Effective strategies include offering subsidized training programs, career navigation support, leadership development, childcare solutions, and outreach campaigns that highlight women in trades and manufacturing.

1.9 Green economy companies should also partner with New Jersey unions to give clear direction of upcoming job demand, and the occupations and skills needed. Support for clean energy technologies among New Jersey unions is mixed, and green economy companies can play a key role in building alignment with unions by clarifying training needs and pursuing collaborative approaches.

Unions

1.10 Unions will play a crucial role in advancing New Jersey's green economy, particularly by ensuring jobs in building and construction trades, where much of the projected workforce demand is centered, are safe for workers and provide family-sustaining wages. Continuing to support the hiring of union workers will maximize the growth of a strong green workforce in the state.

1.11 To fully capture the benefits that unions provide, barriers to union entry and membership must be addressed. Union-exclusive training programs can create challenges for individuals seeking to enter apprenticeships. To address these challenges, unions can increase diversity and accessibility through initiatives like expanded apprenticeships, commitments to more welcoming workplaces, and better support systems for new apprentices. Unions can also improve outreach by partnering with educational institutions, fostering relationships with intermediary organizations, and providing clear guidance on the union entry process.

1.12 Unions that administer their own pre-apprenticeship programs can set women and minority participation goals and provide direct entry pathways into union opportunities. Pre-apprenticeship programs help workers access careers in unions, manufacturing, or other employers, with best practices including stipends, trusted curricula, and outcome monitoring. To improve these programs, New Jersey unions can create clearer pathways, enhance outreach to overburdened communities, provide support for disadvantaged candidates, and adopt a locally targeted approach to recruitment and support for prospective apprentices.

1.13 Direct entry programs that ensure pathways into union apprenticeships can help overburdened communities in overcoming lengthy wait periods for union entry, which can often last a year or more even after successfully

passing through a union's assessment and screening process. Stakeholders identify direct entry as critical to overall pre-apprenticeship success, but the state has limited direct entry programs. The lack of an established system for supporting the creation of and approving state and local direct entry programs in New Jersey can hinder access to union jobs for overburdened communities. To address this gap requires changes to New Jersey's apprenticeship system and encouraging unions to support direct entry commitments.

State Government

1.14 The State needs to increase awareness of funding opportunities and incentives, such as those available through NJEDA and other state and federal programs, and support applicants through the application processes for state funding and Requests for Proposals. Confusion and lack of knowledge about available funding is hampering uptake. State agencies should improve communication and provide support to raise awareness of these programs, while also offering technical assistance to help smaller nonprofits and hard-to-reach communities navigate the application process. By providing regular outreach and resources, more employers and organizations can access funding for training and recruitment needs.

1.15 The growth of certain occupations within New Jersey's green economy underscores the importance of targeting workforce development strategies to those roles in the near-term while continually assessing progress across talent pipeline development, coordination among key entities, and expansion of statewide training capacity. Addressing severe occupational demand gaps, such as for Electricians, Plumbers, and HVAC workers, necessitates strategic and focused expansion of training programs and recruitment pipelines to meet these needs. A flexible, iterative workforce strategy is more important in the longer term to align with market trends and improve accessibility, especially in overburdened communities, and will enhance workforce readiness and a sustainable green economy.

1.16 Increasing funding for vocational-technical schools and community colleges in the state can help launch new workers into priority occupations in New Jersey's green economy. New Jersey's CTE programs face capacity constraints and require increased state and partner investments in trainers, equipment, and aligned curricula. Strengthening connections between CTE programs and green economy industries, along with additional funding for low-income populations, could enhance training opportunities and visibility into green industries for overburdened communities.

1.17 Improving data and information available about occupations and career paths in the green economy can fill knowledge gaps and support new workers' interest in the green economy. Stakeholders emphasize the need for clear career guidance and informational resources to better connect residents with opportunities in the green economy. Providing standardized guidelines for certifications, licenses, and career maps in New Jersey's green industries can help individuals navigate their career paths more effectively. Developing a central online database with career information, wage details, and growth projections, along with resources for workforce program development, can support under-resourced groups and improve workforce training.

1.18 Effective placement, retention, and tracking of graduates from New Jersey training and education programs is critical to the success of green economy workforce pipeline building, and a key place for New Jersey agencies to play a leading role. Capturing comprehensive career pathway data from recruitment to long-term retention will require close collaboration with workers and employers.

Training Providers and Wraparound Support Providers

1.19 Varying the length of green economy training programs and providing stackable short-term credentials can increase accessibility to certain occupations in the green economy. Programs that offer more immediate credentials and stackable certifications can help participants re-enter the workforce more easily. Workforce stakeholders in New Jersey are seeing a shift in interest toward shorter, non-credit training programs, particularly in clean energy and manufacturing sectors, as some students seek these quicker paths to employment.

1.20 More training programs, especially those based in overburdened communities, should couple a specific focus on training for green industries with foundational education and job readiness training. Individuals looking to enter or re-enter the workforce can lack basic job-readiness skills. Combining foundational skills like math and reading with green training, along with professional skills development, can create direct pathways to employment in the green economy.

1.21 Targeting the southern part of the state is important to maximize statewide impact. The southern region of New Jersey has a large untapped workforce for the green economy, and future training programs should focus on this region, particularly in overburdened communities with fewer resources, to better support jobseekers.

1.22 Community organizations can be powerful partners for the State and training providers. Community organizations are trusted resources that can enhance the impact of workforce programs by effectively reaching local populations and are excellent partners for training providers to improve program credibility and relevance.

1.23 Providing integrated and holistic wraparound support services will more effectively meet the needs of New Jersey workers. These support services, including childcare, transportation, mental health care, and other resources and assistance, are essential for helping job seekers overcome barriers to participating in workforce programs, especially in the green industry. These services, although underfunded, can be supported through federal, state, and philanthropic funding, with strategies like stipends and learn-and-earn opportunities offering additional assistance. Transportation and childcare are critical barriers and solutions like rideshare services, bus passes, and flexible training hours can help alleviate them. Addressing these issues requires collaboration with service providers and adapting training programs to better meet the diverse needs of job seekers.

INTRODUCTION

New Jersey is a national leader in clean energy and remains focused on building a substantial green economy. The State's accelerated targets, policies, and investments have already created thousands of jobs and will continue to do so, as the State strives for 100% clean energy by 2035. Since the first iteration of the Council on the Green Economy report (CGE) *Green Jobs For A Sustainable Future*, published in 2022, New Jersey's green economy employment has gained over 6,000 jobs, growing at a rate above 10%, faster than the state's total economy growth of 7%.[7] The green economy is a proven job creator in the state, and there is extensive opportunity for continued expansion.

While employment growth is projected to continue, a variety of barriers exist that may slow future job creation and accessibility, hindering the State's progressive climate and economic goals. In the near-term, while the number of green jobs continues to increase, the pool of qualified and skilled applicants to fill the growing demand remains limited, and these opportunities in the green economy are not equally available to all populations across the state.

Growth in any sector is never linear, and New Jersey's green sector will be no exception. Recent economic and political changes, at both state and federal levels, are likely to have an impact on the state's short-term green employment and clean energy goals, most likely on a technology-by-technology basis. While New Jersey will continue to emphasize the importance of offshore wind (OSW) and deployment of electric vehicles (EVs) as foundational building blocks of its green economy, federal policy change may limit opportunities in the near-term.

This report seeks to provide policymakers and other green economy stakeholders with data-driven information and conclusions that can inform policy decisions, resource allocation, and workforce investments needed to meet New Jersey's green economic and employment goals. Through innovative use of scenarios modeled for New Jersey's Board of Public Utilities (NJBPU) 2025 Energy Master Plan (EMP), it updates calculations of current and projected green economy employment, compared to the CGE's previous report. It features a new, comprehensive analysis of the state's existing training and workforce ecosystem, including the capacity of wraparound support services in the state, and the ability of that ecosystem to meet anticipated job growth in ways that support equal access to job opportunities. The report concludes with a set of recommendations that incorporate learnings and best practices from across New Jersey and throughout the research process. Finally, twelve detailed occupational profiles are included, featuring insights into many of the most important occupations in New Jersey's green economy. Several research workstreams, inventories, and methodologies are available in a separate appendix.

7 U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, New Jersey, 2021-2023.

DEVELOPMENTS IN NEW JERSEY'S GREEN ECONOMY SINCE 2022

The CGE's 2022 report *Green Jobs for a Sustainable Future* was the culmination of a first-of-its-kind initiative to bring together critical stakeholders and government agencies across New Jersey's economy. Over the course of a year, the CGE members met nearly monthly, spoke with companies and workers, conducted site visits and tours, and learned how New Jersey's green economy was evolving. The concluding report covered numerous topics connected to workforce, innovation, investment, and support for industries within New Jersey's green economy, and provided dozens of recommendations. This section reviews developments on some of those topics and priorities since the report was published.

Impact of the "Future of Green Jobs in New Jersey 2022 One Year Plan"

In conjunction with the New Jersey CGE report *Green Jobs for a Sustainable Future*, the NJ CGE released a 2022 One Year Plan.[8] The plan was divided into four categories: the execution of emerging programs and pilots, development of new programs, learning, and convening. A brief recap of each category is below:

- **The 'execution of emerging programs' section** highlighted funding for pilot programs through the Governor's Office of Climate Action and the Green Economy, the New Jersey Economic Development Authority, the New Jersey Board of Public Utilities, and New Jersey Department of Environmental Protection. These programs focused on areas including decarbonization, OSW, workforce development and wraparound services, diversity initiatives, and manufacturing.

- **The 'learning' section** included the proposed creation of a study focused on the development of a workforce gap in building decarbonization (which has been completed), as well as a study on workers and industries impacted by a transition to a green economy. That latter workstream is achieved through this report.

- **The 'convening' section** called for regular convening of stakeholders facilitated by the Governor's Office of Climate Action and Green Economy. The Governor's Office has successfully established or actively participated in multiple working groups, including for building decarbonization, EVs, New Jersey Department of Labor and Workforce Development's Industry Partnerships, and Business and Industry Leadership Team meetings.

- **The 'development of new policies and programs' section** laid out four proposed actions, starting with assembling stakeholder working groups to review strategic recommendations in the NJ CGE's 2022 report. This has happened at an informal level but has not yet been formalized.

8 "Future of Green Jobs in New Jersey: 2022 One Year Plan," NJ Council on the Green Economy, September 2022,https://www.nj.gov/governor/climateaction/documents/CGE%20Roadmap%20One%20Year%20Plan.pdf.

Recent Green Economy Funding and Workforce Program Development

From 2022 to 2024, funding and programming for workforce development expanded dramatically at both state and federal levels. The Biden White House reported funding 130 projects in New Jersey through the Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA), which accounts for over $13 billion in investment and thousands of jobs.[9]

State green workforce funding efforts were led by a number of state agencies, including the New Jersey Economic Development Authority (NJEDA), the New Jersey Department of Environmental Protection (NJDEP), and New Jersey Department of Labor and Workforce Development (NJDOL).[10] Examples of state funds to support workforce and skills development in the green economy include NJDEP's $5 million Building our Resilient, Inclusive, and Diverse Green Economy (BRIDGE) grant, NJEDA's $7 million Green Workforce Training Grant Challenge, and NJEDA's $3.725 million Offshore Wind Workforce and Skills Development Grant.

NJEDA has granted various funding streams, in addition to the workforce grants, with many intentionally focused on supporting the wind and adjacent industries, including reimbursement of construction costs, revolving loan funds, credit enhancements and more. The NJ Cool Pilot Program, for instance, reimburses eligible hard construction costs to replace fossil fuel heating systems in commercial, industrial, and institutional buildings.

From 2021 to 2025, NJDEP invested nearly $2.5 million in a summer workforce development program, hosting approximately 275 youth, 16-20 years of age, from across New Jersey. Entitled the Youth Inclusion Initiative, this initiative empowers youth from overburdened communities by offering hands-on experiences, environmental insights, and technical skills needed for careers in environmental protection. Through collaboration with NJDEP and local organizations, the program cultivates a diverse and capable new generation of environmental stewards, particularly focusing on providing opportunities to youth from communities with limited access to natural lands.

NJDOL has continued to be instrumental in providing funding for workforce development that impacts green industries. The Growing Apprenticeship in Nontraditional Sectors (GAINS) grant, for example, helps fund the training costs for employers to provide apprenticeships, specifically in nontraditional, high-growth industries. NJDOL also supports programming to match industry partners with trainers which commits employers to certain hires. In addition, the Upskill program provides free worker training for businesses who have existing employees who can be trained in a new skill for future workforce demands.

Utilities have also increased their focus on providing training. Triennium 1, approved by the NJBPU and running from 2021 to 2024, was a three-year multi-program initiative requiring utilities to achieve energy efficiency targets. Triennium 2 programs take effect this year. Under Triennium 1, utilities expanded their training course options, with one utility, for example, growing from offering four training programs to 11. Utilities also grew their workforce upskilling programs that supported the creation of long-term careers and pathways to higher-level positions in the green economy. This growth in workforce programming served to strengthen utilities' collaboration with local communities, technical schools, and community colleges.

9 "Investing in America," The White House, https://www.whitehouse.gov/invest/?utm_source=www.invest.gov. Original web address no longer available.

10 A more comprehensive inventory of policy and programs that support workforce development in New Jersey can be found in Appendix G: Policy and Program Inventory.

Changes in Public Perception

Publicly accessible information about clean energy technologies is considered more readily available according to workforce and education stakeholders, and employers. Many agencies, such as NJDEP, NJDOL, and NJEDA, have pursued dedicated information sharing since 2021.

> ***"If you look at whole region, there's a lot more information than there was 3 years ago. This was a great job by EDA."***
>
> Regional economic development executive

However, the perception of the green economy in New Jersey is not uniformly positive. The green economy faces growing pushback due to extensive public campaigns against OSW and wind developers pulling out of OSW projects.

Evolving Employer Concerns

Surveys and interviews of green employers find that many are having trouble finding qualified workers to participate in the green economy. However, while employers are having trouble meeting current job demand, they are also less certain about future employment expectations. Employers do not want to oversubscribe resources toward developing training and education for jobs in industries that could be distressed by political and global market constraints, or where job availability is limited. Surveys and interviews with employers also identified uncertainty and confusion in how best to define green or clean energy projects.

Increasing Focus on the Green Economy by Educators

In interviews, New Jersey higher education institutions and associations highlighted their work and programming to increase awareness of clean energy and the green economy for students. In interviews conducted with post-secondary educators, the main challenges include maintaining students' interest to sustain new clean energy programs, finding qualified tradespeople to teach courses, and ensuring programs stay relevant to the needs of emerging industries.

> ***"It's hard to get instructors, they are pulling them right from the industry so they might not know how to teach. [The] State could help to get people more certified in teaching. We are having a hard time finding OSHA teachers, and [it's] not geographically fair, as most [are] in the North."***
>
> Workforce training provider

Some education providers report emphasizing shorter, non-credit training programs in the green economy, especially among community colleges. Community colleges share that they are seeing degree program participation dropping off due to the longer time commitment, as well as lack of wraparound services. They are finding these types of programs to be most successful when collaborating with industry partners to develop curriculum and provide employment opportunities for program graduates.

> ***"I'm not as confident today as I was 3 years ago that degree programs are what the industry needs."***
>
> College academic officer

Many stakeholders highlighted groundbreaking work implemented in New Jersey's public schools to reach kindergarten through 12th grade (K-12) student populations with a curriculum focused on sustainability, as well as an expansion of summer and pre-college programs and workshops focused on clean energy. Despite these efforts, stakeholders feel that K-12 students are not being

exposed to critical trades occupations and other potential career opportunities in the green economy during their education.

Development of Offshore Wind

OSW has been the technology featured most prominently in New Jersey's strategy to become a national leader in clean energy and the green economy. Despite the setback of Ørsted's cancelled projects in New Jersey in 2023, OSW remains important in New Jersey's plan for increasing employment in the green economy. From 2021 to 2023, employment in wind (onshore and offshore) grew 21% in the state, from 975 jobs to 1,182.[11]

Training programs and educational programs were established in the state over the past three years. These OSW programs vary in their approach. Some emphasize skill-transferability to give students skills that can also be transferred to other industries. A notable milestone was the launch of an apprenticeship program for sub-arc welding in partnership with EEW Group, which became the first OSW-based registered apprenticeship program in New Jersey, highlighting the impact of NJEDA investment in workforce development. The program, developed in collaboration with NJEDA, U.S. Department of Labor (USDOL), and Gloucester County Institute of Technology (GCIT), is a four-year apprenticeship that offers apprentices certifications such as the 6G welding certification, with a pathway to earn dual credits.

NJEDA has been a key grant provider in funding OSW training programs through grants such as the Wind Safety Training Challenge and NJ Wind Turbine Technician Training Grant Challenge. Training providers have used funding in numerous ways, such as communication of OSW opportunities by providing small scholarships in wind adjacent areas, partnering with vocational and technical schools to provide students with certifications relevant to OSW, and supporting advanced manufacturing through new training equipment.

Additionally, there has been an increased focus on building the supply chain for OSW in New Jersey. While jobs directly related to OSW projects are still nascent, attracting manufacturers into the state represents a substantial opportunity to increase job creation in high wage occupations. Investments are being made in manufacturing facilities to increase training opportunities for workers, develop partnerships between manufacturing facilities and OSW projects, and to increase production of necessary OSW infrastructure.

While some OSW training providers are continuing to train students for OSW, others have slowed efforts until job demand is clearer. Stakeholders remain excited for the rise of the OSW industry but have tempered their optimism since the cancellation of Ørsted projects in 2023 and the challenges that remaining OSW projects face under President Trump's administration.

Expansion of Electric Vehicles

EV deployment and charger station buildout have also been a focus of New Jersey policymakers. From 2021 to 2023, employment related to EVs, and EV infrastructure continued to see expansion in New Jersey, increasing from 5,206 jobs to 6,603 jobs, a 27% growth rate.[12]

Policies and incentives continue to be implemented in New Jersey to promote the use of EVs in the state. As one example, created in 2021 and amended again in 2024, the Electric Vehicle Charger Make-Ready Requirements for Multifamily Housing statute requires new or reconstructed multifamily housing developments to proportion part of their off-street parking for EV parking spaces, as well as to install EV chargers.[13] Additionally, by 2029, NJBPU is required to create a request for proposal for the establishment of an Electric Vehicle Charging Depot Demonstration Project.[14] Advanced Clean Cars II and Advanced Clean Trucks regulations take effect in 2027 and 2025, respectively, and require auto manufacturers to deliver an increasing percentage of EVs to the state.

Along with regulations to expand EV infrastructure, the promotion of EV use is present through various incentives such as It Pay$ to Plug In,[15] the Electric Vehicle Tourism Program, Clean Fleet Electric Vehicle Incentive Program, eMobility Grant Program,[16] the Electric School Bus grant program,[17] the Diesel Modernization Program,[18] and utility sponsored charging station rebate programs. These represent a few of the incentives and rebates that are all available, as of 2024, in addition to other incentives that have been offered since 2021.

Impacts of the Administration of President Donald Trump

The re-election of President Donald Trump has significantly altered the federal strategy of promoting green economy development in comparison to the Biden administration. New Jersey received considerable funding through the Biden administration's policies targeting climate-related actions and clean energy deployment. These programs are now expected to experience significant cuts or elimination under the Trump administration or be refocused to include the support of fossil-fuel-based infrastructure. Funding for EV infrastructure and climate resilience will similarly see reductions.

In addition, President Trump's administration has taken several immediate steps to halt the development of OSW, including an executive order that indefinitely pauses leasing of OSW energy areas, and separately a new review of previously permitted existing projects. The Trump administration has stated it will pursue an "all of the above" approach to energy, which supports the continued production of fossil fuels, along with renewable and nuclear energy. However, the impacts of these shifts in federal policy are difficult to predict and could be countered by the extensive funding that remains available at the state level for clean energy and workforce development. But the 2024 election results are certain to have near-term impact on New Jersey's approach to expanding its green economy and workforce.

11 "United States Energy & Employment Report 2024," US Department of Energy, 2024, https://www.energy.gov/policy/us-energy-employment-jobs-report-useer.

12 Ibid.

13 "Alternative Fuels Data Center," US Department of Energy, https://afdc.energy.gov/laws/state_summary?state=NJ.

14 Ibid.

15 "It Pay$ to Plug In." Drive Green New Jersey, Department of Environmental Protection, https://dep.nj.gov/drivegreen/it-pays-to-plug-in/.

16 "eMobility Grant Program," Drive Green, Department of Environmental Protection, https://dep.nj.gov/drivegreen/emobility/.

17 "Electric School Bus Grant Program," Bureau of Mobile Sources, Department of Environmental Protection, https://dep.nj.gov/stopthesoot/electric-school-bus-program/.

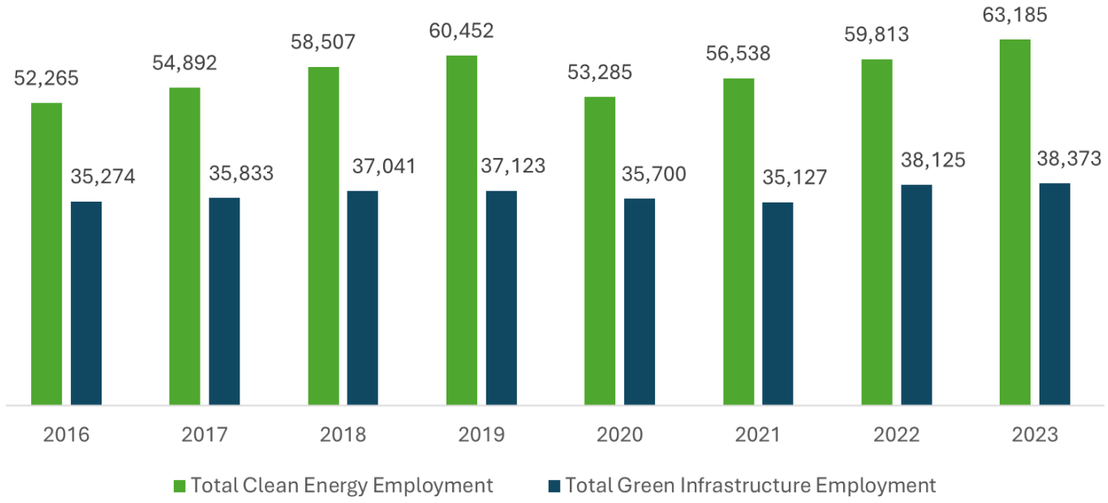
18 "WorkClean: Diesel Modernization Program," Bureau of Mobile Sources, Department of Environmental Protection, https://dep.nj.gov/stopthesoot/equipment-modernization-program/.

QUANTIFYING NEW JERSEY'S GREEN ECONOMY WORKFORCE

THE CURRENT GREEN ECONOMY

Employment in New Jersey's green economy continues to grow, with increases seen in the clean energy workforce each year since 2020, and in the green infrastructure workforce each year since 2021.[19] As of 2023, there are over 63,000 workers in the state's clean energy economy, representing 1.4% of the state's total workforce.[20] Additionally, there are over 38,000 workers in green infrastructure, making up 0.8% of the state's workforce (Figure 1).

Figure 1. Clean Energy and Green Infrastructure Employment in New Jersey, 2016-2023

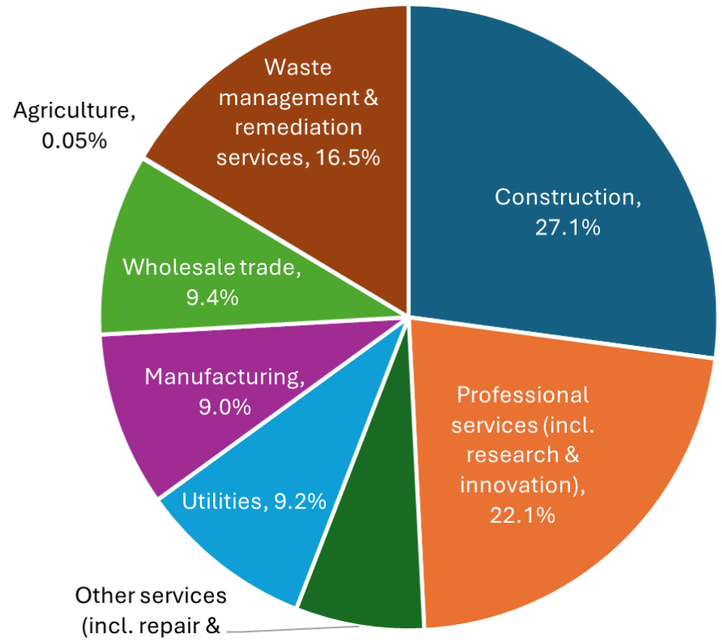


19 Clean energy and green infrastructure are reported separately to avoid double-counting of jobs and should not be summed.

20 https://data.bls.gov/timeseries/LASST340000000000005?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true.

Construction is the largest value chain segment in the state's green economy, representing over one-quarter (27%) of the jobs, followed by professional services, which makes up 22% of jobs in the green economy workforce. The agriculture and forestry segment makes up the fewest jobs, representing under one percentage point of the total jobs in the green economy (Figure 2).

Figure 2. Green Economy Employment in New Jersey by Industry, 2023



Green Economy Employment by Technology

Employment grew in every major technology sector of New Jersey's green economy between 2021 and 2023, as shown in Table 1. The highest concentrations of clean energy workers remain in the green infrastructure and energy efficiency sectors, together making up three-quarters of New Jersey's green workforce. The alternative transportation sector grew by the largest percentage (27%), representing growth of over 1,300 new jobs.

The energy efficiency sector employed over 38,300 in 2023, an increase of 11% from 2021. This continues a pattern of recent rapid growth, expanding by 5% from 2022 to 2023 alone. This sector includes manufacturers, installers, mechanics, and wholesale distributors of energy efficient technologies, such as efficient lighting, ENERGY STAR® appliances, or high efficiency heating, air conditioning, and refrigeration (HVAC) systems. In terms of absolute number of jobs, energy efficiency grew the most between 2021 and 2023 (over 3,600 jobs), compared to the other green economy sectors.

Comprising over 16,200 workers in 2023, New Jersey's renewable energy generation and fuels technology sector added more than 1,300 jobs from 2021 to 2023. This represents employment growth of over 9%. While employment in clean fuels makes up a small portion of the green economy (7% in 2023), it grew by 15% in 2023, compared to 8.2% growth in renewable energy generation employment.

New Jersey's green infrastructure industries, such as water, waste, and wastewater treatment and management of stormwater and resiliency infrastructure, employed over 38,000 workers in 2023, up from approximately 35,000 in 2021. Over six in ten (64%) green infrastructure workers were engaged in the water, waste, and wastewater treatment and management segment, which includes lead paint abatement and removal services and contractors. The remaining 36% of green infrastructure workers support stormwater and resiliency infrastructure developments and buildouts through heavy and civil engineering and construction.

The state's smallest green economy sector, grid infrastructure and storage, still employed over 2,000 workers in 2023, with over 1,100 in grid infrastructure and 900 in storage. Across smart grid, microgrids, energy storage, charging infrastructure, and other grid modernization technologies, employment in this sector increased by 14% from 2021 to 2023.

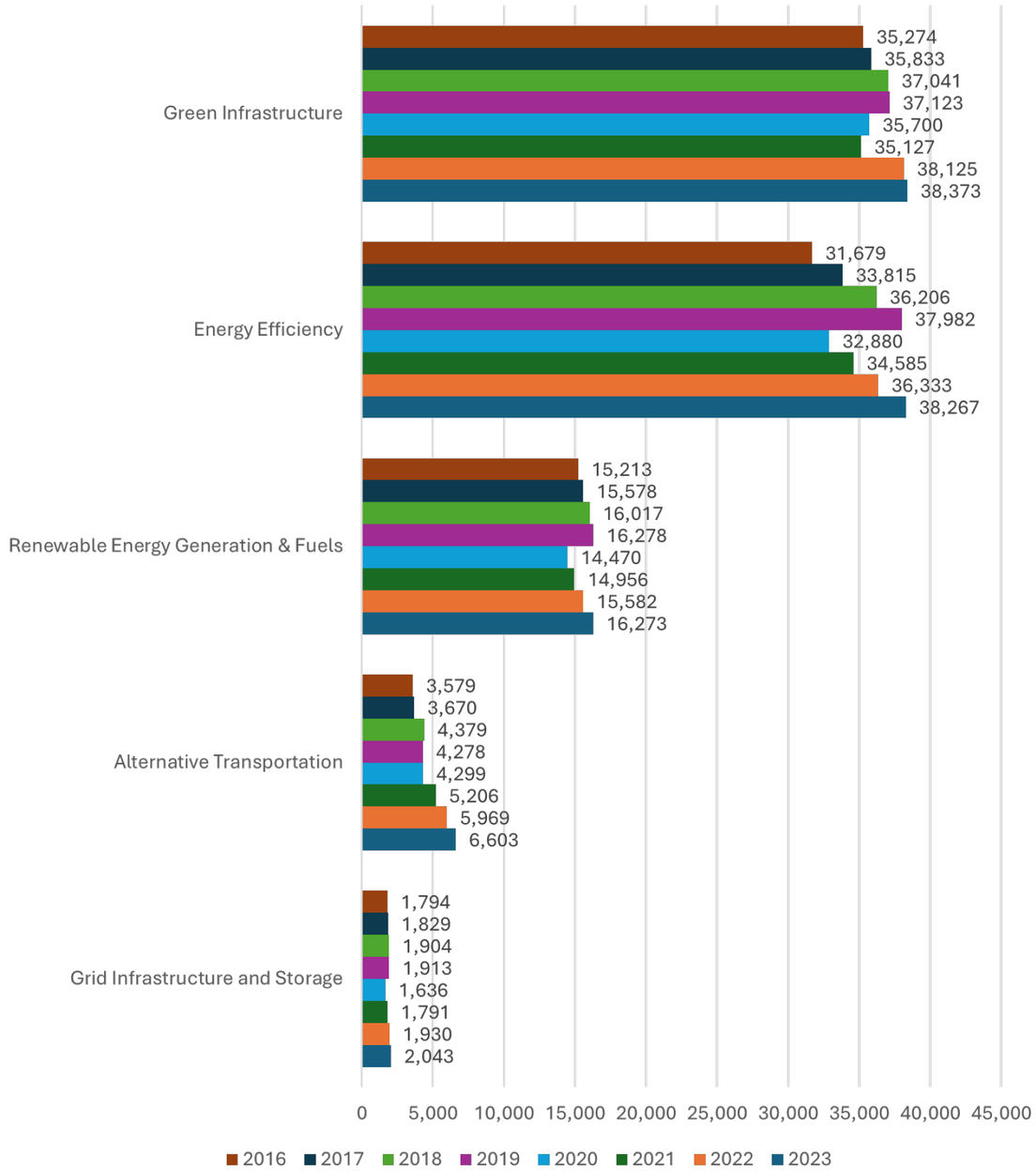
Table 1. Green Jobs by Sector[21]

Sector	Total Jobs, 2021	Total Jobs, 2022	Total Jobs, 2023	Percent Change, 2021-2023	Percent Change, 2022-2023
Green Infrastructure	35,127	38,125	38,373	9.2%	0.7%
Water, Waste, & Wastewater Treatment & Management (incl. lead paint)[22]	21,963	24,136	24,619	12.1%	2.0%
Stormwater & Resiliency Infrastructure	13,164	13,989	13,754	4.5%	-1.7%
Energy Efficiency	34,585	36,333	38,267	10.6%	5.3%
Traditional & High Efficiency HVAC/ Renewable Heating & Cooling	17,751	18,654	19,656	10.7%	5.4%
ENERGY STAR & Efficient Lighting	7,554	8,199	8,772	16.1%	7.0%
Advanced Materials & Other Energy Efficiency Technologies	9,280	9,479	9,839	6.0%	3.8%
Renewable Energy Generation & Fuels	14,956	15,582	16,273	8.8%	4.4%
Renewable Energy Generation	14,034	14,592	15,211	8.4%	4.2%
Clean Fuels	922	990	1,062	15.2%	7.2%
Alternative Vehicles	5,206	5,969	6,603	26.8%	10.6%
Grid Infrastructure & Storage	1,791	1,930	2,043	14.0%	5.8%
Grid Infrastructure	991	1,056	1,105	11.5%	4.7%
Storage	800	875	938	17.2%	7.2%

21 There is some overlap across the stormwater and resiliency infrastructure sub-sector, as these employment estimates are more broadly defined than the other green sectors. Due to this overlap, job totals across stormwater and resiliency infrastructure should not be summed against other sectors, particularly with grid infrastructure or energy efficiency; summing employment across these sectors could result in double-counting of jobs. For more information on the technologies considered part of New Jersey's green economy, please refer to Appendix B: Green Jobs Definition.

22 This sector includes lead paint abatement services and lead paint removal contractors, which are a smaller segment of the overall remediation services industry; the remediation services industry is classified under waste treatment and management.

Figure 3. Green Economy Employment in New Jersey by Technology, 2016-2023



Green Economy, Clean Energy, and Other Energy Technologies in New Jersey

The green economy of New Jersey compromises both green and clean energy technologies in this report, consistent with the CGE's 2022 report's definition of green employment, which sought to balance a credible and defined categorization of specific green industries with an ambitious look at the breadth of New Jersey's green economy.

Green technologies as defined in New Jersey include water, waste, and wastewater treatment and management, as well as stormwater and resiliency infrastructure. These technologies generally contribute to a cleaner, more sustainable environment. Clean energy technologies produce little to no greenhouse gas emissions and, within this definition, these technologies include grid infrastructure and storage, renewable energy generation and fuels, energy efficiency and alternative vehicles. These latter technologies are captured by the annual United States Energy and Employment Report and are commonplace in various state clean energy definitions.

New Jersey's broader energy economy includes these clean energy sectors as well as fossil and nuclear energy generation and fuels, traditional electric transmission and distribution, and gas and diesel motor vehicles and fueling stations.

Green Economy Workforce Demographics

New Jersey's overall workforce is evenly split by gender, with 50% male and 50% female representation. In comparison, the green economy workforce has a heavier concentration of male workers. New Jersey's green infrastructure workforce has the largest share of males (84%) compared to the other green economy sectors, which range between 71% to 77% male.

For both New Jersey's workforce overall and green economy, approximately one-fifth of workers are Hispanic or Latino. White workers are more concentrated in the green economy than the overall workforce. In the overall New Jersey workforce, 70% of workers are White. In contrast, White workers make up 86% of the green infrastructure workforce and 77% of both the energy efficiency and alternative vehicles workforces. Black or African American workers comprise 16% of the state's overall workforce, while making up 10% or less of the workforces in green infrastructure and clean energy technology sectors (Table 2).

Since 2021, demographic trends at the overall level and in the green economy have remained largely unchanged. The only segments to move by more than three percentage points are within green infrastructure workers, with the Hispanic or Latino workforce growing by four percentage points.

Table 2. Workforce Demographics, New Jersey, 2023

	New Jersey Overall[23]	Green Infrastructure[24] [25]	Grid Infrastructure & Storage	Renewable Energy Generation & Fuels	Energy Efficiency	Alternative Vehicles
Male	50%	84%	77%	71%	76%	77%
Female	50%	16%	23%	29%	24%	23%
Hispanic or Latino	19%	20%	17%	18%	16%	18%
Not Hispanic or Latino	81%	80%	83%	82%	84%	82%
American Native[26]or Alaska Native	1%	1%	2%	1%	1%	1%
Asian	11%	3%	8%	9%	6%	5%
Black or African American	16%	9%	10%	9%	9%	9%
Native Hawaiian or other Pacific Islander	0%	0%	1%	1%	1%	1%
White	70%	86%	72%	72%	77%	77%
Two or more races	2%	1%	8%	8%	6%	7%

23 "QWI Explorer," 2023Q4 United States Census Bureau, https://qwiexplorer.ces.census.gov/.

24 The total jobs in green infrastructure for the state are determined at the 6-digit North American Industry Classification System (NAICS) level, however demographic information is not available at this level. These percentages were calculated using the 3-digit NAICS level.

25 JobsEQ®. 2024Q1. Based on Place of Residence estimates

26 Reported as "American Indian" in data sources.

Overview of Priority Occupations in New Jersey's Green Economy

Alongside green and clean energy technologies, the report explores key occupations within the green economy, selecting 12 occupations for deep analysis, spanning four different occupational groups (Table 3). These 12 occupations are expected to be prominent as the green economy expands further. Prioritization of these occupations can create more targeted incentives and training programs, among other activities, to best support the growth of New Jersey's green economy.

Table 3. Key Occupations and Corresponding Occupational Groups for New Jersey's Green Economy Report[27]

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 Mechanics and Installers (HVAC Technicians)	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.
Construction Laborers	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.
Construction Managers	11-9021	Management	Oversee and coordinate construction and maintenance activities, including planning, budgeting, and scheduling. Manage specialized areas like carpentry or plumbing and supervise subordinate staff.
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)	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.
Solar Photovoltaic Installers (Solar Installers)	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.
Maintenance and Repair Workers, General	49-9071	Installation, Maintenance, and Repair	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of a building in repair.

Current Occupational Employment in New Jersey's Energy Economy

While these 12 occupations are important to the state's green economy, the current employment of these occupations is assessed within New Jersey's broader energy economy. A broader energy approach is utilized here because the modeled employment impacts in the later report sections are based on New Jersey's EMP which analyzes the full energy economy.

Maintenance and Repair Workers are the most common priority occupation in New Jersey, with over 38,000 workers economy-wide in 2022, followed by over 28,000 Construction Laborers. The smallest priority occupations include Sheet Metal Workers and Solar Installers, with around 2,500 and less than 1,000 total workers in New Jersey, respectively.[28]

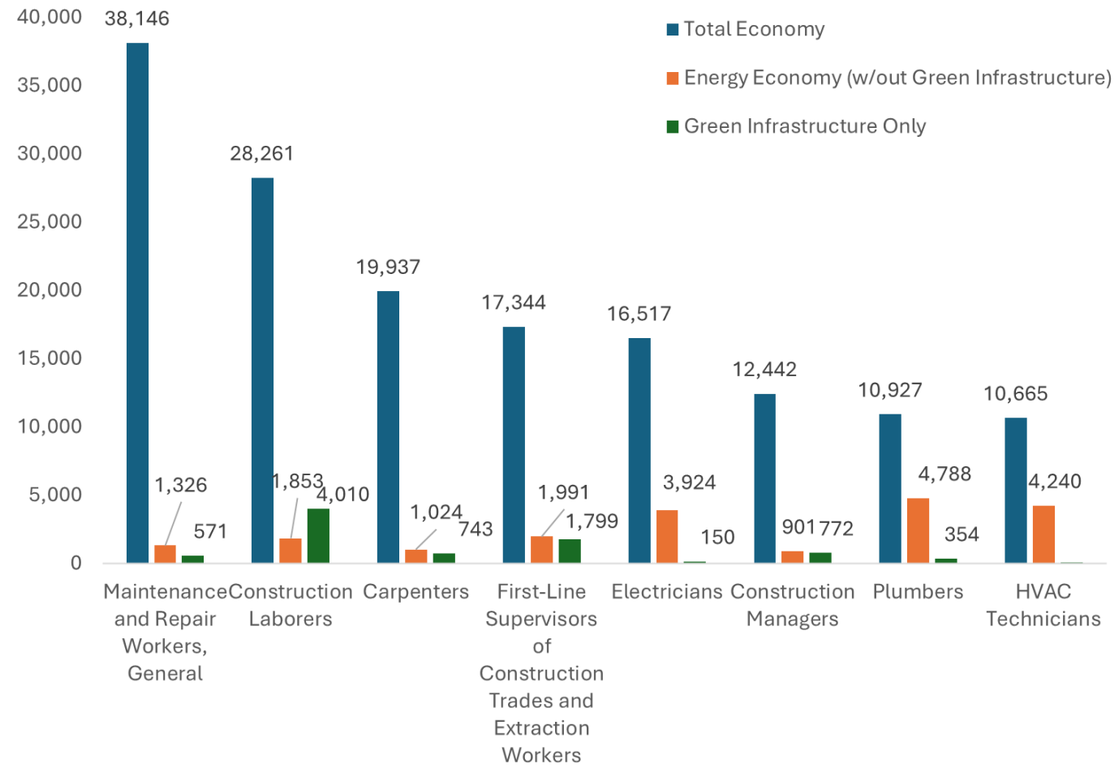
When compared to the total New Jersey workforce, energy economy workers in priority occupations can be a sizable portion of the total number of workers in these priority occupations in the state. Of the nearly 11,000 Plumbers in New Jersey, 44% of this workforce is in the energy economy. Similarly, 40% of New Jersey's HVAC Technician workforce and 39% of Sheet Metal Workers are found in the energy economy. Among green infrastructure workers, two priority occupations stand out. Green infrastructure Operating Engineers comprise 22% of total Operating Engineers in New Jersey while

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

28 Dedicated Solar Photovoltaic Installers are one of several occupations involved with the installation of solar energy. The classification of Solar Photovoltaic Installers captures a portion of all occupations involved in photovoltaic installation. For example, a construction firm doing a solar installation may utilize electricians, construction laborers, etc. rather than a worker classified as a dedicated Solar Photovoltaic Installer.

Construction Laborers in green infrastructure represent 14% of the total Construction Laborer workforce in the state (Figure 4).

Figure 4. Total Energy and Green Infrastructure Employment of the Eight Largest Key Occupations in New Jersey, 2022[29]



PROJECTED GROWTH IN THE ENERGY ECONOMY TO 2035

The Modeling Process

This chapter details the New Jersey employment impacts under the *Current Policy* and *High Electrification Scenarios* in New Jersey's EMP modeling. The *Current Policy Scenario* was chosen as the basis for the subsequent occupational analysis as it details a path forward that relies on policies and programs currently in place for New Jersey. Employment modeling mirrors the parameters outlined for the EMP and calculates net job gains or reductions across four sectors — electricity, fuels, buildings, and transportation — and includes all energy technologies — clean, fossil, and neutral. While the scope of employment impacts here encompasses the full energy economy, the growth seen under the *Current Policy Scenario* and *High Electrification Scenario* is almost entirely due to the clean energy and climate policies and investments enacted by the State of New Jersey.

29 There is some overlap across the green stormwater and resiliency infrastructure sub-sector, as these employment estimates are more broadly defined than the other green sectors. Due to this overlap, job totals across green infrastructure should not be summed against the other green economy sectors, particularly with grid infrastructure or energy efficiency; summing employment across these other green sectors could result in double-counting of jobs. Due to this, 2022 green employment is separated between the clean energy sectors and green infrastructure sector in this figure.

The 2035 projected New Jersey job growth is assessed within the State's broader energy economy, rather than only the green economy. While New Jersey's energy portfolio and related planning includes all types of energy technologies, the State has strong clean energy and climate-related policies and investments, and the broader energy economy's growth is primarily attributable to growth in the green economy.

Employment impacts for each sector were derived from in-state capital and operational expenditures on electricity and fuel resources, building efficiency and electrification measures, and alternative transportation adoption. To provide a comprehensive look at direct employment outcomes, the modeling framework includes negative impacts to the New Jersey economy in the form of reduced employment in fossil electricity generators and fuel suppliers. This modeling does not include economic impacts to households and businesses from cost recovery or energy savings, which is outside the scope of this analysis.

The Initial Employment Outputs (IEO) show employment changes between 2022 and 2035 resulting from federal and state investments in New Jersey at the industry level. IEO employment projections include breakdowns by the construction, professional and business services,[30] manufacturing, and other supply chain industry groups. [31] These projections are also broken out into the five sectors receiving investments: buildings,[32] electricity,[33] transportation,[34] fuels,[35] and green infrastructure.[36] The Secondary Employment Outputs (SEO) are developed using staffing pattern analyses to understand the occupational-level detail of the IEO based on the same federal and state investments.[37]

The Modeling Results: Current Policy Scenario

14,300 net new jobs are projected in New Jersey's energy economy through 2035. Construction and maintenance occupations are expected to see the most growth from 2022 to 2035, generating 21,000 new jobs. While these occupational groups are expected to see large growth, other supply chain occupations are estimated to lose over 7,400 workers.

Employment creation projected in New Jersey's broader energy economy is primarily driven by growth in its green sub-sectors. Figure 6 shows the green sub-sectors in the state's energy economy that are largely responsible for this growth, with these green sub-sectors representing a total of over 24,100 added jobs.[38] The anticipated

30 Professional and business Services includes finance, legal, consulting, engineering, research, or architectural support.

31 Other Supply Chain includes employment in the retail and wholesale trade, utilities, and automobile and other equipment repair and maintenance industries.

32 The buildings sector relates to investments in commercial and residential insulation work, including shell, HVAC, and other activities.

33 The electricity sector involves solar, wind, hydropower, hydrogen, biomass, distribution, transmission and storage, generation, and nuclear sub-sectors.

34 The transportation sector involves investments into the adoption of vehicles running on low carbon fuels or electricity sources and into charging and alternative fueling infrastructure to support those vehicles.

35 Subsectors of the fuels sector includes hydrogen, bioenergy, natural gas, natural gas distribution and petroleum fuels.

36 The green infrastructure sector includes investment into waste, water, and wastewater activities.

37 Appendix A: Report Methodology provides a detailed methodology for these employment projections.

38 The employment figures presented here include direct and indirect employment and omit induced employment.

gross employment growth in these green sub-sectors represents 87% of the total projected gross employment growth in the state's energy economy, excluding green infrastructure, and is displayed in Figure 6.[39] Green economy jobs can also be found in other energy sub-sectors. However, those other energy sub-sectors contain both green and non-green jobs that cannot be disaggregated for this study.

Figure 5. Energy Economy Employment Projections in New Jersey by Value Chain, Modeled Change 2022-2035

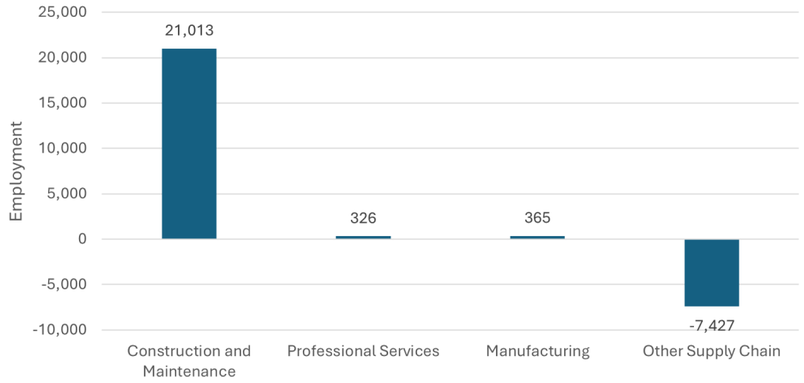
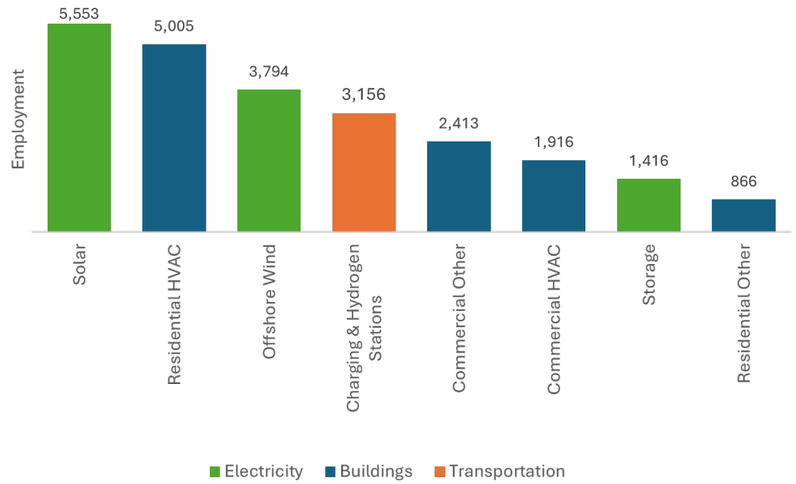


Figure 6. Employment Growth within Green Sub-Sectors of New Jersey's Energy Economy, 2022-2035
40



Within New Jersey's energy economy,[41] all priority occupations except one are expected to grow, and half (50%) will increase their energy workforce by more than

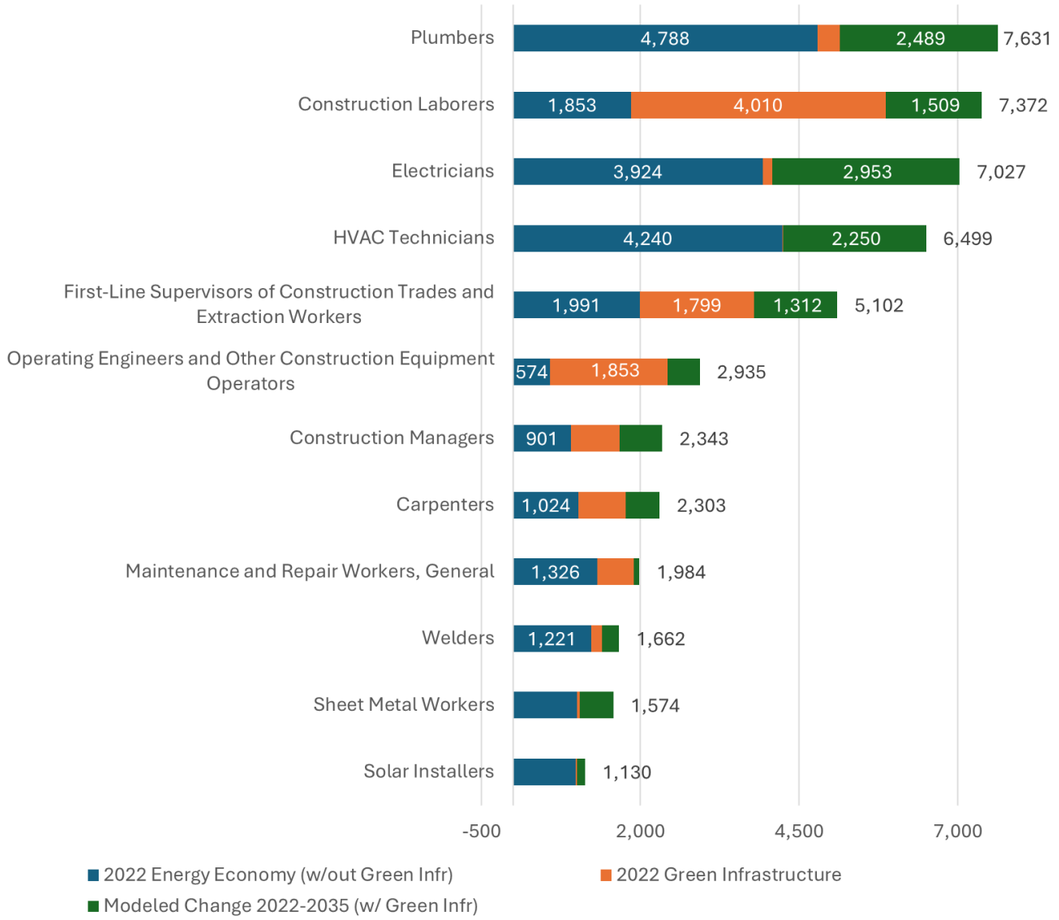
39 Net growth rates may be different than gross employment rates listed but directionally are still the same.

40 This figure displays the green economy sub-sectors within the state's energy economy that are projected to grow from 2022 to 2035. While the jobs in these sub-sectors are not the only green economy jobs in the state (i.e. green economy jobs also exist in sub-sectors that are not wholly green), the growth in the green sub-sectors represent a large portion of total energy economy growth projected. Please refer to above section The Modeling Process for more detail on the employment projections.

41 The modeling projections assess employment changes within New Jersey's entire energy economy in which there are green sub-sectors, non-green sub-sectors, and sub-sectors with both green and non-green jobs. While the employment projections are reported in terms of the state's entire energy economy, the growth in the green sub-sectors represent a large portion of total energy economy growth projected. Please refer to above section *The Modeling Process* for more detail on the employment projections.

40% compared to their 2022 workforce. Electricians are expected to see the largest growth through 2035, with added jobs representing approximately 73% of the current Electrician workforce in the energy economy. HVAC Technicians will see a 53% increase in the existing energy workforce through 2035, while Sheet Metal Workers involved in the energy economy will increase by 51% (Figure 7).

Figure 7. 2022 Employment Compared to Modeled Employment in New Jersey's Energy Economy Workforce[42]



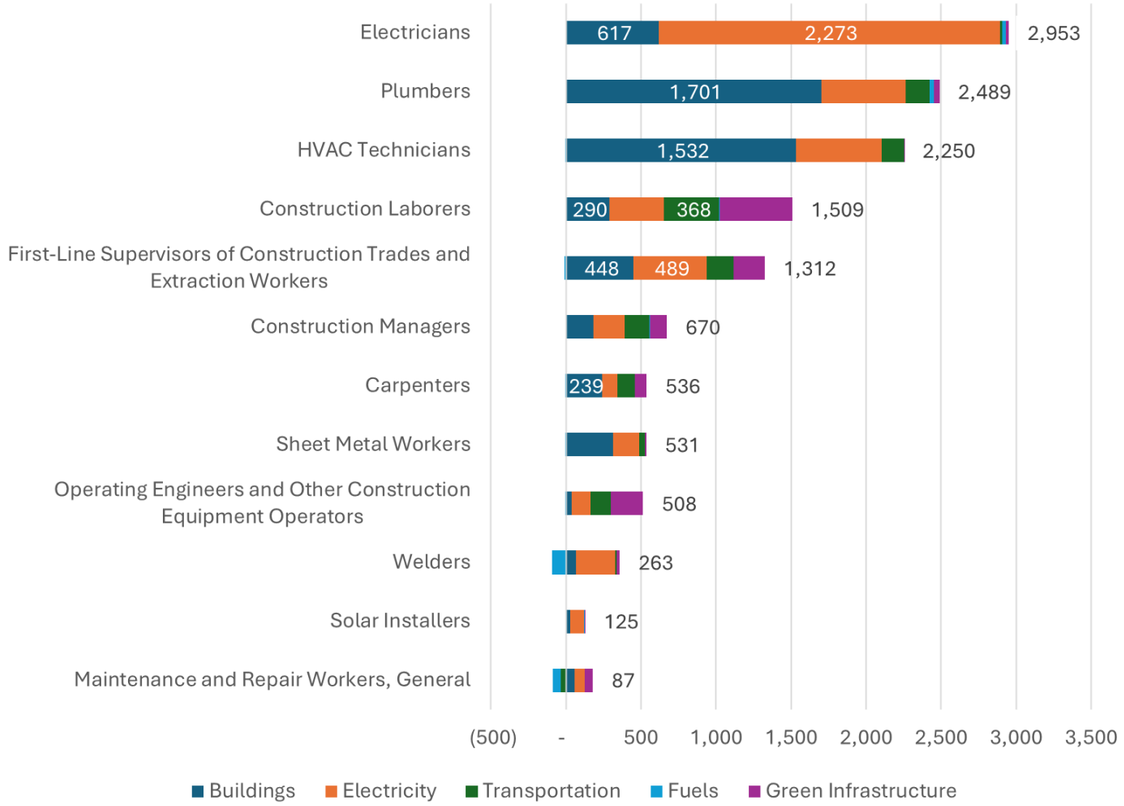
In the buildings sector,[43] Plumbers and HVAC Technicians grow the most. About 1,700 new Plumbers are expected in this sector and over 1,500 new HVAC Technicians. Within

42 2022 energy economy employment data is estimated from energy-specific national staffing patterns, developed by BW Research Partnership, applied to New Jersey's energy employment from the U.S. Energy and Employment Report and Bureau of Labor Statistics. This figure combines the energy economy, encompassing the green economy (without green infrastructure), and green infrastructure figures. Due to some overlap across the stormwater and resiliency infrastructure sub-sector, this figure likely includes some double counting between green infrastructure and the green economy but is being used to illustrate growth compared to the current workforce. See Appendix B: Green Jobs Definition for more details on the technologies included in New Jersey's green job definition.

43 The buildings sector includes the following sub-sectors: Commercial HVAC, Commercial Shell, Commercial Other, Residential HVAC, Residential Shell, and Residential Other.

the electricity sector,[44] an additional 2,300 Electrician jobs are projected, representing 77% of all Electricians added under this scenario. Outside of the electricity sector, over 600 new Electricians are expected within the buildings sector while the remaining sectors, including green infrastructure,[45] fuels,[46] and transportation,[47] are expected to add around 20 Electricians each. The green infrastructure sector will mostly generate Construction Laborer jobs, which are expected to increase by a net of 485 jobs. Most occupations in the fuels sector and a few in the transportation sector will see a decline in employment (Figure 8).

Figure 8. Net Employment Growth of Priority Occupations in New Jersey's Energy Economy Workforce, 2022-2035, by Sector



44 The electricity sector includes the following sub-sectors: Solar, Including Utility and Distributed PV, Offshore Wind, Land-Based Wind, Hydropower, Hydrogen, Biomass, Distribution, Transmission, Storage, Natural Gas Generation, Other Fossil Generation, and Nuclear.

45 The green infrastructure sector includes the following sub-sectors: Waste, Water, and Wastewater.

46 The fuels sector includes the following sub-sectors: Hydrogen, Bioenergy, Natural Gas, Natural Gas Distribution, and Petroleum Fuels.

47 The transportation sector includes the following sub-sectors: Vehicle Manufacturing, Vehicle Maintenance, Wholesale Trade Parts, Conventional Fueling Stations, and Charging & Hydrogen Fuel Stations.

Uncertain Impacts of Hydrogen and Data Centers and AI

Hydrogen Technology

Hydrogen fuels and generation represents a collection of mostly emerging technologies that could play a prominent role in New Jersey's green economy, especially within energy storage and transportation. Various projects are already under development in the state, and stakeholders interviewed for this report identified several active companies operating in the state. New Jersey is one of three states that are a part of the Mid-Atlantic Clean Hydrogen Hub, created under IIJA, that has received funding for planning and community input. This network of producers, users, distributors, and other stakeholders shares collective goals including hydrogen generation that reuses infrastructure, creates jobs, increases economic opportunities, and improves health for overburdened communities. Hydrogen could also have a meaningful impact on New Jersey's maritime and trucking industries. However, significant new infrastructure is needed for hydrogen production, and challenges in the build-out of new infrastructure and expansion or refurbishment of existing infrastructure could slow the near-term progress of hydrogen development. It remains unclear whether the new Federal administration will continue to support all hydrogen hubs funded under IIJA.

Data Centers and AI

A potential game changer in New Jersey's energy economy involves the deployment of data centers within the state. There has been significant government interest in both artificial intelligence (AI) and the creation of data centers in the state. Governor Phil Murphy established an Artificial Intelligence Task Force in Fall 2023 and the Next New Jersey Program in July 2024 to award tax credits for AI work and data centers.[48] In January 2025, Governor Murphy and Princeton University President Christopher L. Eisgruber announced that Microsoft and Coreweave will join the State and the University as founding partners in a NJ AI Hub.[49] However, there is not universal support for data center growth in the state. While some utilities have publicly sought to build a data center near New Jersey's nuclear facilities, other stakeholders believe New Jersey should focus more on AI talent development and academic support and not seek to become a national hub for data centers.

The Modeling Results: High Electrification Scenario

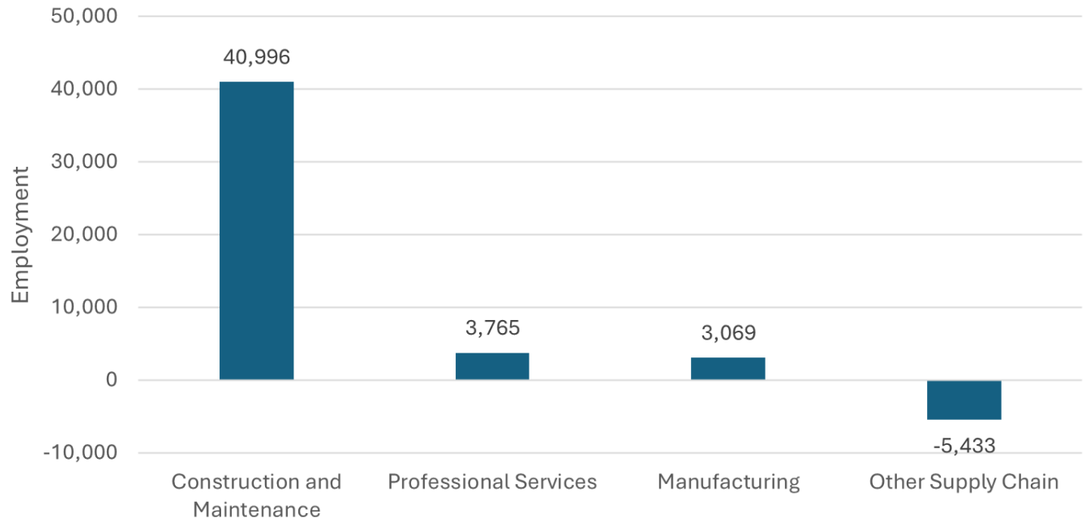
This section details the New Jersey occupational employment impacts under New Jersey's EMP *High Electrification Scenario*. The *High Electrification Scenario* was chosen to be modeled as a complement to the *Current Policy Scenario*, on the basis that high electrification presents a similar pace of change through 2035 but incorporates greater levels of building electrification and additional in-state, non-fossil electric generating capacity. Most job growth, seen as a result of the *High Electrification Scenario*, is within the energy economy's building and electricity sectors.

48 "Governor Murphy Signs Legislation to Spur Investment in New Jersey's AI Sector," New Jersey Economic Development Authority, July 25, 2024, https://www.njeda.gov/governor-murphy-signs-legislation-to-spur-investment-in-new-jerseys-ai-sector/.

49 "Governor Murphy and Princeton University President Eisgruber Announce Microsoft and Coreweave as Founding Partners in NJ AI Hub," New Jersey Economic Development Authority. February 5, 2025. https://www.njeda.gov/governor-murphy-and-princeton-university-president-eisgruber-announce-microsoft-and-coreweave-as-founding-partners-in-nj-ai-hub/.

Overall, the employment impacts of the *High Electrification Scenario* generate more severe gaps in employment for this job study's priority occupations. Nearly 42,400 net new jobs are projected in New Jersey's energy economy though 2035 under the *High Electrification Scenario*.[50] Similar to the *Current Policy Scenario*, the Construction industry will support most of these new jobs, adding almost 41,000 energy jobs, while the Other Supply Chain segment will lose jobs just over 5,400 jobs.

Figure 9. Energy Economy Employment Projections in New Jersey by Value Chain, Modeled Change 2022-2035, High Electrification Scenario



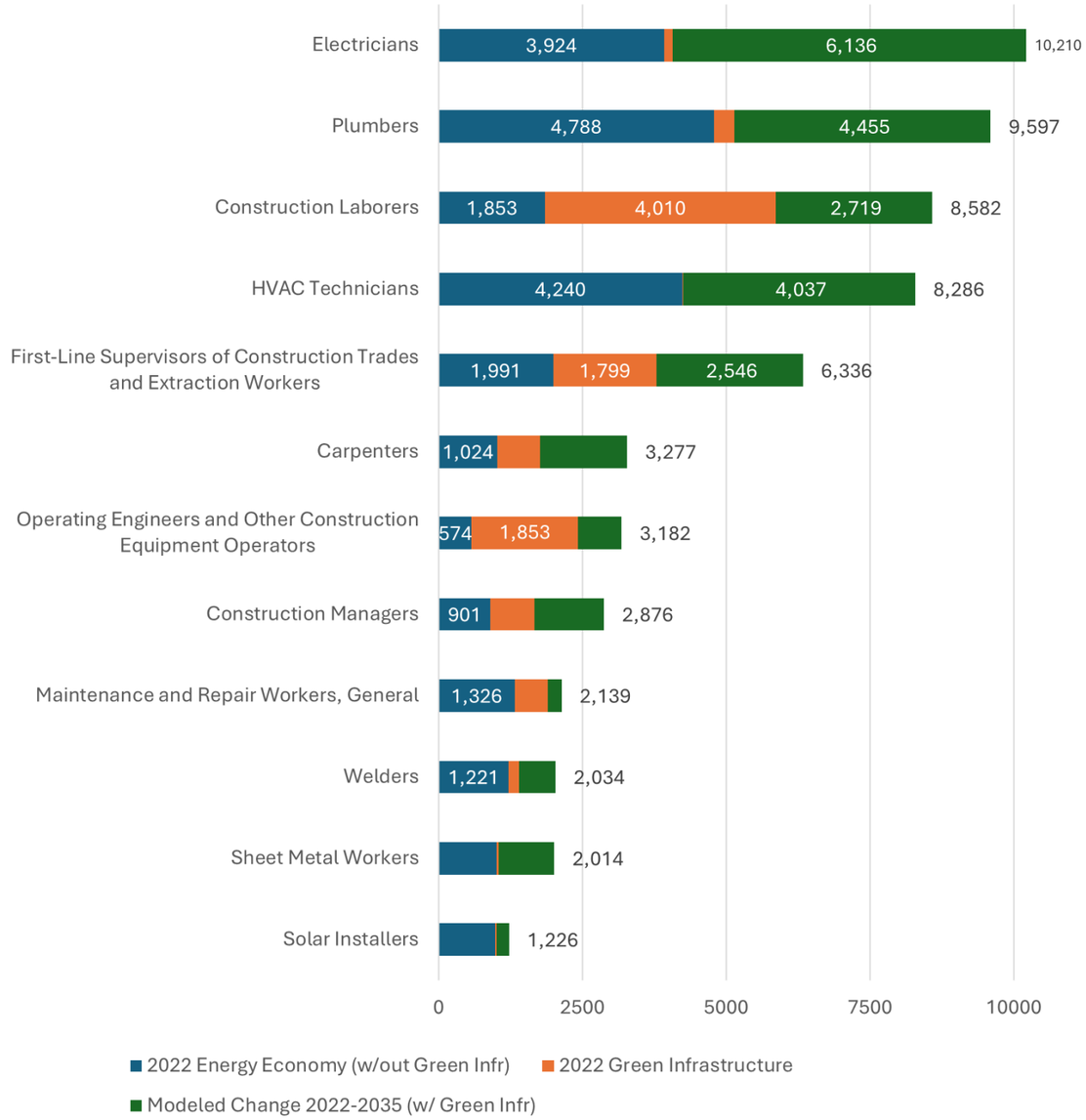
The *High Electrification Scenario* generates growth for every priority occupation through 2035 and most (75%) occupations will grow by more than 40% of their 2022 workforce. The five occupations anticipated to grow by the greatest number of jobs through 2035 are the same under both the *High Electrification Scenario* and *Current Policy Scenario*.

Under the *High Electrification Scenario*, Electricians, the occupation with the largest growth projection in both scenarios, are expected to see a growth that is more than double that of the *Current Policy Scenario*. From 2022 to 2035, over 10,000 Electricians are expected to be added to New Jersey's energy economy in a high electrification environment, representing an increase of 151%.

In the other four highest growth occupations, the *High Electrification Scenario* growth projections surpass the *Current Policy Scenario* growth by at least 79%.

50 The modeling projections assess employment changes within New Jersey's entire energy economy in which there are green sub-sectors, non-green sub-sectors, and sub-sectors with both green and non-green jobs. While the employment projections are reported in terms of the state's entire energy economy, the growth in the green sub-sectors represent a large portion of total energy economy growth projected. Please refer to above section The Modeling Process for more detail on the employment projections.

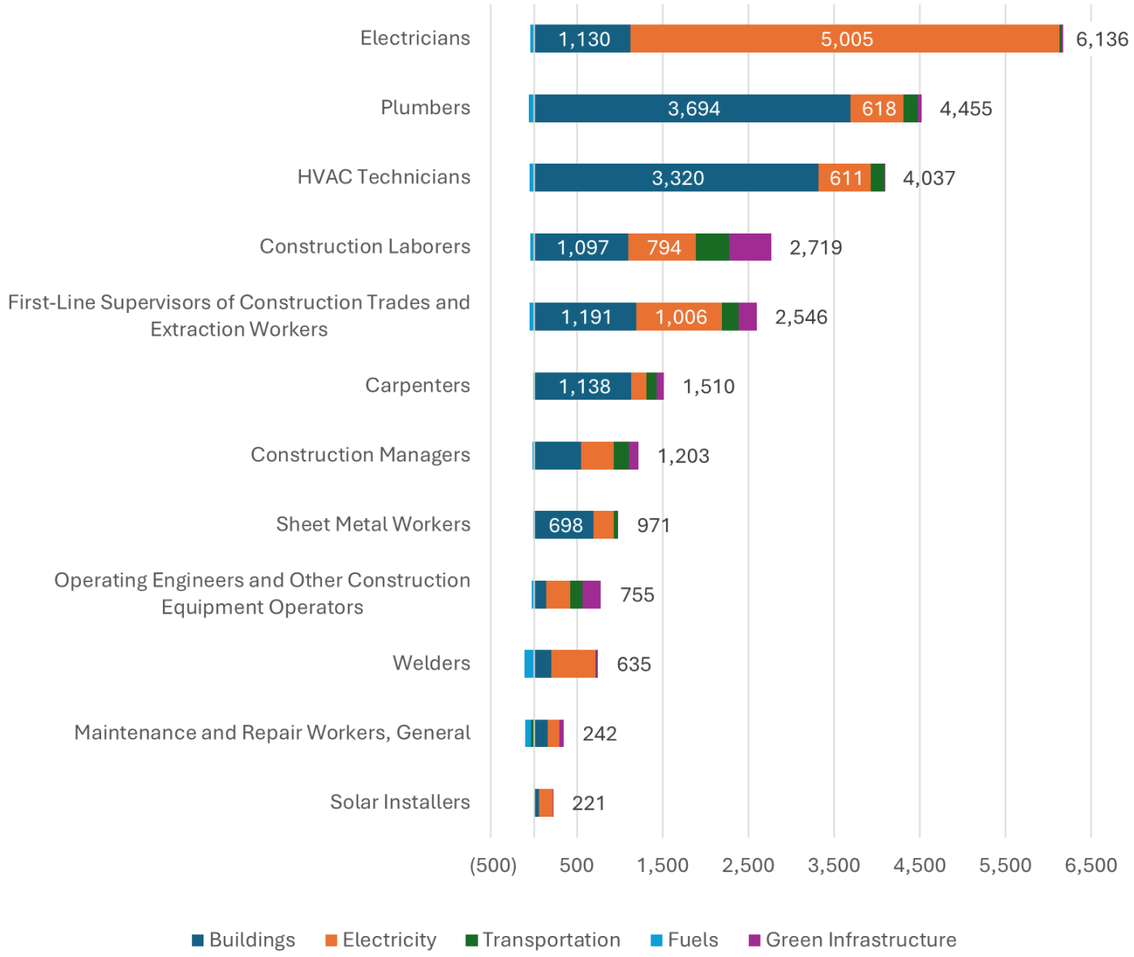
Figure 10. 2022 Employment Compared to Added Employment of Key Occupations in New Jersey's Energy Economy Workforce under the High Electrification Scenario



New Plumbers and HVAC Technicians are still the largest contributors to growth in the buildings sector while Electricians continue to drive electricity sector growth. Under the *High Electrification Scenario*, an additional 3,700 building sector Plumbers and 3,300 building sector HVAC Technicians are projected between 2022 and 2035, representing approximately 2,000 more workers supported in each occupation compared to the *Current Policy Scenario*. For electricity sector Electricians, the *High Electrification Scenario* more than doubles the projected growth of the *Current Policy Scenario*, with just over 5,000 Electricians added from 2022 to 2035 in the energy economy's electricity sector. Newly supported jobs by occupation in the green infrastructure sector are the same in both the *High Electrification Scenario* and *Current Policy Scenarios*.[51]

51 Please refer to footnotes 43 through 47 for more information on which sub-sectors are encompassed by each of these sectors.

Figure 11. Net Employment Growth of Priority Occupations in New Jersey's Energy Economy Workforce, 2022-2035, by Sector, under the High Electrification Scenario



Addressing Transition Impacts on Workers

The 2022 CGE Roadmap highlighted the importance of supporting workers who would need to transfer from occupations and industries in decline.

"The transition to a green economy cannot come at the expense of legacy energy workers whose efforts helped build a thriving economy. As New Jersey grows its green economy, it cannot assume automatic entry of these workers. The State must rise to the challenge of ensuring they can continue to play a central role in New Jersey's clean energy future. They must be connected to targeted training and skills-refinement programs and provided pathways in new fields."

"Green Jobs for a Sustainable Future" (Page 36)

In the subsequent years, workforce grants provided by NJEDA have included support for programs that address workers needing to transition to new industries. This workforce needs assessment offers further clarity on opportunities for state agencies to support energy transition employment by highlighting two specific sectors, Transportation and Fuels, where decreases in employment can be anticipated under the EMP, as well as several critical occupations that will be most impacted. Future research can highlight adjacent roles with high transferability and similar wages, requiring minimal reskilling, for displaced occupations, such as those working at gas stations or in petroleum fuel production and transportation.

While New Jersey has the potential to be a leader in supporting workers and communities in any energy transitions, early planning is crucial. Proactive steps include direct research and engagement with communities, workers, and industries to track employment trends, assessments of workforce training and education capacity to support workers, and examinations of initial community impacts. Workers should be active and priority participants in the process. Similarly, communities must be involved, sharing their perspectives on participation in the transition.

Worker transition policies must also consider changes in wages and benefits, which, depending on the industry, role, and future opportunity, may not be replicable. Policy should address potential disparity by ensuring retraining leads to jobs offering comparable or higher wages.

OCCUPATIONAL ANALYSIS RELATIVE TO HISTORICAL AND BASELINE EMPLOYMENT

An occupational gap analysis can be used to assess the feasibility of expanding the state's green workforce to meet projected job growth based on scenarios in the state's EMP. This analysis uses occupational outcomes from the *Current Policy Scenario* compared to historical growth, baseline employment, and baseline growth projections for those occupations.[52] The *Current Policy Scenario* represents a significant expansion of employment across a range of occupations and provides a baseline that is well suited to gauge near-term needs for specific workforce development strategies and resource allocations. While the *High Electrification Scenario* has not been included in this gap analysis, gaps established through the *Current Policy Scenario* are generally most likely to be larger and more pronounced in the *High Electrification Scenario*.

52 This is a gap analysis on the worker demand side, using the assumption that the statewide market has reached an approximate equilibrium in its current state, and issues related to leakage (either technology, occupationally, or geographic) will hamper any longer-term supply-side analysis at the state level. This gap analysis takes the existing level of economic activity in the state as a baseline that will likely be impacted by macroeconomic forces in future but not accounted for in the modeling.

New Jersey is projected to add nearly 14,300 workers to the energy economy through 2035. When combined with projections for growth found across the total New Jersey workforce, the state may struggle to hire and retain workers needed to fulfill expected demand in the energy workforce.

Table 4 below displays the baseline employment of the priority occupations in New Jersey's overall economy, energy economy, and green infrastructure sector in 2022. It also includes the baseline growth projections of the occupations, and the added demand expected from the *Current Policy Scenario*. While some growth in the green economy may already be captured in the baseline demand, the additional growth projected from the modeling effort is primarily attributed to the clean energy and climate policies and investments enacted by the State of New Jersey.

Table 4. Baseline and Projected Employment in Total and Green Economies, New Jersey

6-digit SOC Code	Occupation Name	2022 Employment			Baseline Demand Through 2034[53]	Additional Demand Through 2035
		New Jersey Overall Economy	Energy Economy (w/o Green Infr)	Green Infr. Only[54]	New Jersey Overall Economy	Energy Economy (w/ Green Infr)
New Jersey Overall Workforce[55]		4,412,141	173,369	38,125	102,848	14,278
47-2111	Electricians	16,517	3,924	150	1,380	2,953
47-2152	Plumbers, Pipefitters, and Steamfitters	10,927	4,788	354	83	2,489
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	10,665	4,240	9	464	2,250
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	17,344	1,991	1,799	239	1,312
47-2061	Construction Laborers	28,261	1,853	4,010	990	1,509
11-9021	Construction Managers	12,442	901	772	477	670
47-2211	Sheet Metal Workers	2,607	1,004	39	(69)	531
47-2031	Carpenters	19,937	1,024	743	(132)	536
51-4121	Welders, Cutters, Solderers, and Brazers	4,922	1,221	178	(107)	263
47-2073	Operating Engineers and Other Construction Equipment Operators	8,236	574	1,853	(36)	508
47-2231	Solar PV Installers[56]	985	985	20	511	125
49-9071	Maintenance and Repair Workers, General	38,146	1,326	571	261	87

53 Baseline projections for occupations across New Jersey's overall economy are sourced from JobsEQ® as of 2024Q2. Employment change from 2022 to 2024 was incorporated into the JobsEQ® 10-year growth projection, from 2024 to 2034, to estimate the number new workers expected from 2022 to 2034.

54 There is some overlap across the stormwater and resiliency infrastructure sub-sector, within Green Infrastructure, as employment estimates are more broadly defined than the other green economy sectors. Due to this overlap, job totals across stormwater and resiliency infrastructure should not be summed with other sectors, particularly grid infrastructure or energy efficiency to avoid potential for double-counting.

55 Overall economy data are sourced from JobsEQ® as of 2024Q2. Based on a four-quarter moving average and on Place of Work estimates. Energy economy and green infrastructure employment data are sourced from BW Research's economic impact modeling (see Appendix A: Report Methodology).

56 The number of solar photovoltaic Installers captured here reflect a portion of total occupations involved in the installation of New Jersey solar systems. Construction firms completing a solar installation may classify workers as electricians, or construction laborers, rather than as a dedicated Solar PV Installer

MODERATE AND SEVERE GAPS IN PROJECTED PRIORITY OCCUPATIONS

The potential gap between current labor supply and projected demand in a region may be influenced by several factors. The remainder of this section assesses the challenge faced by New Jersey in closing a potential employment gap. For each priority occupation, this report compares historical growth, projected growth relative to current employment, and considerations such as current unemployment of a particular occupation, regional concentrations of that occupation, ages of current workers, and difficulties among employers in finding qualified candidates for each of the priority occupations.

Table 5 shows the total new workers expected in New Jersey based on baseline demand through 2034 in New Jersey's overall economy, and additional demand projected by modeling for the 2025 EMP. 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
Moderate	Demand exceeds supply and the gap is more than 3% but less than 10% of the existing workforce[57]
Mild	Demand exceeds supply and the gap is 3% or less than the existing workforce

When accounting for the baseline projection of priority occupation workers joining New Jersey's overall economy and the additional workers joining the energy economy, total changes from 2022 to 2035 show varying levels of impact across the priority occupations. This analysis identifies 5 priority occupations with severe demand gaps

57 This gap classification is defined using 3% because the total projected demand for New Jersey's overall workforce as a share of its 2022 employment is 3%

and 5 with moderate demand gaps (Table 5). Closing these projected gaps over the next decade can prevent workforce constraints that hamper growth of New Jersey's green economy.

Table 5. Projected Growth of Priority Occupations Relative to Historical Growth and Baseline Employment, New Jersey[58]

6-digit SOC Code	Occupation Name	Historical Growth (2014-2024) New Jersey Overall Economy	Total Projected Demand, Through 2034/2035[59]	Total Projected Demand, As a % of 2022 Employment	Total Projected Demand, As a % of Historical Growth[60]	Status
New Jersey Overall Workforce		422,009	117,125	2.7%	27.8%	N/A
47-2231	Solar Photovoltaic Installers	596	636	64.5%	106.8%	Severe
47-2111	Electricians	2,861	4,333	26.2%	151.5%	Severe
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	3,114	2,714	25.4%	87.1%	Severe
47-2152	Plumbers, Pipefitters, and Steamfitters	832	2,572	23.5%	309.3%	Severe
47-2211	Sheet Metal Workers	(344)	462	17.7%	-134.5%	Severe
11-9021	Construction Managers	1,374	1,147	9.2%	83.5%	Moderate
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	3,572	1,551	8.9%	43.4%	Moderate
47-2061	Construction Laborers	3,502	2,499	8.8%	71.4%	Moderate
47-2073	Operating Engineers and Other Construction Equipment Operators	1,026	472	5.7%	46.0%	Moderate
51-4121	Welders, Cutters, Solderers, and Brazers	540	156	3.2%	28.9%	Moderate
47-2031	Carpenters	(2,086)	404	2.0%	-19.4%	Mild
49-9071	Maintenance and Repair Workers, General	4,429	348	0.9%	7.9%	Mild

58 Overall economy historical growth and 2022 employment data sourced from JobsEQ® as of 2024Q2. Based on a four-quarter moving average and on Place of Work estimates.

59 Total Projected Demand is the sum of the Baseline Demand Through 2034 for the Overall Economy and the Additional Demand Through 2035 for the Energy Economy in Table 4.

60 Negative percentages are a result of historical employment declines in certain occupations.

For five of the priority occupations – Electricians, Plumbers, HVAC Technicians, Sheet Metal Workers, and Solar Installers – the total expected growth is more than 10% from their 2022 overall economy employment. The highest *growth rate* is seen among Solar Installers (65%), leading to over 600 workers joining the state's workforce through 2035, while Electricians will add the largest *number* of workers, over 4,300, at a growth rate of 26%. Plumbers and HVAC Technicians will each add more than 2,500 workers between 2022 and 2035.

Another five priority occupations will have moderate projected gaps and the remaining two will have mild gaps with total expected growth being less than 10% than 2022 employment for all seven of these moderate and mild occupations.

Compared to historical growth, between 2022 and 2035, Electricians, Plumbers, and Solar Installers are all expected to gain more than double the workers that had been added from 2014 to 2024. In addition, two occupations – Sheet Metal Workers and Carpenters – experienced employment declines over the past 10 years but are expected to see employment growth through 2035. In fact, Sheet Metal Workers are projected to see more workers added over the next decade than what was lost over the previous decade.

UNEMPLOYMENT, LOCATION QUOTIENT, AGE, AND HIRING DIFFICULTY FACTORS

Overall, New Jersey in early-2025 had an unemployment rate of 4.6%. Table 8 shows a collection of metrics related to potential labor supply for specific priority occupation demand.

Table 6. Unemployment Rates (UER), Location Quotients (LQ), Ages, and Reported Hiring Difficulty for Priority Occupations, New Jersey[61]

6-digit SOC Code	Occupation Name	UER	LQ	Share of Current Workers Aged 55+ Years	Reported Hiring Difficulty in Green Economy: [62] % of Employers with Great Difficulty
		2024Q2, New Jersey Overall Economy			
New Jersey Overall Workforce		4.7%	1.00	26.0%	N/A
47-2111	Electricians	3.0%	0.79	22.6%	60% (n=11)
47-2152	Plumbers, Pipefitters, and Steamfitters	3.3%	0.84	22.7%	50% (n=5)
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	2.7%	0.92	21.3%	80% (n=6)
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	3.3%	0.76	26.9%	
47-2061	Construction Laborers	9.5%	0.74	18.9%	57% (n=9)
11-9021	Construction Managers	2.7%	0.88	31.2%	63% (n=10)
47-2211	Sheet Metal Workers	3.1%	0.75	26.7%	
47-2031	Carpenters	7.0%	0.77	18.2%	50% (n=2)
51-4121	Welders, Cutters, Solderers, and Brazers	5.3%	0.41	20.2%	50% (n=7)
47-2073	Operating Engineers and Other Construction Equipment Operators	8.0%	0.65	25.5%	60% (n=6)
47-2231	Solar Photovoltaic Installers	14.6%	1.39	10.4%	100% (n=2)
49-9071	Maintenance and Repair Workers, General	4.7%	0.90	31.1%	36% (n=16)

Half of the priority occupations had an unemployment rate (UER) lower than the state's UER, including four of the five occupations with a severe demand gap. New Jersey may experience a more challenging time finding workers to fill the demands for these occupations due to a smaller pool of workers available to fill demand.

Other than Solar Installers, an occupation with a high UER and a severe demand projection, New Jersey does not exhibit high concentrations or specializations of workers in the remaining 11 priority occupations based on each occupation's location quotient (LQ). To compound this, these 11 occupations also have a high share of workers who are aged 55 years and over and may be looking to retire within the next decade. The highest share in this age group are Construction Managers (31%) and General Maintenance and Repair Workers (31%).

61 LQ is the concentration of workers in New Jersey relative to the nation.
Source: JobsEQ®. Data as of 2024Q2. 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.

62 Low sample size; caution interpreting results. Results are sourced from the BW Research Partnership employer survey effort. Full results can be found in Appendix C: Survey Toplines. Survey methodology can be found in Appendix A: Report Methodology.
Note that occupations 47-1011 and 47-2211 were not included in the survey and therefore, do not have the reported hiring difficulty data.

ASSESSING THE ROLE AND CAPACITIES OF NEW JERSEY'S GREEN WORKFORCE

Many stakeholders are vital components of the workforce ecosystem in New Jersey, including but not limited to employers, educators, unions, training providers, community groups, and government at the state and local level.

- Employers are critical as they provide jobs through hiring (i.e., demand for occupations), in addition to recruiting and providing career advancement pathways.
- Unions serve as employers, particularly in construction, while providing high-quality employment opportunities for workers, and best-in-class on-the-job training through multi-year apprenticeships.
- Educators, as entities, range across K-12 schools, community colleges, vocational and technical schools, and universities, each playing an integral role in growing interest and preparing future skilled workers for the green economy.
- Training providers, many found at the non-profit and community level, provide additional pathways for skills training, and can integrate wraparound services from community groups to increase access to opportunities for overburdened communities.
- The government, at the local and state levels, plays a significant role in establishing, maintaining, and strengthening the state's workforce. All levels of government can provide funding and create policies, programs, and regulations that create employment demand and bolster the ability of the workforce ecosystem to boost the supply of labor to meet that demand.

The next section provides a snapshot of each stakeholders' role in developing workers for New Jersey's green economy, integrating responses from research interviews and an employer survey conducted for this report.

EMPLOYERS

Employers are crucial to any functioning workforce system. To better understand how New Jersey employers see their needs and are engaging in workforce development, a comprehensive employer survey was conducted, screening for those involved in the green economy. The results indicate employers are struggling to find workers, and somewhat likely to partner with other stakeholders to recruit employees, but that their overall involvement in supporting efforts to develop the green economy workforce varies.

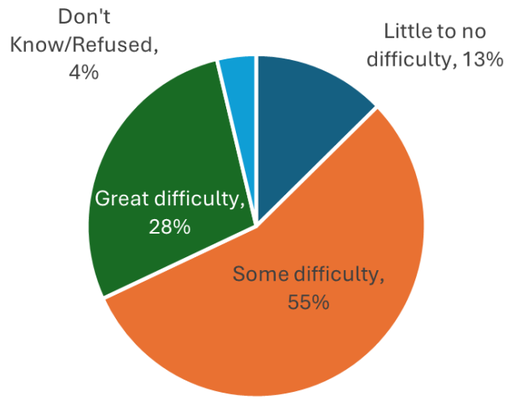
As part of the research effort completed for this report, a survey of New Jersey business establishments involved in green economy activities was conducted in August and September of 2024 to better understand their needs and hiring experiences. A total of 102 responses[63] were obtained and analyzed for this report. There were limited survey responses for questions focused on occupations. For the questions in which less than 30 employers of a given occupation provided a response, results should be interpreted as directional and qualitative in nature. Full employer survey responses can be found in Appendix C.

63 Includes incomplete survey responses – incomplete survey response data utilized when available. Responses from employers of Computer Numerically Controlled Tool Operators and Team Assemblers are included in the survey data since they were included as occupations of interest at the time the survey was fielded, and the responses were analyzed.

Hiring Difficulty

The survey of green economy employers highlights their ongoing concern in meeting workforce demand. Over eight in ten (85%) of surveyed firms report "some" or "great" difficulty hiring qualified workers in any occupation, while only 13% of firms reported "little to no" difficulty in hiring qualified workers (Figure 12).

Figure 12. Surveyed Firms' Level of Difficulty with Hiring Qualified Workers (80 respondents)



When looking at hiring difficulty from an occupational perspective, HVAC Technicians and Construction Managers are the most challenging occupations for green economy employers to hire, with 63% and 80% of surveyed firms reporting "great" difficulty when hiring for these occupations, respectively (Figure 13). These two occupations also take surveyed firms the longest time to hire, with approximately one in three firms indicating it takes more than three months to hire for these occupations (Figure 14). Hiring Electricians and Welders also poses challenges to at least half of the surveyed firms who employ these workers, with 50% and 60% of firms reporting "great" difficulty hiring qualified workers for these occupations, respectively.

Figure 13. Surveyed Firms' Level of Difficulty Hiring Qualified Workers, by Occupation[64]

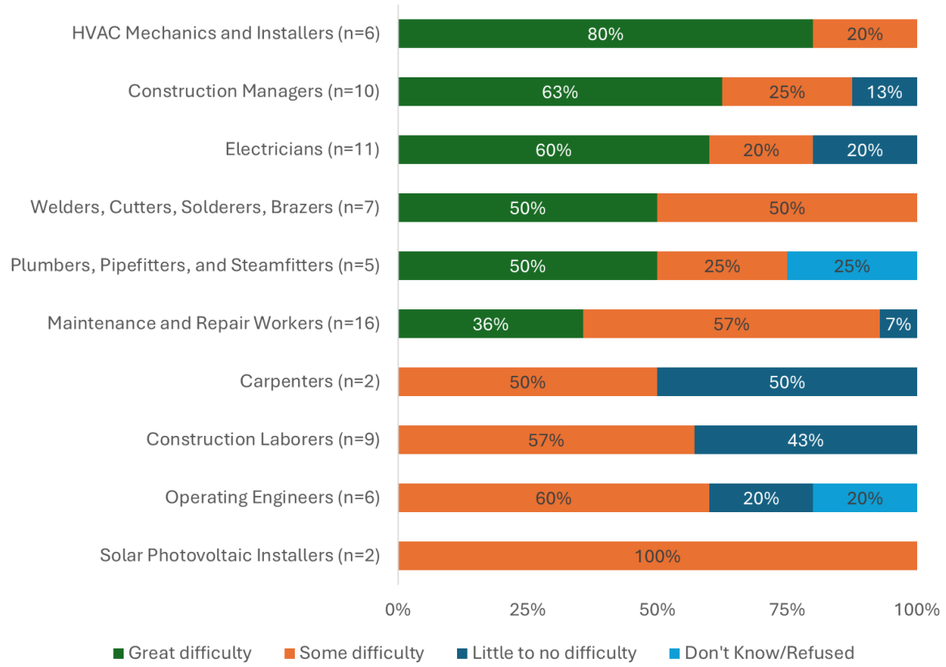
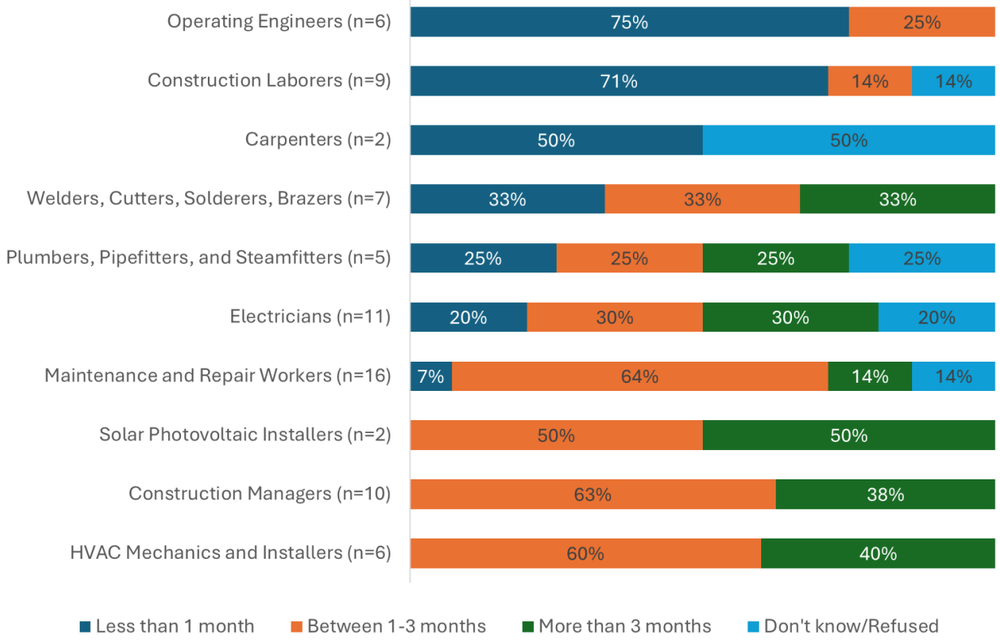


Figure 14. Approximate Time to Find and Hire Employees per Surveyed Employers, by Occupation[65]



Reasons for Hiring Difficulty

When asked to provide reasons for the hiring difficulty, surveyed firms focused

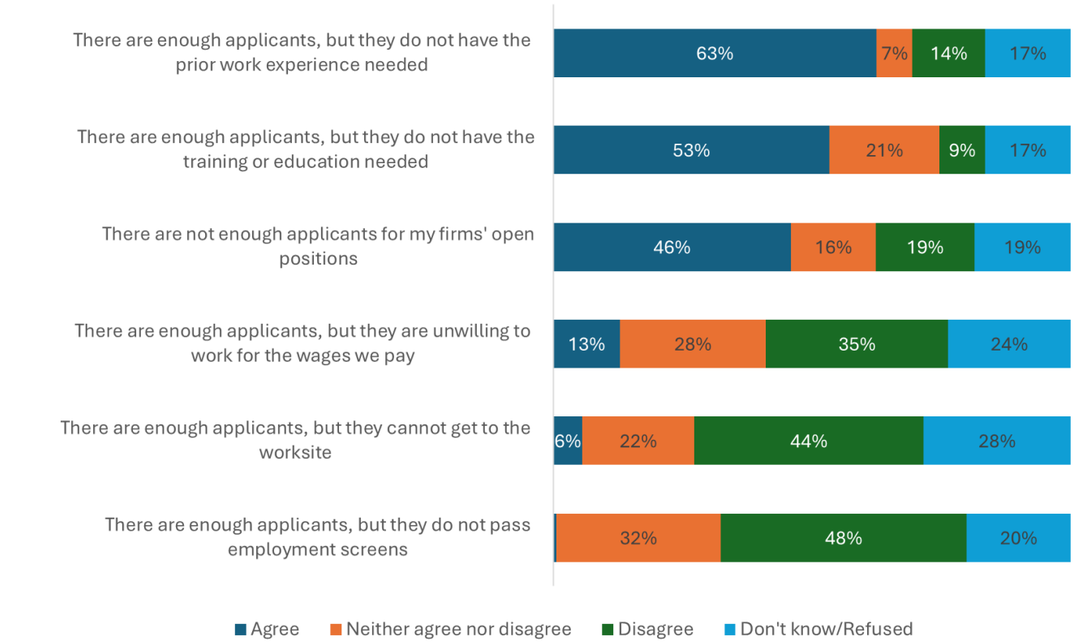
64 The "n" represents the number of respondents.

65 Ibid.

on a lack of prior work experience, training, and education required of applicants. Addressing each of these are critical objectives of the state's workforce ecosystem.

Approximately two-thirds (63%) of firms indicated that applicants lack the prior work experience needed, while just over half (53%) indicated that applicants lack the training or education needed. Surveyed firms said they face little difficulty with providing applicants with competitive wages, receiving applicants with adequate transportation means, and receiving applicants who can pass employment screening procedures. However, approximately one in two (46%) firms indicated that there are not enough applicants for their open positions at the outset (Figure 15).

Figure 15. Surveyed Firms' Level of Agreement with Hiring-Related Issues (80 respondents)



Collaboration with Other Workforce Stakeholders

Meeting workforce needs may be complicated by the limited involvement of green employers in New Jersey's workforce ecosystem. Research interviews of both employers and non-employers highlighted a distinction between larger, more established New Jersey employers who are familiar and comfortable with their role in the New Jersey workforce ecosystem, and new or emerging green economy companies who have more limited engagement with training providers, educational institutions, or workforce recruitment beyond internal needs.

The employer survey provided a mixed picture. Four in ten (41%) surveyed employers partner with high schools or technical/vocational schools for recruiting and hiring. One in three partner with four-year colleges (34%) and community colleges (30%). Only one in ten (9%) firms have an existing partnership with union apprenticeship or joint apprenticeship training centers (JATCs) (Figure 16). When seeking training opportunities for their existing employees, 60% of surveyed firms partnered with high schools or technical/vocational schools to meet their training needs, and one in four (26%) partnered with four-year colleges or conducted internal training (21%) (Figure 17).

Figure 16. Surveyed Firms' Partner Organizations for Recruiting and Hiring – Multiple responses permitted; Percentages may sum to more than 100% (44 respondents)

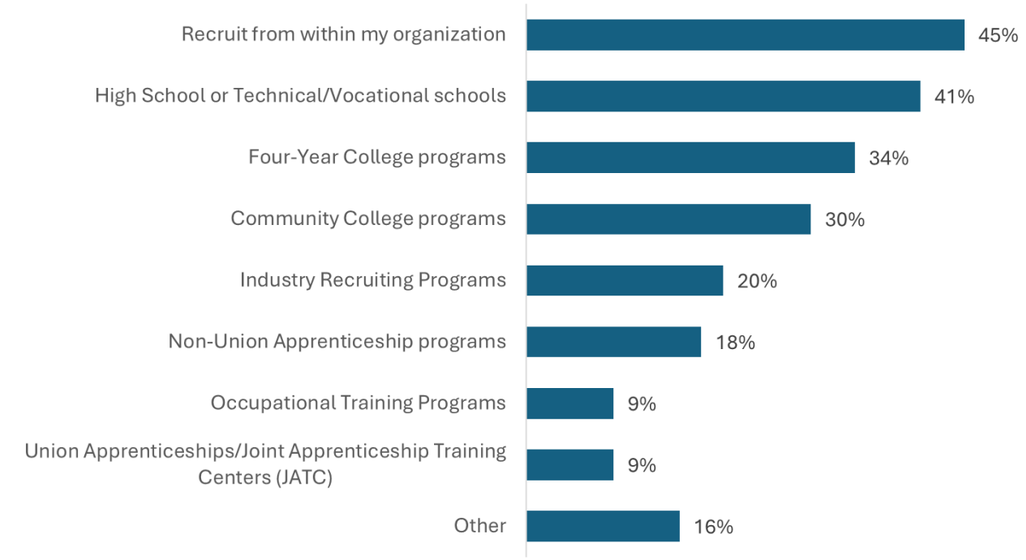
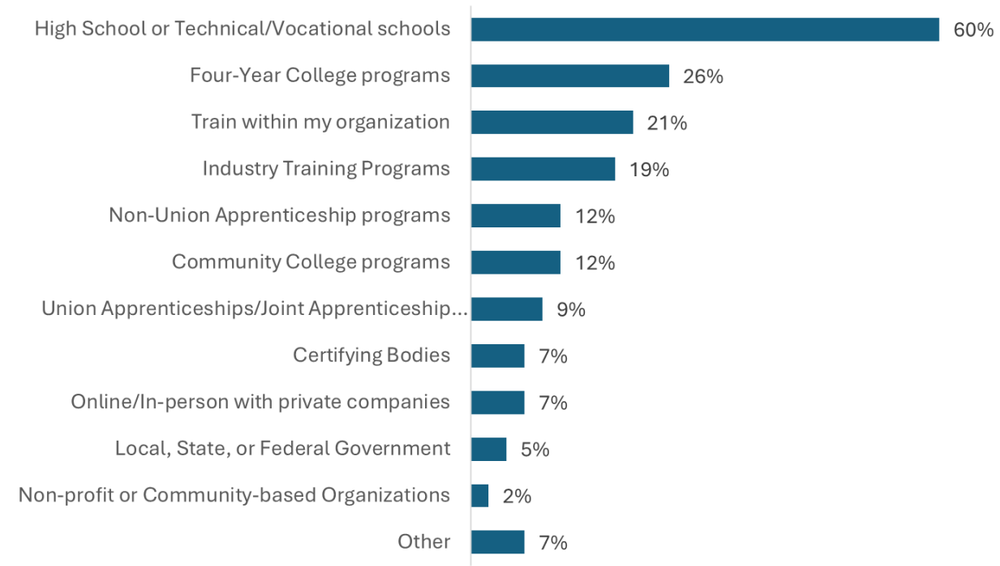
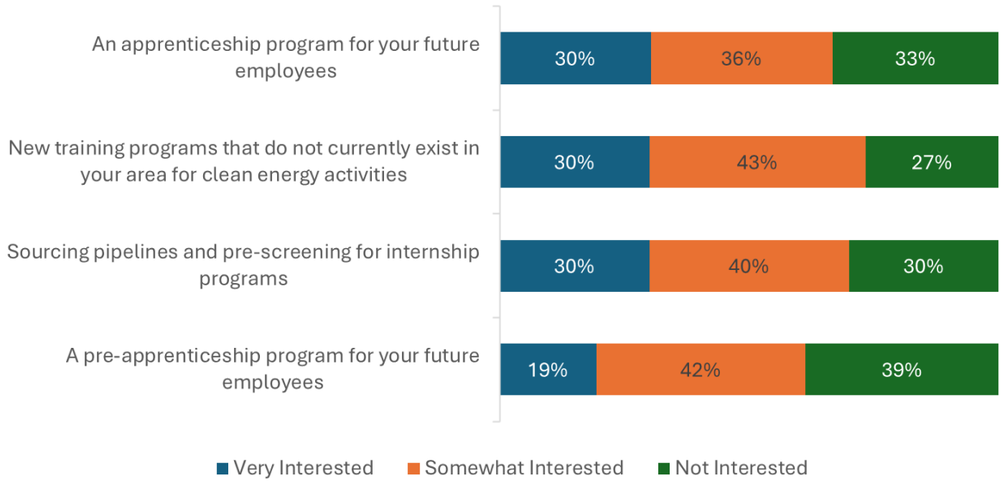


Figure 17. Surveyed Firms' Partner Organizations for Training – Multiple responses permitted; Percentages may sum to more than 100% (43 respondents)



Overall, employers' support for new training and recruitment programs is sizable, but not strongly enthusiastic. Three in four (73%) surveyed firms were either "very" interested (30%) or "somewhat" interested (43%) in new clean energy training programs in their area, while two in three (66%) expressed interest in an apprenticeship program for their future employees. Programs to support sourcing worker pipelines and pre-screening for internship programs were also of interest to seven in ten (70%) of the survey respondents (Figure 18).

Figure 18. Surveyed Firms' Expressed Interest in Programs, Services, and Resources to Support Workforce Needs (Respondents range from 30 to 33)



Incentive Funding

Employers are less likely to utilize available incentive programs and rebates, which can be used, in many instances, to support aspects of workforce development. Only one in four (26%) surveyed firms utilize incentive or rebate programs connected to certain green industries. The most common reason given for this is a lack of familiarity with the types of incentives or programs available (Figure 19, Figure 20).

Of surveyed firms who do utilize incentive and rebate programs in the green economy, the most common provider is either the State of New Jersey or utilities, with 73% of survey respondents identifying the use of these two rebate and incentive providers. The federal government rounds out the top three with 64% of respondents utilizing federal incentives (Figure 21).

> ***"Incentives aren't moving the needle for contractors. If it's a pain, they'll walk."***
>
> Trade association head

Figure 19. Does your Firm Utilize Incentive or Rebate Programs in its Green Economy Business? (43 respondents)

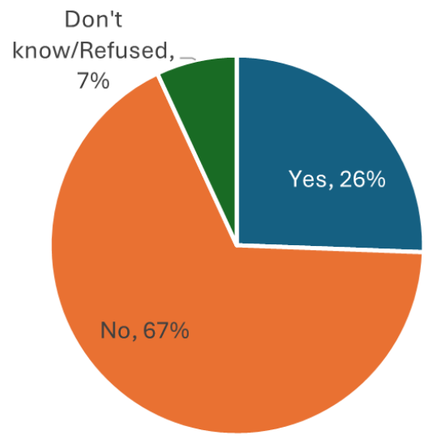


Figure 20. Primary Reasons Incentives or Rebate Programs are not Utilized, per Surveyed Employers – Multiple responses permitted; Percentages may sum to more than 100%. (29 respondents)

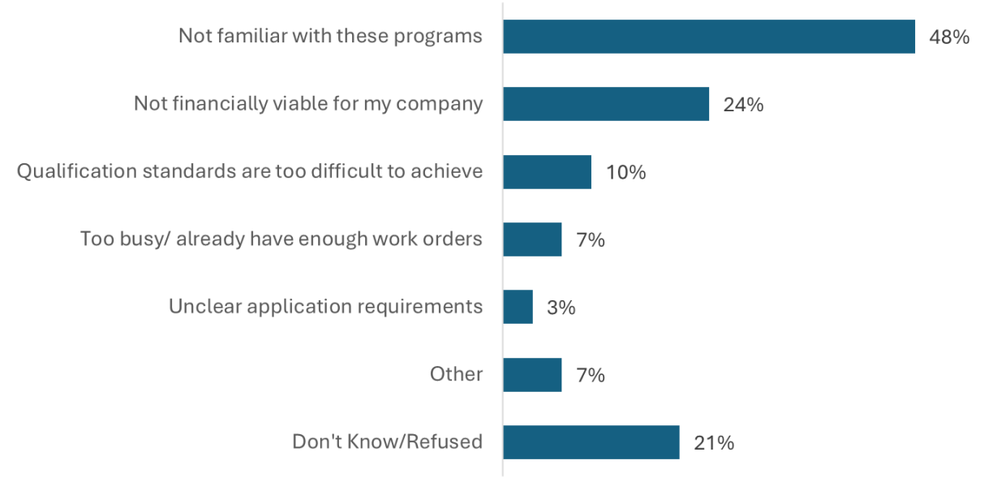


Figure 21. Type of Incentive or Rebate Programs Utilized by Surveyed Firms – Multiple responses permitted; Percentages may sum to more than 100%. (11 respondents)

EDUCATIONAL INSTITUTIONS

The State of New Jersey has focused extensively on expanding K-12 education to create awareness of sustainability issues. In 2020, New Jersey became the first state to introduce climate education as a part of the state-required curriculum in 2020. Climate related curricula are now taught across K-12 grades and increasing numbers of education institutions across the state are developing programming to increase awareness of clean energy and other aspects of the green economy for K-12 students. However, research interviews highlighted the ongoing challenge with students not being exposed to the trades and other potential career opportunities in clean energy during their education. This exposure is critical to building the pipeline of future clean energy workers, and tradespeople in general. Expanding the network of administrators,

counselors, teachers, and other educators who can highlight career pathways outside of traditional college-bound pathways is critical to address this need.

Community colleges and technical schools are vital in developing workers for most of the priority occupations seen in the green economy workforce. These entities provide career training for a variety of occupations, especially those in the skilled trades or manufacturing industry. Most community colleges offer different programs, including degree seeking, credit and no credit training. Community colleges are more easily accessible to students than four-year universities; however, many of these colleges reported struggles in securing the resources and funding to offer ongoing programming.

Shorter, non-credit training programs are proving particularly useful for some green technologies. Community colleges and other training providers find these types of programs to be most successful in supporting collaboration with industry partners, including the development of industry-vetted curriculum and providing connections to employment opportunities for program graduates. In addition, these shorter programs are usually more affordable for students and provide a lesser time constraint for those looking to be immediately employed.

Four-year and advanced degree institutions also play an important role in developing the green workforce, primarily by educating workers who enter technical or professional services fields. In research interviews conducted for this report, four-year degree institutions described their green economy workforce development practices as primarily preparing students for careers in research, engineering, policy, and various professional services that require advanced degrees. These stakeholders view New Jersey colleges as hubs for innovative ideas and advancement in the green economy. Some schools also have centers dedicated to providing students with guidance for finding careers in the green economy, including making connections with employers, such as Rutgers University's Climate and Energy Institute.

Integration between employers and educational institutions is vital to addressing any skills gaps found in future workers. A consistent criticism heard in interviews is that incoming workers are not being trained or educated to most industry's current standards and desired skillsets. Training for occupations in emerging green industries is a particular struggle since the skills and other training needs of these jobs are difficult to predict or identify without the experience from employers and other industry stakeholders over time. Education providers that are more directly engaged with industry and employers can lessen potential skills gaps and give students more access to employment opportunities post-graduation.

> ***"A lot of training isn't industry led – a lot of educational institutions aren't necessarily bringing in the employer perspective."***
>
> Clean energy company representative

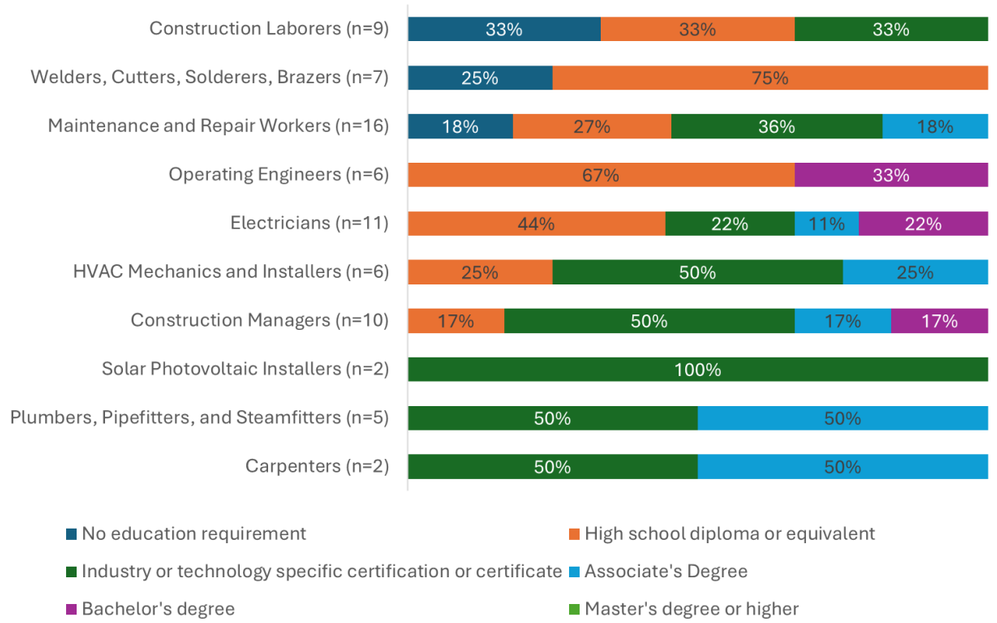
Survey results show promise in partnerships. The most common partners for employers to recruit from are high schools and technical schools, four-year colleges, and community colleges (Figure 16). The outcome is the same for employer training (Figure 17). Utilities are continuing to deepen their collaboration efforts with technical schools and community colleges, especially as Triennium 2 energy efficiency programs take effect. Other programs already in operation include K-12 summer camps and workshops, K-12 targeted solar installation trainings, and internship partnerships between colleges and employers.

In addition to finding workers to fill the projected demand in the various priority occupations, job seekers for green economy jobs may need to seek new education and training required for these jobs. Access to training and wraparound support programs will be critical to allow workers to obtain the training, certification, experience, and education they need to find success in the green economy. Detailed education and training information can be found in the Occupational Profiles section of this report.

The varying education and training requirements for different occupations can also be seen in the results of the employer survey. Workers interested in the five occupations with severe demand gaps under the *Current Policy Scenario* – Electricians, Plumbers, HVAC Technicians, Sheet Metal Workers, and Solar Installers – should expect to need to earn at least some level of minimum education for the entry-level roles and at least some level of on-the-job training or prior experience. Figure 22 below displays the highest level of education that surveyed employers reported seeking from applicants of the various priority occupations while
Figure 23 illustrates the length of prior work experience these employers require of the applicants.

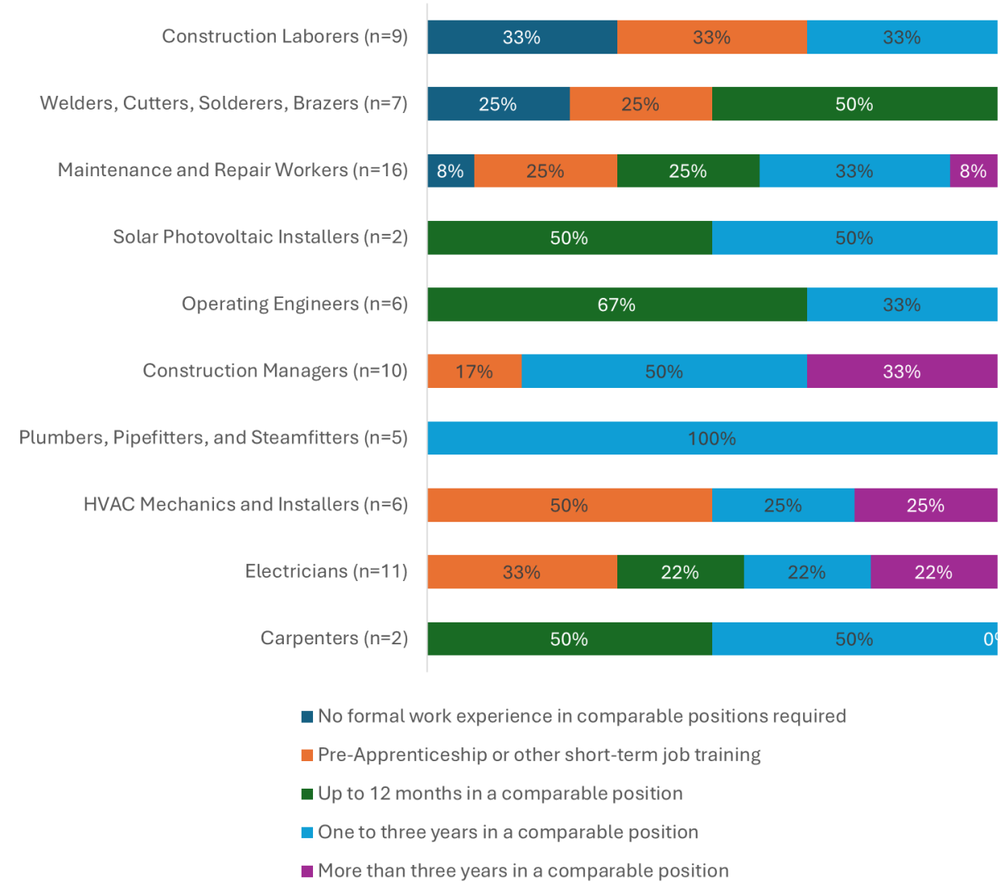
Generally, Electricians, Plumbers, HVAC Technicians, and Sheet Metal Workers typically complete apprenticeship programs or long-term training prior to entering journey-level positions, while Solar Installers may complete an apprenticeship program or attend a technical school or community college to obtain the proper training.

Figure 22. Highest Education Level Required of Qualified Applicants per Surveyed Employers, by Occupation[66]



66 The "n" represents the number of respondents.

Figure 23. Minimum Level of Prior Experience Required of Qualified Applicants per Surveyed Employers, by Occupation[67]



UNIONS

Opinions about opportunities for workers in the green economy vary among New Jersey unions. Many unions are still at the stage of exploring and considering their role in the green economy. Through interviews and listening sessions, unions highlighted that they are not against supporting the technologies that comprise the green economy but have not seen the demand for jobs that they have been promised for their collaboration and support. Some unions would also like to see the green economy to include other technologies and industries that do not fall under New Jersey's current definition of a green economy.

Strengthening partnerships between unions and clean energy employers can bolster participation, engagement, and support among unions in the green economy. Green economy employers also need to offer clear directives of what training will be needed for specific occupations to participate in the green economy. "Based on the employer survey, those employing Carpenters, Construction Laborers, and Operating Engineers have the highest rate of Collective Bargaining Agreement (CBA), Project Labor Agreement (PLA), or other Union coverage with New Jersey unions compared to the employers of the other priority occupations. Coverage rates are lower among those employing Welders and HVAC Technicians, keeping in mind limited sample size for these occupational categories.

In interviews, union members in New Jersey generally recognize that a transition to clean energy is occurring but also urge the State to move more slowly in transitioning between energy technologies, with the needs of the workforce in mind. In addition, labor policy that requires prevailing wages, fair benefits, and union access in clean energy programs will help to raise interest among job seekers and secure more workers to meet growing demand.

Apprenticeships

One bridge to increasing the role of unionized workers in the green economy is through the development of union apprenticeship programs. Apprenticeships can be a valuable pathway to creating a skilled workforce for any industry, especially in the green economy. New Jersey places particular emphasis on apprenticeships in its workforce development policy, exemplified by NJDOL's various efforts. This includes the previously mentioned GAINS grant that offsets the training costs for apprenticeships, along with the Pre-Apprenticeship in Career Education (PACE) grant program.

Unions are unlikely to expand apprenticeship programs without assurance that demand for their members will increase over time. Paid training and education for jobs that are not currently present but instead promised soon is a difficult idea to sell to both unions and other training providers. Given difficulties in predicting deployment rates for new or emerging green technologies, this may contribute to creating a potential workforce gap in the future.

> ***"There are a ton of articles about green jobs, but if we go to an employer and say, 'we train on green jobs,' they say, 'we don't have those.' But if we say we are training them in water infrastructure, they say 'oh we have a ton of need for that.'"***
>
> Workforce training provider

While apprenticeships are a key training and recruitment mechanism, their structure and rules can present barriers to training in newer technologies. For example, while solar energy deployment is expected to increase in the state, there is no official registered apprenticeship for Solar Installers in New Jersey, creating a hindrance for this pathway into solar installation work. Training for solar installation can be covered in registered apprenticeships for Electricians, although electrician apprenticeships have low acceptance rates, and take longer to complete than solar training programs.

Existing funding mechanisms such as PACE and GAINS that are designed to support apprenticeship programs cannot support training for newer technologies that do not have their own registered apprenticeships. Other states are exploring adding newer green economy occupations like solar installation as recognized apprenticeships, or lessening requirements for these types of occupations to receive apprenticeship grants. New Jersey's current apprenticeship structure, following Federal guidelines, makes this a challenge.

67 The "n" represents the number of respondents.

STATE GOVERNMENT

> ***"Information provided by the State is critical. I don't have the time to look at all the pathways myself."***
>
> Trade association executive

The government of New Jersey has been a key player, across multiple agencies, in incentivizing and contributing to the advancement of the green economy. In addition to driving workforce demand through policies and investments, New Jersey's state agencies can play a key role in the coordination of green workforce activity. NJDOL plays an influential role in supporting employers' recruiting efforts, identifying workers with matching skills, connecting employers to funding opportunities, and more. NJEDA has been an active participant and funder in raising awareness in local communities about opportunities in the green economy and working in clean energy technologies. Multiple state agencies can also facilitate collaboration and convening of various stakeholders. For example, NJBPU, NJDOL, and NJIT coordinate the Business and Industry Leadership Team (BILT) involving various state utilities, community-based organizations (CBOs), employers, labor unions, and training providers. BILT focuses on workforce development and training for the energy efficiency sector.

Regional Disparity Between North and South Jersey

There are clear regional disparities in workforce development capacities between the northern and southern parts of the state. North Jersey has a larger concentration of resources and economic opportunities than South Jersey, with an accompanying disparity in green economy opportunities between the two regions as well. North Jersey tends to have better infrastructure, including educational institutions. This gap can also be seen in this report's inventories for both training and wraparound support. South Jersey has a greater concentration of unemployed citizens; in some South Jersey overburdened communities, the unemployment rate reaches close to 30%. In interviews conducted for this report, some business and workforce stakeholders recognize this disparity and are seeking to expand programming and funds towards the southern part of the state and explore how they can best reach the residents of South Jersey.

For the purposes of this report, North Jersey includes Bergen, Essex, Hudson, Morris, Passaic, Sussex, and Warren Counties; South Jersey includes Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Salem Counties; and Central Jersey includes Hunterdon, Mercer, Middlesex, Monmouth, Somerset, and Union Counties.

INVENTORYING NEW JERSEY TRAINING ASSETS AND ANALYZING ABILITY TO MEET LABOR DEMAND

THE TRAINING INVENTORY

A comprehensive inventory of training assets in in New Jersey identified 398 publicly available training and credentialing programs that serve the priority occupations.[68] These trainings were identified by looking at programs offered at the state's community college system, career technical education school districts, labor unions, and other local entities.[69] Additional information on the methodology for developing this training inventory is found in Appendix A while the full inventory is found in Appendix E. This section summarizes the inventory findings including gaps in the training ecosystem for the priority occupations.

Training programs provide a variety of workforce services . Credit-bearing certificate programs from academic institutions are the most common found in the inventory, making up one-fifth (20%) of the inventory. Career and Technical Education (CTE) programs and job readiness training are also popular, accounting for 16% of the inventory each. Rounding out the six most popular programs are non-credit bearing certificate programs, making up 11% of the inventory each. The prominence of CTE and

68 Two priority occupations are not included in this analysis due to inclusion after data collection: Sheet Metal Workers and First-Line Supervisors of Construction Trade and Extraction Workers.

69 The inventory was developed from mid-July 2024 through mid-August 2024, with additional updates made in October 2024.

apprenticeship programs in New Jersey highlights the breadth of hands-on and work-based learning, which is a valuable component of a holistic workforce development approach.

Table 7. Number of Identified Training Programs by Degree or Outcome[70]

Degree/Outcome	Number of Programs	Percent of Total
Certificate (credit-bearing, from academic institution)	78	20%
Job Readiness only[71]	64	16%
CTE program	63	16%
Apprenticeship	43	11%
Certificate (non-credit bearing, from bootcamps, workforce training centers, etc.)	42	11%
Pre-apprenticeship/Apprenticeship readiness	25	6%
Degree/Outcome	Number of Programs	Percent of Total
Test Preparation	17	4%
Continuing Education Unit (CEU) Credits	13	3%
Apprenticeship Classroom Instruction[72]	13	3%
Upskilling only (Occupation Specific)	10	3%
Associate Degree	6	2%
General Industry Professional Development	6	2%
Bachelor's Degree	6	2%
Master's Degree	4	1%
Undergraduate Course/Credit	3	1%
Graduate Certificate or Course	2	1%
Doctorate Degree	2	1%

Of the priority occupations analyzed for this inventory, programs for Electricians make up the largest share (22%) of identified training programs, followed by programs for HVAC Technicians (14%) and Welders (14%). There are limited trainings for General Maintenance and Repair Workers, however the qualifications and skills necessary for this occupation are less extensive than most of the other priority occupations (Table 8). A few programs are not targeted to a specific occupation and are instead designed for multiple pathways. For example, an exploratory construction program at the Sussex County Technical School was developed to expose participants to several types of trades work and give them a wide range of foundational knowledge and skills, allowing them to specialize later, once employed.

70 The training programs identified for this inventory are those serving the one or more of the priority occupations and not the green economy more broadly. Therefore, generalist or broader sustainability and environmental studies programs are not included in the inventory which may reflect a low number of higher education degree programs.

71 Over one-fifth (23%) of the job readiness programs are intensive online programs offered by community colleges, some ranging from 3 months to 18 months and others ranging from 40 hours to 250 hours. These programs do not result in certifications.

72 Programs that offer classroom instruction needed for an apprenticeship but require apprentices to secure an employer to fulfill the hands-on learning portion of an apprenticeship on their own. In other words, the institution offering the classroom instruction is not the same institution that is offering the hands-on training.

Table 8. Number of Identified Training Programs by Primary Occupational Focus

Primary Occupational Focus	Number of Programs	Percent of Total
Electricians	89	22%
HVAC Technicians	57	14%
Welders	56	14%
Plumbers	41	10%
Carpenters	33	8%
Construction Managers	33	8%
Multiple occupations	28	7%
Construction Laborers	20	5%
Solar Installers	19	5%
Primary Occupational Focus	Number of Programs	Percent of Total
Operating Engineers	17	4%
General Maintenance and Repair Workers	5	1%

GEOGRAPHIC ANALYSIS OF TRAINING PROGRAMS

Among the 398 total training programs identified in New Jersey, 11%, or 46 programs, are offered online by New Jersey institutions. The largest share (40%) of the remaining 357 programs hosted in-person are in the northern region of the state. Some training providers, especially non-profits, have recognized this disparity and are seeking to focus their efforts on the southern region, along with some training grants only being eligible in South Jersey.

> ***"Most training facilities are in the northern half of the state. Many folks go into Philly, West PA, or NY to do hands-on training and small businesses have a hard time with this. We need facilities accessible to South Jersey."***
>
> Clean energy advocate

Table 9. Number of Identified Training Programs by County/Location and by Occupation[73]

Primary Occupational Focus	Number of Programs by County/Location			
	South Region	Central Region	North Region	Online
Carpenters	14	13	6	0
Operating Engineers	6	9	2	0
Construction Laborers	5	8	5	2
Multiple occupations	9	7	10	2
Welders	18	10	25	3
Electricians	23	23	34	9
Construction Managers	7	4	20	2
Plumbers	9	12	13	7
HVAC Technicians	12	16	21	8
General Maintenance and Repair Workers	1	0	2	2
Solar Installers	1	2	5	11
GRAND TOTAL	**105**	**104**	**143**	**46**

73 Zip codes were cross walked to New Jersey county definitions using data from U.S. Housing and Urban Development (https://www.huduser.gov/portal/datasets/usps_crosswalk.html). Regional definitions for New Jersey were extracted from NJDOT (https://www.nj.gov/transportation/about/employ/regions.shtm).

The share of training opportunities available for the occupations classified as "severe," based on the high projected employment demand, is mixed. Training opportunities for those who seek to become or advance as an Electrician, a "severe" occupation, are well dispersed throughout the state. Electrical training programs comprised the largest share of identified training programs in New Jersey, with 23 programs each in both the southern and central regions, and 34 in northern region.

Plumbers, along with HVAC Technicians, two other "severe" occupations, also have a high number of training opportunities. For Plumbers, nine programs are available in the South, while 12 are available in the central region and 13 in the North. When looking at HVAC Technicians, the difference in training capacity between regions becomes more pronounced, with 12 programs in the South, compared to 16 in the central region and 21 in the North.

Other high-growth occupations such as Construction Laborers, Construction Managers, Operating Engineers, and Welders have a sizable number of training opportunities in the state, with Welders notably having 56, the third most in the inventory. Unlike most of the other occupations, Carpenters and Operating Engineers have a higher concentration of training programs in the southern and central regions of the state than the northern. There is a notable gap in training for Construction Managers, with only seven programs in the South, four in the central region of the state and 20 in the North. Constructions Managers have the highest state wage of these high-growth priority occupations.

As the green economy expands in New Jersey, ensuring residents of the state's southern region have access to high-quality training and high-wage job opportunities will be pivotal to achieving equity goals.

Training Gap for "Severe" Occupations at a County-Level

When comparing the workforce of the five "severe" occupations at the county-level,[74]these occupations all have county concentrations similar to each county's overall workforce concentration, showing this statewide shortage is generally not concentrated in any one county more than another. Hudson County is the only county to have four "severe" occupations three-percentage point less than their overall workforce makeup.

Middlesex, Monmouth, and Bergen Counties employ the most workers of the five "severe" occupations, unsurprisingly given their large shares of the state's total workforce. Of these counties, Middlesex and Monmouth are in the central region of the state, while Bergen is in the North. While the North has more training opportunities for these occupations, the central region employs a greater share of these workers but offers a smaller share of training opportunities.

South Jersey has a notable presence of workers in these five occupations, especially in Camden and Burlington Counties, but overall, a lower presence of workers than the other regions. The region's fewer training opportunities could perpetuate the already lower concentration of these workers.

74 Plumbers; Electricians; HVAC Technicians; Sheet Metal Workers; Solar Installers

Table 10. "Severe" Occupation Employment by New Jersey County, 2024Q2

County	Plumbers	Electricians	HVAC Technicians	Sheet Metal Workers	Solar Installers	Total Workforce	Percent of State's Total Workforce
Atlantic County	351	529	325	66	40	131,698	3%
Bergen County	1045	1641	1094	247	94	473,454	10%
Burlington County	517	611	516	136	37	222,031	5%
Camden County	737	941	750	172	53	219,489	5%
Cape May County	167	150	162	32	8	45,663	1%
Cumberland Cty.	250	210	260	62	12	62,703	1%
Essex County	633	838	675	189	42	372,760	8%
Gloucester County	433	471	434	90	25	131,147	3%
Hudson County	386	604	400	73	52	293,789	7%
Hunterdon County	178	265	185	37	13	51,304	1%
Mercer County	320	748	346	79	48	274,141	6%
Middlesex County	1065	1728	1162	269	119	453,103	10%
Monmouth County	1171	1663	1113	217	92	293,717	7%
Morris County	790	1584	819	180	93	315,225	7%
Ocean County	672	1005	656	143	53	205,893	5%
Passaic County	520	983	517	127	51	187,163	4%
Salem County	86	111	85	18	6	23,547	1%
Somerset County	378	706	380	88	42	201,814	4%
Sussex County	140	208	150	36	9	43,172	1%
Union County	688	927	658	146	55	246,769	5%
Warren County	80	141	89	22	6	36,065	1%
N/A[75]	389	803	390	101	103	233,003	5%
Total	10,998	16,867	11,167	2,530	1,052	4,517,651	N/A

75 Jobs that cannot be allocated to a specific county

ENSURING ACCESS TO GREEN ECONOMY EMPLOYMENT OPPORTUNITIES

Many stakeholders are making concerted efforts to ensure marginalized communities gain access to employment in the green economy and increase the diversity of the workforce. Community organizations play a vital role in expanding access to training and employment opportunities, especially in overburdened communities. In some communities, especially those where green economy activity is limited, misinformation, negative perceptions, and a lack of awareness about available opportunities can hinder participation. Community organizations are more likely to be localized and trusted in the communities in which they work, and are trusted partners to connect with education, training, and other workforce and economic development resources. They are a key asset in these communities to share information about the green economy and increase interest in the workforce opportunities among community members.

"There is hesitation in communities with government and utility entities, so when new initiatives come out, policymakers may try making an effort, but tapping into community-based organization will have better response rates and better outreach."

Clean energy company representative

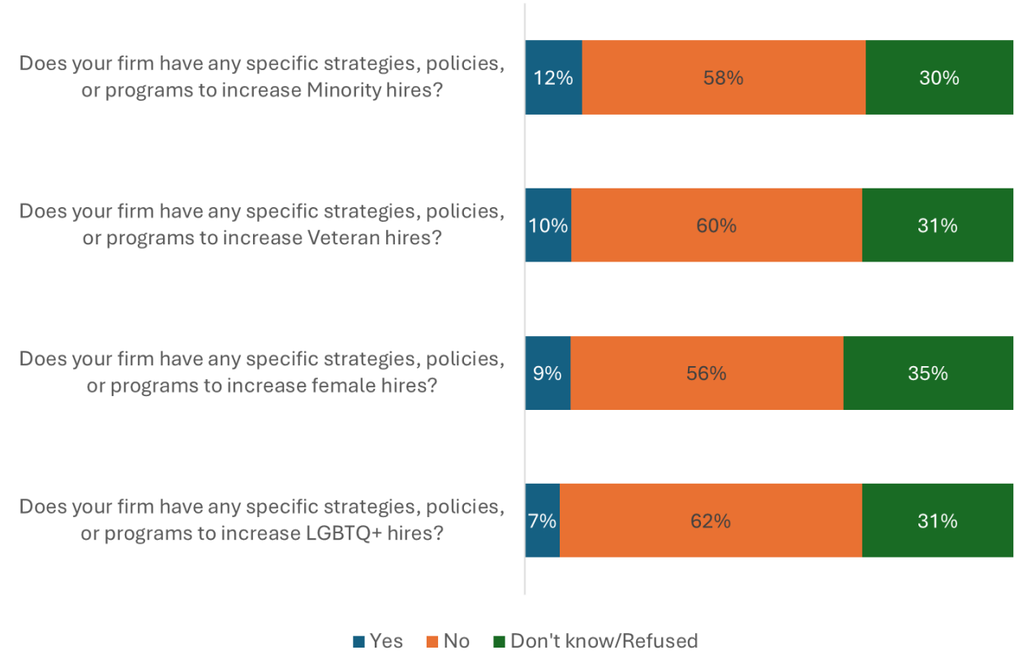
PRE-APPRENTICESHIPS

Pre-apprenticeships and other similar apprenticeship-readiness programs are crucial to the recruitment of individuals from underserved populations. Basic math, reading comprehension, computer proficiency, and job searching skills are vital to any industry. Pre-apprenticeships provide essential skill development in those areas, alongside individualized mentorship, and provide future workers with new pathways to attain and succeed in a registered apprenticeship. Vocational-technical schools are one potential pipeline for pre-apprenticeship candidates, and an opportunity for schools and employers to work together. Targeting overburdened communities for pre-apprenticeships and other job-readiness programs serves to diversify the workforce and help ensure underprepared students and workers have greater success upon entering the workforce.

EMPLOYERS' APPROACH TO DIVERSITY

Employers play a critical role in increasing access to green employment opportunities for all workers. However, in surveys conducted for this report, few surveyed firms have special hiring initiatives to target female, minority, LGBTQ+,[76] or Veteran populations.[77] Only 9% of firms have specific strategies, policies, or programs to increase female hires, while only 7% of firms have strategies to increase LGBTQ+ hires (Figure 24).

Figure 24. Surveyed Firms' Special Hiring Initiatives (Respondents range from 42 to 43)

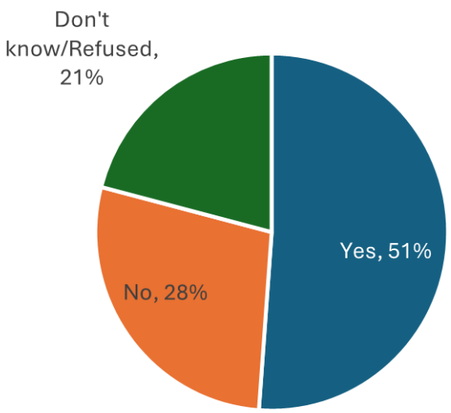


Only half of firms (51%) surveyed reported that they conduct criminal background screening on potential applicants (Figure 25). This flexibility can create opportunities for justice-involved citizens of New Jersey to navigate pathways into green economy employment.

76 Lesbian, gay, bisexual, transgender, queer, and additional gender and sexual identities

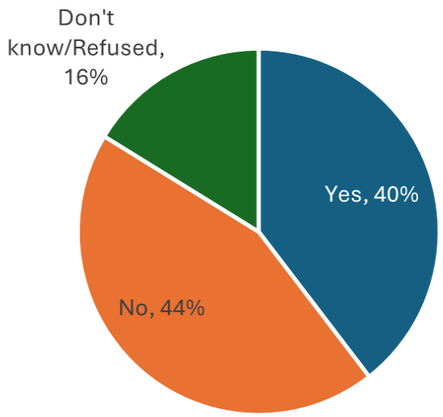
77 Responses from employers of Computer Numerically Controlled Tool Operators and Team Assemblers are included in the survey data since they were included as occupations of interest at the time the survey was fielded, and the responses were analyzed. These two occupations have since been removed as priority occupations elsewhere in the report.

Figure 25. Does your Firm Conduct Criminal Background Checks for Potential Applicants? (43 respondents)



Two in five (40%) survey respondents reported substance use screening for potential job applicants at their companies (Figure 26). Partnerships with employers can help delineate the types of occupations for which the screening is necessary and provide job seekers with the information about the types of screenings to be performed.

Figure 26. Does your Firm Conduct Substance Use or Drug Testing for Potential Applicants? (43 respondents)



WRAPAROUND SUPPORT SERVICES IN NEW JERSEY

Comprehensive supportive services are essential for encouraging greater participation in training opportunities. Wraparound support services are resources or services that reduce barriers to accessing training and job opportunities, including but not limited to career coaching/counseling, transportation, childcare, mental health services, financial education, English language proficiency, and legal services.

To help New Jersey better understand access to and types of wraparound services, researchers compiled an inventory of community groups and government agencies that assist in providing wraparound support services to New Jersey residents.[78] Among the 85 total organizations identified, those that offer Education and Training Resources comprise the largest concentration (72% of total organizations), followed by Behavioral Health Support and Counseling (55%), and Youth and Family Services (54%). Organizations that offer Addiction and Recovery Services (19%), as well as Transportation Services (21%), are rarer (Table 11). Typically, an individual organization will offer a range of supportive services spanning multiple areas of social well-being.[79]

> ***"For any workforce program, funding for supportive programs is imperative. There is little motivation to get someone to take time away from their home. Supportive services and stipends get people to show up without feeling like they must sacrifice something. Pair this with shorter duration trainings or condensed trainings, as people don't have time or money for multiple month/year college programs. They need to make money to put food on the table."***
>
> Community group lead

Only 35 of the total 85 organizations (41%) currently offer some sort of workforce development program and/or partner with a workforce organization to provide supportive services.

Table 11. Number of Identified Organizations to Offer Specific Wraparound Services

Service Offered	Number of Organizations	Percent of Total
Child Care	24	28%
Transportation Services	18	21%
Career Coaching	42	49%
Youth / Family Services	46	54%
Education / Training Resources	61	72%
Financial Services	36	42%
Service Offered	Number of Organizations	Percent of Total
Disability Services	22	26%
Addiction / Recovery Services	16	19%
Behavioral Health Support / Counseling	47	55%
Other	62	73%

78 Inventory developed from July 2024 through September 2024. Please see methodology for additional details on data gathering process. Due to difficulties in locating all

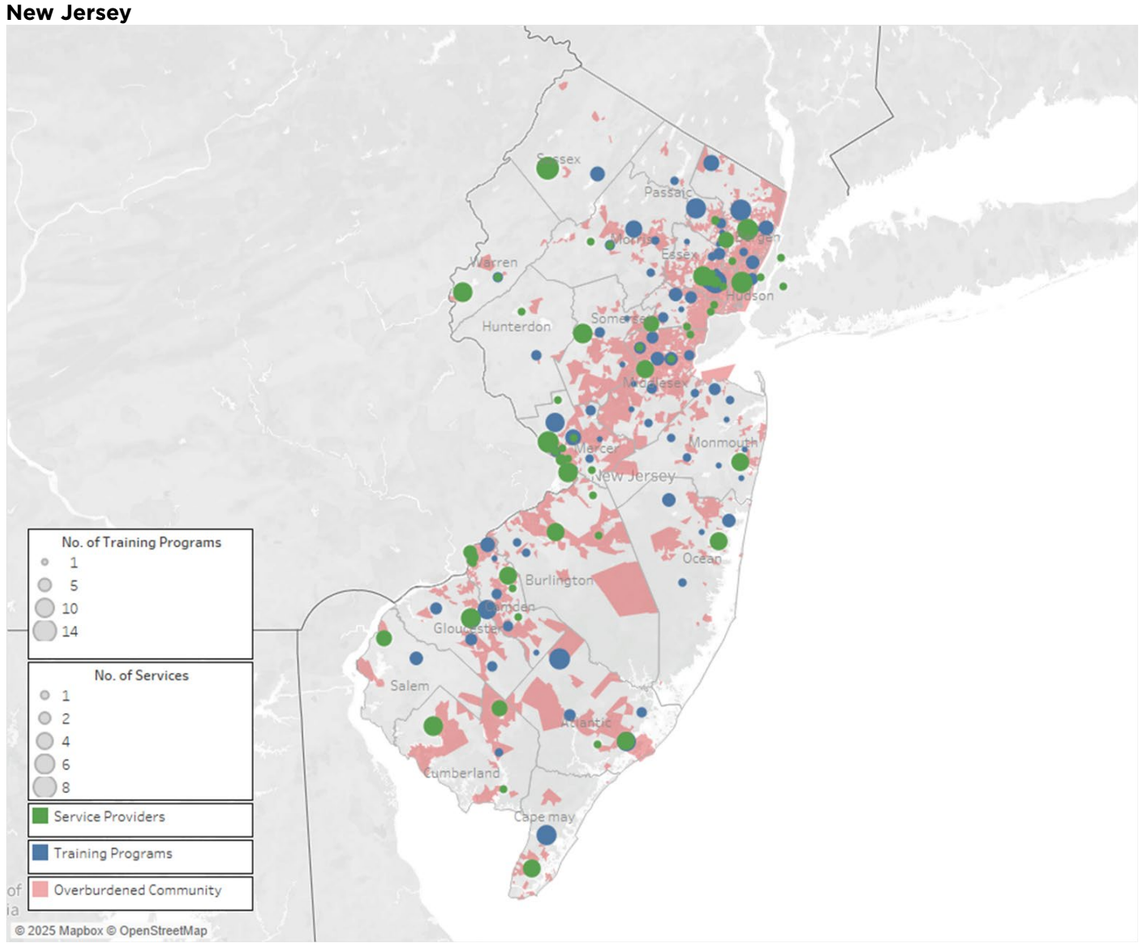
79 73% of organizations offer services in "Other." Services commonly listed under "Other" include housing assistance, technology services, food/healthy eating resources, domestic violence services, legal services, community revitalization, re-entry services, environmental justice, immigration assistance, healthcare referrals/resources, and English language and literacy services.

Geographically, these wraparound service providers are distributed across several counties, with Mercer County hosting the highest concentration (24%) of organizations, followed by Essex County (13%). Some counties, like Atlantic, Cumberland, Morris, Ocean, and Passaic, are home to only one or a few organizations. This inventory identified at least one support service organization in three quarters (15 of 21) New Jersey counties.

When looking at service and training provider locations in comparison to overburdened communities, the overburdened communities in the northern half of the state have greater proximity to training and service providers than those in the South. The northern counties of Bergen, Hudson and Middlesex have providers located throughout the state and within overburdened communities, whereas counties like Burlington, Atlantic and Cumberland have fewer providers throughout the county. Some large areas containing overburdened communities lack any providers nearby (Figure 27).

> ***"The infrastructure is not in place in southern New Jersey to allow green energy participation. We've had micro-transit pilot programs, but they just haven't panned out. Private transit options are happening for hospitals, we should expand this to other parts of the economy."***
>
> Regional economic development executive

Figure 27. Map of Supportive Service Providers, Training Programs, and Overburdened Communities in New Jersey



While wraparound supportive services are valuable in increasing opportunity and access in the green economy for underrepresented groups and residents of overburdened communities, provision of these services is not sufficient by itself. These services also require extensive coordination and integration between multiple providers. Coordination between multiple partners may create some initial challenges, but it is important to build the necessary trust and credibility. Working with a partner who is a trusted resource to the community is valuable to understanding a community's specific history and needs.

As with many types of programming, funding is imperative to providing these services. Stakeholders throughout the state identify a lack of communication and information about the various funding opportunities in support of wraparound services. In addition to pursuing increases in federal and state funding increases for service providers, better communication and application assistance can help to increase the funding capacity of providers to perform services.

RECOMMENDATIONS

The CGE's 2022 report contained recommendations covering all of New Jersey's green economy, organized into three goals:[80]

1. Creating high-quality good jobs that are accessible to all.
2. Building a strong, well-trained, and demographically representative workforce.
3. Supporting a robust innovation ecosystem.

The recommendations included in this new report expand specifically on the CGE's 2022 report recommendations that were directly *workforce related*. These new recommendations below are grouped among several stakeholders who will play key roles in crafting New Jersey's green workforce strategy. While organized by specific stakeholder group, many of these recommendations are also relevant to, or rely on, the other stakeholders as well. These recommendations are not designed as a detailed action plan for the state but instead can serve as a starting point for discussion among those stakeholders about New Jersey green workforce development, and programmatic and funding strategies that can support all New Jersey workers who seek to enter the green economy.

Educational Institutions

1.1 The state's innovative K-12 climate curriculum should also include information on employment opportunities in the green economy, as well as explore and support students' interest in the trades.

The state's climate curriculum is a landmark achievement and the first in the country. It also can provide a helpful foundation for developing young workers for the State's economy. Greater exposure to careers within the green economy could bolster the curriculum and support the ongoing creation of pipelines of workers for green industries. Introducing young people early to industry career opportunities can significantly impact their career orientation and approach to seeking employment after school. Many types of stakeholders can participate in boosting vocational efforts within the climate curriculum including employers, trade groups, unions, training providers, post-secondary educational institutions, and workforce boards. Specific career-related activities include inviting employers and unions to speak at schools as part of the curriculum, hosting green economy career events, developing individual partnerships between stakeholders and schools, and tours and field trips to manufacturing facilities, companies, and job sites.

1.2 Community colleges and technical schools can support graduates entering entry-level jobs through direct outreach and expanded partnerships with green industry employers that inform and enhance their training and vocational programs.

The inclusion of green economy employers in CTE programs can maximize the opportunities for students to learn the skills needed to be successful in entry-level roles in the green economy. Employer involvement in training and the development of the curriculum for a program can increase confidence across employers that graduates have the necessary knowledge to join their workforce. This also allows employers to provide technical support, access to opportunities, and post-graduation employment pipelines for students. This will require dedicated outreach between

80 Council on the Green Economy: "Green Jobs for a Sustainable Future", 2022

educational institutions and employers to support hands-on training activities for students. Employers serving on advisory boards at educational institutions can also provide helpful introductions and exposure between employers and the workforce and education system.

1.3 New Jersey undergraduate and graduate students need targeted exposure to career-centered experiences, relevant to their field of study, which facilitate entry into clean energy and other green economy industries.

Based on surveys and interviews, new graduates from four-year and graduate programs tend to lack industry-specific tools and skills to thrive in the green economy in New Jersey. Direct exposure to career information and experience during a student's post-secondary education is essential for developing hirable graduates in STEM[81] roles. Universities can pursue a continuum of strategies for students, including career exploration classes, career counseling, internships, earn-and-learn opportunities, apprenticeships, and job placement targets. Revising university curricula to help students earn important industry-valued certifications is another approach to improving students' marketability in the labor market.

1.4 The shortage of career and industry professionals in CTE programs can be partly addressed by expanding pathways and resources for them to enter teaching and training positions.

There is a significant gap in trainers and instructors participating in career-based education efforts in the state. Workers with first-hand industry experience have the potential to be highly effective teachers and trainers, but may lack the background, exposure, or training to teach effectively. In addition, the transition from worker to teacher may be a pay cut. Providing easy access to initial educational training and offering incentives and other supplements can address some of these barriers. A dedicated outreach effort could target instructors within specific occupations. Maximizing the participation of industry professionals within teaching can support better transfer of industry knowledge to students. This can further help to alleviate some of the gap in instructors for green-related and trade-related training programs, while improving the experience and employability of students.

Employers

1.5 Industry partnerships that focus on employers in New Jersey's green economy can be a foundation of successful statewide green economy workforce initiatives.

These partnerships, currently led by NJDOL, integrate the employer perspective throughout the workforce development process, in order to surface employers' anticipated demand for specific occupations, and ensure that New Jersey workers possess the required skills, education, and industry certifications. Employer involvement is crucial to workforce development success (as demonstrated by how many of the recommendations in this report connect back to employers). Effective green industry partnerships would feature a collection of workforce boards, and other workforce entities, educational institutions, employers, trade associations, and community interests. These entities should be organized around long-term green workforce goals in the state, and operate with holistic, workforce-system-wide goals in mind, concentrating on coordination and collaboration across key entities.

1.6 New Jersey's manufacturing sector is a critical component of the state's green workforce strategy, especially within more emerging green industries.

Alongside growing the economy through exports, manufacturing can be a key job creator for New Jersey's workforce. In-state manufacturing helps ensure New Jersey manufacturing workers can prosper from the production of green economy technologies, and sale of those goods outside the state. Manufacturers should ensure they are informed about and pursuing tax incentives and other economic development grants, especially connected to the retooling of existing manufacturing plants to produce green economy technologies or components and increasing their capacity to enter new green markets. New Jersey is home to nation-leading manufacturing training organizations who have taken leading roles in mapping supply chains and promoting New Jersey companies. Well-established training organizations in manufacturing will be important partners moving forward. Manufacturers should work more closely with these training organizations and the State to maximize connections between manufacturing facilities and emerging green technology developers.

1.7 Green economy employers should join other stakeholders in recruiting, hiring, and retaining workers from overburdened New Jersey communities.

Workers drawn from underrepresented populations and in overburdened communities represent an untapped opportunity in expanding New Jersey's green economy. However, they can be difficult to reach and tend to face higher barriers to employment, such as inadequate education, access to transportation, childcare needs, limited career exposure and experience, and justice system involvement (additional barriers are highlighted in Recommendation 5.5).

Addressing these complex and intersectional barriers necessitates a comprehensive approach that integrates the needs of the candidate and the employer. Employers must be aware of the specific barriers these workers from overburdened communities face, and implement recruiting, hiring, and retention strategies that are tailored to specific populations(such as underemployed youth, or single parents). Additionally, while the participation of employers is crucial, many other workforce stakeholders can be valuable partners and allies in reaching the goal of a more diversified New Jersey green economy workforce.

Direct outreach with community organizations and schools can create a helpful connection for underrepresented youth to learn about opportunities in the green economy. This includes connecting directly with populations through trusted advisors and mentors, providing targeted events and programs, boosting career awareness among these groups through communications campaigns, and committing to providing employment opportunities. Hiring staff dedicated to community engagement and integrating them into programming can also help guide students and provide real-world insights. Dedicated career navigators can offer guidance in navigating support structures and create holistic support plans for individual clients.

1.8 Employers should pursue greater access to opportunities for women in the New Jersey green economy and integrate gender-specific barrier-reduction strategies as an essential element of success.

As highlighted in this report, there is a significant gap between male and female participation in New Jersey's green economy, compared to non-green economy industries. Addressing this gap will require resources and commitments specifically targeting impediments to drawing women into these industries. Providing free foundational training programs in the trades and manufacturing has proven a successful strategy, especially when classes are taught by women instructors, and include career navigation and workplace guidance. Marketing and outreach that highlight New Jersey

81 Science, Technology, Engineering and Mathematics

women in the trades and manufacturing can familiarize these new opportunities. Other best practices include prioritizing leadership development for women already in these fields and supporting clear pathways into apprenticeships and pre-apprenticeships. While not a unique barrier, addressing childcare needs and scheduling barriers that can hinder female participation in the workforce continues to stymie women seeking to enter the green workforce. Wraparound support solutions are discussed in further detail in Recommendation 5.5.

1.9 Green economy companies should also partner with New Jersey unions to give clear direction of upcoming job demand, and the occupations and skills needed.

Support for clean energy technologies among New Jersey unions continues to be mixed and is determined by many factors, stemming in part from many unions not having a clear idea of occupational demand in the green economy, and their role in it. Green economy companies hoping to work with unions should begin building partnerships and connections and provide unions with a clearer idea of what training and jobs union workers will need to participate in projects with specific green companies. A collaborative approach between companies and unions is crucial for integrating clean energy employers early in the training process and fostering positive engagement with unions.

Unions

1.10 Unions will play a crucial role in advancing New Jersey's green economy, particularly by ensuring jobs in building and construction trades, where much of the projected workforce demand is centered, are safe for workers and provide family-sustaining wages.

Continuing to support and promote the hiring of unionized workers can encourage ongoing development of a robust clean energy workforce in the state. Unions are instrumental in providing high-quality training and offer highly attractive employment benefits. Training providers and employers want to ensure workers can perform their jobs safely and maintain the necessary credentials. This is a responsibility that unions handle for their members.

1.11 To fully capture the benefits that unions provide, barriers to union entry and membership must be addressed.

Individuals who want to join unions often face substantial obstacles, as unions maintain exclusive training programs and processes that can be extremely competitive to enter. This competition can limit entry into unions for graduates of high schools, CTE schools, and other training programs, who can lack access to kinds of networks and initial training and experience beneficial to passing apprenticeship examinations, New Jersey unions are starting to make progress in boosting outreach to different communities and populations, expanding pre-apprenticeship and apprenticeship-readiness programs, and providing support to entry-exam takers. Unions can also provide more information and greater clarity on the process for entering the union, such as navigating waiting lists, and preparing for entrance exams, especially for those potential union members with limited familial or community experience with unions. All New Jersey unions should pursue these kinds of efforts that support greater accessibility to union apprenticeship programs.

New Jersey trades can also lead in pursuing programs and initiatives that create a more supportive and welcoming environment for workers of differing backgrounds, genders, and race. A multi-faceted strategy for unions could include increasing access to apprenticeships described above for diverse populations, integrating commitments to diversity into the workplace, and ensuring robust support systems are in place for new apprentices and new journey workers. Other efforts include greater outreach in underrepresented communities, development of relationships with effective intermediary organizations, and partnerships with different types of educational institutions.

1.12 Unions that administer their own pre-apprenticeship programs can set women and minority participation goals and provide direct entry pathways into union opportunities.

Pre-apprenticeship, or apprenticeship-readiness programs, expose workers to careers and establish pathways into apprenticeships in unions, manufacturing, or non-union opportunities at other employers. Existing best practices for pre-apprenticeship programming include paying stipends, developing a trusted curriculum, and monitoring outcomes for graduates. The Building Trades can align with, partner with, or even lead pre-apprenticeship programs. To increase and improve pre-apprenticeships and apprenticeship-readiness programs, New Jersey should develop broader, better-defined pathways into these programs, alongside focused outreach in overburdened communities and more support structures for disadvantaged candidates, including income and other cost supports. Direct entry into apprenticeship programs or other clearly defined job or education pathways ensures that graduates of the program see benefits and encourage future candidates to participate. Establishing a locally targeted approach to recruiting, supporting, and hiring apprentices can also mitigate some of the extensive localized differences for the demand for apprenticeships and the systems in place to support them.

1.13 Direct entry programs that ensure pathways into union apprenticeships can help overburdened communities in overcoming lengthy wait periods for union entry, which can often last a year or more even after successfully passing through a union's assessment and screening process.

Stakeholders identify direct entry as critical to overall pre-apprenticeship success. In New Jersey, there are few direct entry programs (such as Helmets to Hardhats). This is largely due to limited capacity and the lack of an ecosystem of providers that could support direct entry programs. The absence of direct entry limits how New Jersey's apprenticeship system can serve overburdened communities and provide access to union jobs. The absence of a formal system for creating and approving state and local direct entry programs in New Jersey can limit access to union jobs for underserved communities. Addressing this gap begins with changes to New Jersey's apprenticeship system that would lead to the increase and approval of direct entry curriculums while also raising awareness among apprenticeship and pre-apprenticeship providers about the profound impact of direct entry. To bridge this gap, some unions have developed their own pre-apprenticeship programs. For instance, the Eastern Atlantic States Carpenters Technical Center offers the Carpenters' Apprentice Ready pre-apprenticeship program, which helps underserved communities prepare for and accelerate through the union entry process. Although this program does not offer direct entry, it prioritizes its graduates for the union's apprenticeship program over traditional applicants.

State Government

1.14 The State needs to increase awareness of funding opportunities and incentives, such as those available through NJEDA and other state and federal programs, and support applicants through the application processes for state funding and Requests for Proposals.

As detailed in this report, only 26% of surveyed New Jersey green economy firms utilize incentives and rebate programs, with many reporting a lack of knowledge about these programs. Interview

participants frequently noted confusion in finding information about funding opportunities, while NJDOL separately highlighted that many grant programs still have funds available for employers to use for training and recruitment needs. Improving communication and information-sharing around how to tap into available resources and funding opportunities is a critical first step. Relevant state agencies should develop strategies to draw more attention to programs and inform and recruit employers, and other relevant workforce and education stakeholders, at regular intervals through multiple communications approaches.

In addition to general awareness, applicants will benefit from increased support and resources throughout the application process. Smaller non-profits in New Jersey tend to struggle to produce applications for funding opportunities or can be overwhelmed by potential opportunities. State agencies could provide technical support and capacity to facilitate their greater participation. Deploying technical assistance funding through CBOs could be an effective way to roll out opportunities to entities operating in overburdened communities and other hard-to-reach communities,

1.15 The growth of certain occupations within New Jersey's green economy underscores the importance of targeting workforce development strategies to those roles in the near-term while continually assessing progress across talent pipeline development, coordination among key entities, and expansion of statewide training capacity.

By 2035, the EMP *Current Policy Scenario* projections show a "severe demand gap" for five of the twelve priority occupations – Electricians, Plumbers, HVAC workers, Solar Installers, and Sheet Metal Workers – and a moderate gap for five others. While New Jersey already possesses significant capacity to train and prepare workers for some of these jobs, further demand for these occupations, especially HVAC workers and Plumbers, will warrant additional resources. New Jersey should expand training programs strategically for occupations with severe demand gaps, leveraging existing programs, such as those highlighted in this report, where possible. Building a robust pipeline of future workers is also crucial and requires dedicated strategies to inform these future workers about green economy opportunities, and recruit them into apprenticeships, internships, and educational pathways leading to these high-demand roles.

Moving forward, the mix of technologies likely to be deployed in New Jersey's future remain uncertain, complicating comprehensive workforce planning. A flexible, iterative workforce strategy can align with market and technology cycles. Monitoring green employment trends can provide insights into changing roles, skills, and certification, and lead to regularly updated training and education initiatives.

Strategic recommendations throughout this chapter focus on balancing the need to address near-term occupational growth with emerging and unpredictable energy employment trends. Improving coordination and efficiency across the training ecosystem can build on existing workforce development coordination in energy efficiency and OSW. Regularly quantifying the long-term capacity of New Jersey's training assets can optimize planning and coordination among stakeholders and ensure programs meet evolving workforce demands and contribute to a sustainable green economy. Increased public awareness of these training opportunities, and more accessible resources, especially in overburdened communities, will enhance fuller participation in green industries.

1.16 Increasing funding for vocational-technical schools and community colleges in the state can help launch new workers into priority occupations in New Jersey's green economy.

Ongoing capacity constraints at CTE programs highlight the need for dedicated funding and increasing investments by the State and other partners. Technical schools have suffered from declining resources and need more trainers, training equipment, funding for support services, and curriculums better aligned with emerging green industries. There is also an opportunity to better connect CTE programming in the state with different industries in the green economy (see Recommendations 1.2 and 1.4). Encouraging this kind of collaboration with green economy employers and CTE institutions can increase the visibility of green industries to young workers, and entry-level workers from disadvantaged backgrounds. For those programs that charge tuition, seeking additional funding from philanthropy or local, regional, and state agencies could help provide no-cost training access for individuals with lower incomes.

1.17 Improving data and information available about occupations and career paths in the green economy can fill knowledge gaps and support new workers' interest in the green economy.

Understanding requirements to enter specific occupations can help individuals navigate career paths in New Jersey's green industries more effectively. To facilitate this, the State can provide standardized guidelines for certifications and licenses, with comprehensive resources and informational guides publicly available for students and workers. Developing a guide for designing and implementing effective workforce programs, with information on available resources and technical assistance, could further support under-resourced community groups who want to offer workforce training but do not have sufficient expertise and resources to build programs.

Stakeholders across different fields – employers, training providers, non-profits – all highlight the need in New Jersey for more clear career guidance and informational resources for the green economy. Career maps provide users with a visual representation of various career paths in different industries. These maps can provide the educational and training or certification requirements for jobs, the current demand and future growth projections, and wages, along with any regional concentration of opportunities. A central online database of career information could better inform New Jersey residents of where opportunities exist in the green economy, and the skills and education necessary for these jobs. Wage information and employment projections should also be housed in these types of resources. The twelve occupational profiles developed as part of this workforce needs assessment are examples of detailed career information guides.

1.18 Effective placement, retention, and tracking of graduates from New Jersey training and education programs is critical to the success of green economy workforce pipeline building, and a key place for New Jersey agencies to play a leading role.

Tracking and reporting on the success of training programs, and long-term outcomes of graduates, is good practice and can improve future iterations of these programs. Addressing the gap in data requires a robust strategy that involves working closely with future clean energy workers, training providers, educators, and employers and understanding the needs of each. Maintaining active engagement and establishing long-term relationships with employers and training providers allows for capturing more comprehensive career pathway data from the recruitment of a trainee through to placement and long-term retention and advancement of the worker.

Ongoing monitoring of green economy deployment trends, workforce capacity, and apprenticeship growth should inform updates to state priorities. Agencies

like the NJDOL, NJDEP, and NJEDA should lead efforts to track technology development and workforce data to identify needs and align stakeholder initiatives effectively.

Training Providers and Wraparound Support Providers

1.19 Varying the length of green economy training programs and providing stackable short-term credentials can increase accessibility to certain occupations in the green economy.

Short-term training programs in manufacturing and clean energy-related construction are an increasingly popular option to get participants who are out of the workforce prepared for work more quickly and reduce the financial stress and disruptions from not working. These programs work best when they provide immediate credentials for those entering new fields. Stackable certifications allow individuals to continue working while expanding knowledge and skill sets needed to advance in green industries. Some community colleges in New Jersey are seeing a drop in students entering longer, degree-granting programs in favor of shorter, non-credit training programs, according to interviewed stakeholders, as more students seek to enter the workforce sooner.

1.20 More training programs, especially those based in overburdened communities, should couple a specific focus on training for green industries with foundational education and job readiness training.

Some of New Jersey's future workers can lack basic, general job-readiness skills, especially in those areas with lower-quality K-12 educational systems, or large high-school dropout rates. By combining basic math and reading comprehension with work-study programs centered on the green economy , training providers can create more direct pathways to employment in the green economy (and beyond) for these workers with previously limited employment opportunities. Integrating professional skill development such as interviewing, resume development, technology expertise, and softer skills involving time management, and negotiating interpersonal conflict, can also improve the attractiveness and job readiness of these candidates.

1.21 Targeting the southern part of the state is important to maximize statewide impact.

The northern part of the state already has a greater concentration of green economy activity, along with higher employment rates. In addition, the northern region has a greater concentration of resources and training for jobseekers in comparison to the southern region. For training providers and educators, focusing future programming on southern New Jersey, particularly in those overburdened communities with few resources, can have a significant impact.

1.22 Community organizations can be powerful partners for the State and training providers.

Community organizations are a trusted resource on the ground in many communities and can maximize the on-the-ground impact of state and local workforce funds and programs. Many community members are more willing to listen to and consider recruitment opportunities in the green economy when hearing about them through a trusted community-centered entity, as opposed to an outside company or other source. Per one interview, when a new initiative for heat pump rebates was announced, community members were more receptive to outreach from CBOs than policymakers or utilities. Training providers can partner with a CBO, with dedicated funding, to bolster their credibility in the community and ensure the unique perspective and history of an area is considered in the development and implementation of a training program.

1.23 Providing integrated and holistic wraparound support services will more effectively meet the needs of New Jersey workers.

Wraparound support services are essential components of effective green industry workforce programs. These services encompass a broad range of resources designed to mitigate obstacles to workforce entry, such as childcare, transportation, mental health counseling, housing, as well as trauma-informed care, record expungement supports, and internet and technology needs. Wraparound support is crucial in enabling job seekers to participate fully in and benefit from workforce development initiatives.

Developing a holistic support systems approach can be beneficial in addressing multiple barriers at once. While this recommendation is included in this section, all stakeholders featured in this recommendations chapter can play a valuable role in encouraging, funding, or implementing wraparound support. While dedicated funding for wraparound services in New Jersey is limited, some state initiatives and federal funding and programs incorporate funding for wraparound supports into workforce development. Barrier reduction funds and state grants allow organizations to address needs such as transportation and housing. Philanthropic funds can be very helpful, as they often offer more flexibility than federal and state sources, enabling tailored support solutions. Stipends and learn-and-earn opportunities commonly feature wraparound support offerings. Building and maintaining a robust network of New Jersey service providers is essential for meeting the diverse needs of job seekers and ensuring comprehensive support throughout their career journey.

Lack of transportation is a key barrier to attending training programs, especially in South Jersey. Some training providers report that they refuse to work in areas without transportation infrastructure. While improving public transportation infrastructure in the state is a longer-term goal, there are other near-term solutions that can help alleviate transportation burdens on workers attending training programs and seeking job opportunities. Workforce development boards, and training providers themselves, can provide transportation via rideshare services, ride credits, bus passes, and other more targeted approaches.

Childcare is another pressing barrier to entering and staying in the workforce, especially among women. Certain industries, (such as the construction industry) have less flexible hours, and may require workers outside of traditional childcare availability. Effective strategies to address this issue include co-locating training programs near childcare facilities, adjusting daycare center hours to align with training schedules, and offering voucher programs to subsidize childcare costs.

OCCUPATIONAL PROFILES

CARPENTERS (47-2031)[82]

Overview

Carpenters exhibit notable demographic disparities, with nearly all Carpenters in New Jersey identifying as male (97%) and over half of the workforce aged 35-54. The Carpenters workforce in the state is predominantly White, comprising almost three-quarters (74%) of the total.

Pathways to higher wages in carpentry often stem from roles within the construction and installation sectors, including positions such as Insulation Workers, Helpers—Carpenters, Cement Masons, and Fence Erectors. Training for Carpenters typically occurs through apprenticeships or vocational schools, with many opportunities available in New Jersey to support skill development in this trade.

In terms of demand, New Jersey's location quotient for Carpenters is 0.69, indicating a lower prevalence of this occupation compared to the national average currently. At a baseline, employment in Carpentry is expected to rise by 3.4% in New Jersey from 2022 to 2032, and clean energy and climate-related policies and investments in the state are expected to add to this growth. Nationally, employment in this field is projected to grow by 4.2% from 2023 to 2033, with an estimated 76,500 annual job openings across the country during this period.

82 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 12. Summary of Occupation Data[83]

Employment (NJ, 2023)	13,400 workers
Location Quotient (NJ, 2023)[84]	0.69
Median Annual Wage (NJ, 2023)	$69,620
Median Hourly Wage (NJ, 2023)	$33.47
Demographics (NJ, 2024)	3.0% Female 48.9% Hispanic or Latino Ethnicity 25.6% People of Color 18.3% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	A few months to one year of on-the-job training or a recognized apprenticeship program[85]
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	4.0-6.0[86]
Industries with Highest Employment Levels (National, 2023)	Residential Building Construction: 218,950 Building Finishing Contractors: 123,630 Nonresidential Building Construction: 118,290

Job Description

Carpenters play a crucial role in the installation, maintenance, and repair of both commercial and residential buildings. They are responsible for reviewing blueprints and work plans to determine job requirements; estimating project costs; operating hand and power tools; and assembling, constructing, and installing building structures. They are involved in many types of projects, from kitchen cabinet installation in homes to bridge and other infrastructure construction.[87]

Wages

New Jersey Carpenters earn a median annual wage of $69,620, which is greater than the median annual wage of both Carpenters and overall construction and extraction occupations nationwide. This occurs at both the 25th and 75th wage percentiles as well, as shown in Table 13.

83 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/current/oes472031.htm

84 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

85 U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

86 The U.S. Bureau of Labor Statistics defines the "Specific Vocational Preparation" value. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

87 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/current/oes472031.htm
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/carpenters.htm

Table 13. Wage Distribution, 2023[88]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Carpenters (New Jersey)	Annual	$54,120	$69,620	$110,940
Carpenters (New Jersey)	Hourly	$26.02	$33.47	$53.34
Carpenters (National)	Annual	$46,130	$56,350	$72,290
Carpenters (National)	Hourly	$22.18	$27.09	$34.75
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Most Carpenters in New Jersey are male, with only 3.0% identifying as female. Across ethnicities, the make-up of Hispanic or Latino and not Hispanic or Latino workers are nearly even. Yet, across races, nearly three-quarters (74%) of New Jersey Carpenters identify as White, distantly followed by multiracial[89] Carpenters making up 12% of the workforce. In addition, most Carpenters employed in the state are between the ages of 25 and 54 years, though nearly one-fifth (18%) are 55 years or older (Table 14).

Table 14. Demographic Distribution in New Jersey, 2024Q1[90]

Demographic Type	Demographic	% of Current Workers
Sex	Male	97.0%
	Female	3.0%
Ethnicity	Hispanic or Latino	48.9%
	Not Hispanic or Latino	51.1%
Race	White	74.4%
	Black	10.3%
	Asian	2.2%
	American Native[91]	0.8%
	Pacific Islander	0.1%
	Two or More Races	12.3%
Ages	16 to 24 Years	7.3%
	25 to 34 Years	22.8%
	35 to 54 Years	51.6%
	55 Years and Over	18.3%

88 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/current/oes472031.htm

89 The U.S. Bureau of Labor Statistics and JobsEQ report multiracial workers as "two or more races."

90 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Carpenters across all industries in New Jersey and not specific to the green economy industries.

91 JobsEQ reports this as "American Indian," what is classified here as "American Native"

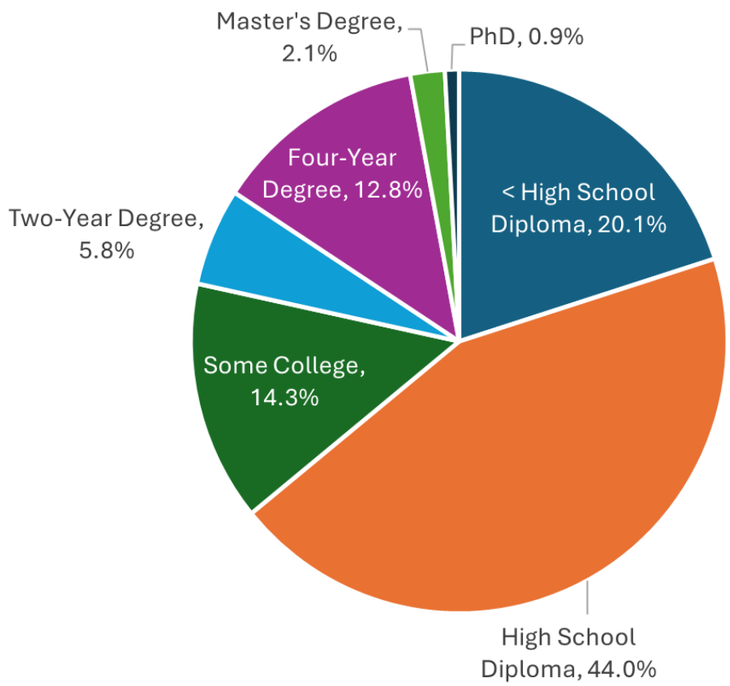
Education, Certifications, Experience & Skill Requirements

Education

To enter the carpentry field, both nationally and in New Jersey, workers typically need at least a high school diploma or its equivalent. Many Carpenters learn their trade through an apprenticeship or vocational school education, which provides a solid foundation of skills and knowledge. Otherwise, they may be trained through on-the-job experience alongside experienced Carpenters. According to the O*NET database, the importance of an apprenticeship for Carpenters is rated at 3.79 on a scale of 1 to 5, with these programs typically lasting 3 to 4 years.[92]

In New Jersey, one-fifth (20%) of Carpenters have not attained a high school diploma or equivalent, while the largest share (44%) has at most a high school diploma. Another one-fifth (20%) of current Carpenters in New Jersey have attended some college or attained a two-year degree (Figure 28).

Figure 28. Educational Attainment of Current Workers in New Jersey[93]



92 U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

93 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

Certifications

In New Jersey, Carpenters are not required to obtain licensure or certification to work in the state.[94] However, those looking to specialize in a particular sector of carpentry may need to obtain additional training and certifications, as detailed in Table 15 below.

Table 15. Top Carpenter Certifications

Certification	Area of Expertise	Provider
Adhesive Anchor Installer	Installation of adhesive anchors in concrete	American Concrete Institute International
Architectural Openings Consultants (AOCs)	Commercial door and hardware industry	Door and Hardware Institute
Certified Door Consultants	Construction and application of doors	Door and Hardware Institute
Leadership in Energy and Environmental Design (LEED) Green Associate	Sustainability and green building principles/practices	Green Business Certification Inc.
Certified Lead Carpenter	Commercial and residential remodeling	National Association of the Remodeling Industry
Certified Craftsman/Master Craftsman	Wood flooring	National Wood Flooring Association
Graduate Master Builder	Building expertise	National Association of Home Builders
Certified Installer (Bronze, Silver, Gold, Platinum, Platinum Plus)	Siding installation	Vinyl Siding Institute
Carpentry Curriculum	General carpentry skills	National Center for Construction Education and Research (NCCER)

Even without a requirement, there are general certifications often in demand by New Jersey employers, including:[95]

- OSHA 10
- OSHA 30
- Certification in Cardiopulmonary Resuscitation (CPR)
- Commercial Driver's License (CDL)
- Certified Welder
- First Aid Certification
- Transportation Worker Identification Credential (TWIC)
- Forklift Operator Certification

Experience

Carpenters may occasionally gain experience in related construction occupations, such as Construction Laborers, before moving into carpentry. Across the U.S., over 60% of Carpenters completed 2-4 years of on-the-job training to become proficient in the job.[96]

94 My Career New Jersey. Carpenters. Accessed 20 August 2024.https://mycareer.nj.gov/occupation/47-2031
& U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

95 U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00
& Based on active job postings in New Jersey and the U.S. for Carpenters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

96 U.S. Department of Labor. O*Net. Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

Skills

General skills, abilities, and knowledge desired for Carpenters by employers in New Jersey and across the country include:[97]

- Power Tools
- Ability to Lift 41-50 lbs.; Ability to Lift 51-100 lbs.
- Blueprint Reading
- Hand Tools
- Plumbing
- Routers
- Cabinet Installation
- Painting
- Commercial Construction
- Joiners

In addition, New Jersey employers typically seek Carpenters with proficiency in the following technologies:[98]

- Accounting software such as Intuit QuickBooks, job costing software, and Quicken
- Computer-aided design (CAD) software
- Office Suite software including Microsoft Word, Excel, and PowerPoint
- Project management software such as Bosch Punch List, Craftsman CD Estimator, Turtle Creek Software Goldenseal, and VirtualBoss
- Webpage creation and editing software

Unionization

Across the U.S., popular unions for Carpenters include the International Union of Operating Engineers and the United Brotherhood of Carpenters and Joiners of America. Regionally, the Eastern Atlantic States Regional Council of Carpenters represents 25 local carpentry unions in the Northeast, including Locals 253, 254, and 255 in New Jersey, and has three training centers in New Jersey that offer courses in carpentry and other construction skills.

There are many advantages to union coverage, as organized labor has greater bargaining power for higher wages and other employment benefits. On average, the hourly wage for union Carpenters in New Jersey in 2022 was $42.15, or almost $12 more than their nonunion counterparts who earned $30.44 an hour.[99]

Employment Outlook in New Jersey

The concentration of Carpenters in New Jersey is less than the national average, with a location quotient of 0.69. Across the country, the Bureau of Labor Statistics projects employment growth of 4.2% for Carpenters and over 76,000 annual job openings to replace retiring workers and others who will leave the occupation. There are over 500 new Carpenters projected in New Jersey's energy economy between 2022 and 2035 (Table 16).

97 Based on active job postings in New Jersey and the U.S. for Carpenters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.
& U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

98 Based on active job postings in New Jersey and the U.S. for Carpenters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.
& U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

99 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

Table 16. Employment Outlook[100]

Employment (NJ, 2023)	13,400 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+536 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+723 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+3.4%
Location Quotient (NJ, 2023)	0.69
Employment (National, 2023)	923,100
Forecasted Employment Percent Change (National, 2023-2033)	+4.2%
Occupational Openings, Annual Average (National, 2023-2033)	76,500
Industries with Highest Employment Levels (National, 2023)	Residential Building Construction: 218,950 Building Finishing Contractors: 123,630 Nonresidential Building Construction: 118,290

Employers in New Jersey

Top employers hiring Carpenters in New Jersey between August 2023 and 2024 include:

- **Princeton University**, as part of school's Facilities Operations team (Princeton, NJ)
- **Mr. Handyman**, home repair services (multiple locations)
- **Bath Fitter**, bathroom remodeling services (multiple locations)
- **Kitchen Tune-Up**, kitchen remodeling services (Bloomfield, NJ)
- **ATI Restoration LLC**, reconstruction and restoration services (Moorestown, NJ and Flemington, NJ)
- **Barnabas Health**, network of healthcare providers (Livingston, NJ and Elizabeth, NJ)

Other common categories of employers hiring Carpenters in New Jersey include public school systems, hospitals, non-profits, commercial construction companies, and local governments. The New Jersey counties with the most job postings during this time period include Essex County, Middlesex County, and Burlington County.[101]

Available Training Options

Typically, Carpenters obtain the necessary training through an apprenticeship or vocational school. Both statewide and nationally, Carpenters may train for up to one year at an educational institution or training center, or complete an apprenticeship, which are generally two to five years. In New Jersey, the northwest corner of the state appears to have limited carpentry-specific trainings. There are also large sections of Burlington and Middlesex Counties in which Overburdened Communities (OBCs), as defined by the New Jersey Environmental Justice Law, are not located near programs targeted for Carpenters (Figure 29).

100 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472031.htm & New Jersey forecasted employment based on BW modeled outputs. & National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm & New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2QxLTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

101 Based on active job postings in New Jersey for Carpenters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

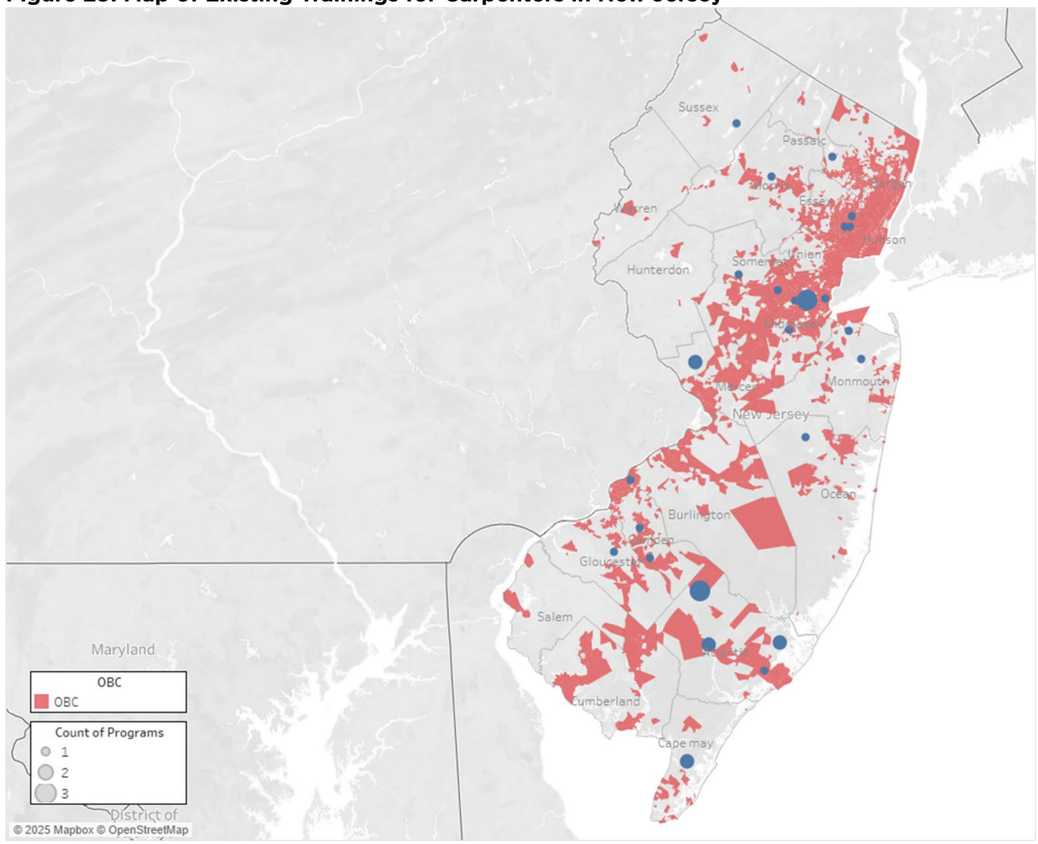
In-state apprenticeships and other training opportunities are available at several institutions, including:

- Vocational Technical Schools of Cape May, Essex, Mercer, Middlesex, Monmouth, Morris, Ocean, Somerset, and Sussex Counties
- Institutes of Technology of Atlantic and Gloucester Counties
- Camden County College
- Eastern Atlantic States Carpenters Technical Centers
- Edison Job Corp Center
- Greater Egg Harbor Regional High School District
- Hudson County Schools of Technology
- Ideal Institute of Technology
- Passaic County Technical Institute
- Pennsauken High School

There are also national apprenticeship and other training opportunities for Carpenters offered at institutions such as:[102]

- North Atlantic States Carpenters Training Fund (NASCTF)
- The Home Builders Institute

Figure 29. Map of Existing Trainings for Carpenters in New Jersey[103]



102 U.S. Department of Labor. O*Net. Carpenters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2031.00

103 BW Research identified the trainings. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Career Transition Potential

This section highlights occupations with comparable educational requirements and skill sets, offering the potential for a seamless transition into a carpentry role with minimal additional training. These roles are primarily within the construction and installation sectors (Table 17).

Table 17. Transferable Occupations and Their Employment and Wages in New Jersey[104] [105]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Carpenters	13,400	$33.47	High school diploma or equivalent
Insulation Workers, Floor, Ceiling, and Wall	State data not available 38,510 (national)	State data not available $22.86 (national)	No requirement
Helpers--Carpenters	State data not available 21,770 (national)	$18.75	No requirement
Layout Workers, Metal and Plastic	40	$24.69	High school diploma or equivalent
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	120	$20.61	No requirement
Drywall and Ceiling Tile Installers	630	$29.88	No requirement
Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	450	$20.29	High school diploma or equivalent
Mechanical Door Repairers	1,320	$27.29	High school diploma or equivalent
Reinforcing Iron and Rebar Workers	State data not available 17,400 (national)	$21.30	High school diploma or equivalent

104 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

105 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

CONSTRUCTION LABORERS (47-2061)[106]

Overview

Construction Laborers represent over 20,000 workers in the New Jersey labor force. Over half of the Construction Laborer workforce identifies as Hispanic or Latino (54%), the highest percentage of this demographic compared to all other green economy priority occupations.

This occupation in New Jersey faces significant challenges, including a lower median hourly wage than most other priority occupations and a demanding physical workload. Despite this, many pathways to better wages exist through transferring skills and training from a Construction Laborer role. Other occupations exist that also do not necessitate a formal education and often yield lower pay than Construction Laborers, providing an opportunity for workers to transition into a Construction Laborer role.

National job growth projections indicate an 8.2% increase in employment of Construction Laborers from 2023 to 2033, and New Jersey expects an increase of 6.8% from 2022 to 2032. Investments in the state's green economy will accentuate this growth. However, New Jersey has a location quotient that is lower than one, meaning that the concentration of these workers in the state is smaller than the national average. Training programs for this role in New Jersey are dispersed throughout the state, with many located near Overburdened Communities (OBCs) and also offering general trade training programs to provide participants with diverse skill sets.

106 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 18. Summary of Occupation Data[107]

Employment (NJ, 2023)	20,230 workers
Location Quotient (NJ, 2023)[108]	0.72
Median Annual Wage (NJ, 2023)	$60,830
Median Hourly Wage (NJ, 2023)	$29.24
Demographics (NJ, 2024)	4.4% Female 54.6% Hispanic or Latino Ethnicity 32.1% People of Color 18.9% Ages 55 Years and Over
Minimum Education	No formal educational credential
Minimum Training	Up to 1 year of on-the-job training[109]
Certification/Licensure Requirements	N/A
Certification Levels	Foreman, Project Manager
Specific Vocational Preparation (National)	4.0- < 6.0[110]
Industries with Highest Employment Levels (National, 2023)	Other Specialty Trade Contractors: 177,760 Residential Building Construction: 132,700 Utility System Construction: 121,530

Job Description

Construction Laborers are the primary physical laborers at construction sites. They perform a wide range of tasks necessary for construction site operations, such as site preparation, (un)loading materials, erecting scaffolding, rubble disposal, and more. Additionally, they may be expected to assist any of the more specialized workers in performing their duties. Due to the variety of tasks a construction laborer may be asked to perform, they should be able to use many different types of hand and power tools.[111]

Wages

In New Jersey, Construction Laborers earn a median annual wage of almost $61,000, which is more than the national median wage for this occupation of just over $45,000. At the 25th and 75th percentiles, similarly, the state's wages for Construction Laborers are higher than the national wages. Construction Laborers in New Jersey also earn approximately $5,000 more, at the median, or 50th percentile, than the overall construction and extraction occupational group in the United States. The wages for all three groups are seen in Table 19.

Table 19. Wage Distribution, 2023[112]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Construction Laborers (New Jersey)	Annual	$47,000	$60,830	$92,420
Construction Laborers (New Jersey)	Hourly	$22.60	$29.24	$44.43
Construction Laborers (National)	Annual	$37,070	$45,300	$56,780
Construction Laborers (National)	Hourly	$17.82	$21.78	$27.30
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Construction Laborers in New Jersey are primarily males (96%) and Hispanic or Latino workers (55%). There is also a significant share of people of color (32%) among this workforce, with most of this share identifying as Black or multiracial.[113] Almost half (46%) of New Jersey's Construction Laborers are between the ages of 35 and 54 years and 23% are between 25 and 34 years of age (Table 20).

Table 20. Demographic Distribution in New Jersey, 2024Q1[114]

Demographic Type	Demographic	% of Current Workers
Sex	Male	95.6%
	Female	4.4%
Ethnicity	Hispanic or Latino	54.6%
	Not Hispanic or Latino	45.4%
Race	White	67.9%
	Black	14.3%
	Asian	2.2%
	American Native[115]	1.0%
	Pacific Islander	0.0%
	Two or More Races	14.6%
Ages	16 to 24 Years	12.2%
	25 to 34 Years	22.6%
	35 to 54 Years	46.3%
	55 Years and Over	18.9%

107 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472061.htm

108 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

109 U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00

110 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00

111 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472061.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-laborers-and-helpers.htm

112 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472061.htm

113 The U.S. Bureau of Labor Statistics and JobsEQ multiracial workers as "two or more races."

114 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Construction Laborers across all industries in New Jersey and not specific to the green economy industries.

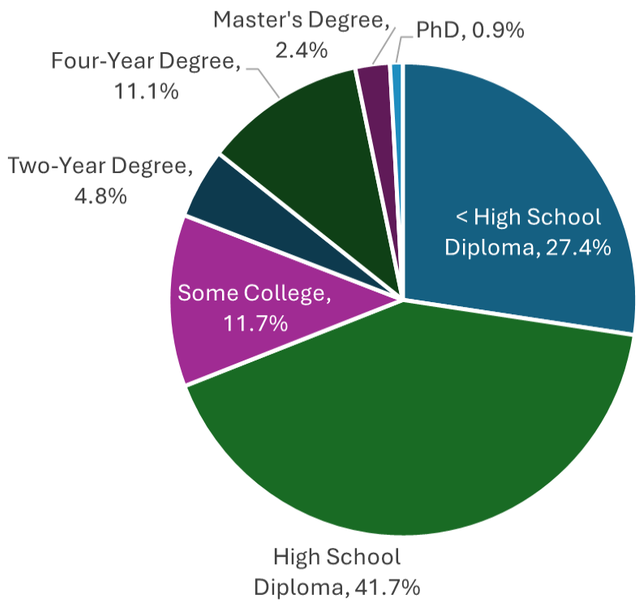
115 JobsEQ reports this as "American Indian," what is classified here as "American Native"

Education, Certifications, Experience & Skill Requirements

Education

Many Construction Laborers are successfully able to enter the field without a high school education, though a high school diploma or equivalent is still valuable in this occupation.[116] In New Jersey, 42% of Construction Laborers have a high school diploma or equivalent while 27% have yet to attain this credential. There is also a small share of workers with some college (12%) but fewer with associate degrees or more (Figure 30).

Figure 30. Educational Attainment of Current Workers in New Jersey[117]



Certifications

Construction Laborers do not need a license to work in the State of New Jersey, though they may be required by their employer to become OSHA certified or gain a trade certificate. They may also benefit from receiving additional certification in a particular area.[118] Optional certifications are available to help Construction Laborers gain further expertise, such as those detailed in Table 21.

116 U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00

117 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

118 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-laborers-and-helpers.htm

Table 21. Top Construction Laborer Certifications

Certification	Area of Expertise	Provider
Concrete Construction Special Inspector	Codes and job specifications of concrete construction	American Concrete Institute International
Certified Constructor Specifier	Specifications and contract document preparation	Construction Specifications Institute
Construction Health and Safety Technician	Occupational health and safety	Board of Certified Safety Professionals
Certification in Construction Materials Testing – Asphalt and Concrete	Field and laboratory technicians – testing and inspection of construction materials	National Institute for Certification in Engineering Technologies
3M Worker Health and Safety Awareness Certificate	Safety awareness for respiratory; hearing; and head, eye, and face hazards	National Coalition of Certification Centers (NC3) and 3M
Tools@Height Certification/ Drop Prevention Certification	Safety and situational awareness and best practices for securing various tools	National Coalition of Certification Centers (NC3) and Snap-on Incorporated
Graduate Master Remodeler	Remodeling	National Association of Home Builders
Master Certified Green Professional	Sustainable building and remodeling	
Heavy Highway Construction	Infrastructure construction (roads, bridges, ports, other non-building construction)	National Center for Construction Education and Research (NCCER)
Construction Craft Laborer curriculum	Introduction to the trades (incl. carpentry, welding, electrical, and more)	
Construction Technology curriculum	Key principles of carpentry, masonry, concrete finishing, electrical work, HVACR and plumbing	

Even without specific certification requirements, general certifications are often in demand by employers in New Jersey and across the country include:[119]

- Driver's License
- Commercial Driver's License (CDL)
- OSHA 10
- OSHA 30

Experience

Most construction workers receive several months of on-the-job training and are not typically required to have extensive prior work experience. They must be flexible and ready to learn new skills as needed. In addition, some employers find certain foundational knowledge, such as high school mathematics or construction technology, to be helpful for new workers as they learn the trade. Overall, more than 50% of O*Net survey respondents, comprised of both workers and occupation experts, agreed that up to six months of on-the-job training was necessary to complete their roles.[120]

119 U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00 & based on active job postings in New Jersey for Construction Laborers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

120 U.S. Department of Labor. O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-laborers-and-helpers.htm

Skills

The 10 most desired skills, abilities, and knowledge Construction Laborers by employers in New Jersey include:[121]

- Ability to Lift 41-100 lbs.
- Operation of Power Tools
- Operation of Hand Tools
- Knowledge of Plumbing
- Knowledge of Mechanical Systems
- Operation of Backhoes
- Operation of Excavators
- Fluency in Spanish
- Knowledge of Telecommunications

In addition, New Jersey employers typically seek Construction Laborers with proficiency in the following technologies:[122]

- Computer-aided design (CAD) software such as EZ Pipe
- Microsoft Office Suite software including Windows, Excel, and Outlook

Unionization

Construction Laborers who are members of a union tend to receive higher wages and other benefits than their nonunion counterparts. In New Jersey, unionized Construction Laborers earned an average hourly wage of $38.07 in 2022. While data for non-union Construction Laborers is not available for New Jersey, workers in overall construction and extraction occupations who were not union members earned $30.44 an hour in 2022.[123]

Employment Outlook in New Jersey

There is a smaller prevalence of Construction Laborers in New Jersey compared to the national average, with a location quotient of 0.72, indicating that this occupation is less concentrated in the state than nationally. Further, across the country, this occupation is projected to grow by over 8% and have more than 133,000 annual job openings. More than 1,500 new Construction Laborers are forecasted to join the state's energy economy by 2035, supported largely by the green infrastructure sector with 485 workers (Table 22).

121 Based on active job postings in the U.S. and in New Jersey for Construction Laborers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00

122 Based on active job postings in the U.S. and in New Jersey for Construction Laborers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00

123 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

Table 22. Employment Outlook[124]

Employment (NJ, 2023)	20,230 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+1,509 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+1,912 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+6.8%
Location Quotient (NJ, 2023)	0.72
Employment (National, 2023)	1,401,200
Forecasted Employment Percent Change (National, 2023-2033)	+8.2%
Occupational Openings, Annual Average (National, 2023-2033)	133,100
Industries with Highest Employment Levels (National, 2023)	Other Specialty Trade Contractors: 177,760 Residential Building Construction: 132,700 Utility System Construction: 121,530

Employers in New Jersey

Popular employers hiring Construction Laborers in New Jersey include:

- **Roto Rooter Services Company**, plumbing company (Runnemede, NJ and Cranbury, NJ)
- **Communications Construction Group, LLC** (subsidiary of Dycom Industries), telecommunications and infrastructure contracting services (multiple locations)
- **BrightView Landscapes**, commercial landscaping services (multiple locations)
- **Home Genius Exteriors**, home improvement contractor (multiple locations)
- **Allied Experts**, HVAC contractor (multiple locations)

Construction Laborers in New Jersey work in an abundance of different industries, including environmental services, residential and commercial services, manufacturing and infrastructure, electrical services, and more. They are employed across the public, private, and non-profit sectors. Middlesex County, Monmouth County, and Burlington County had the highest number of job postings for Construction Laborer roles from August 2023 to August 2024.[125]

124 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/2023/may/oes472061.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

125 Based on active job postings in New Jersey for Construction Laborers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

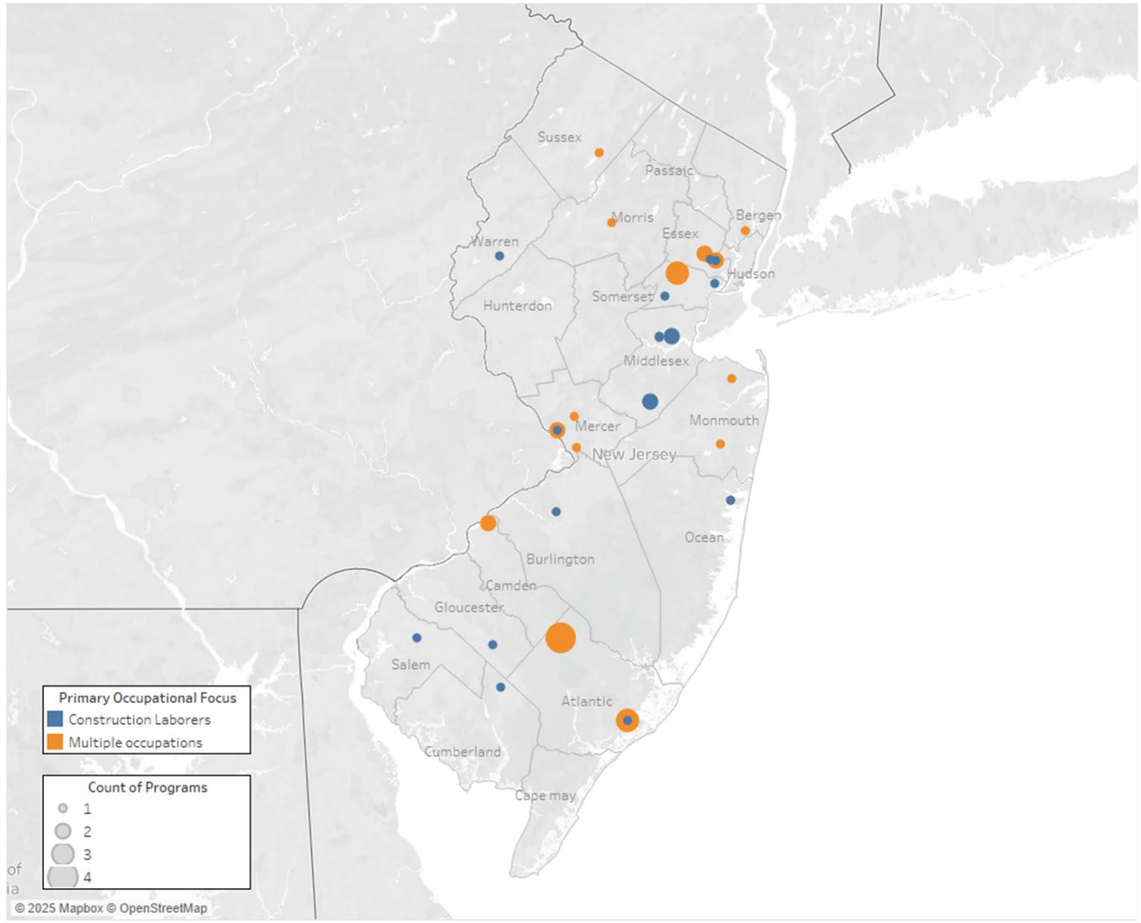
Available Training Options

The map below (Figure 31) shows where training programs for Construction Laborers and general construction pathways are located across New Jersey and how they are clustered around Overburdened Communities (OBCs), as defined by the state's Environmental Justice Law. Programs that are not targeted to a specific occupation and are instead designed for multiple pathways are considered general construction pathways. One example is an exploratory construction program at the Sussex County Technical School that was developed to expose participants to various types of trades work and give them a wide range of foundational knowledge and skills, allowing them to specialize later, once employed.

Locally, workers in New Jersey have access to general construction training offered by various institutions, including:

- The Vocational or Technical Schools of Cumberland County, Monmouth County, Ocean County, Sussex County, and Warren County
- African American Chamber of Commerce
- Atlantic County Workforce Development Board
- Burlington County Institute of Technology
- C&C Lift Truck
- Construction Craft Laborers and Apprenticeship Fund
- County College of Morris
- Delsea Career Technical Education
- Eastern Atlantic States Carpenters Technical Centers
- Edison Job Corp Center
- Essex County Schools of Technology
- EZ Wheels Driving School
- Ideal Institute of Technology
- Installations 3 Construction Training Center
- Insulators Local 89
- Jingoli Power
- Laborers' International Union of North America (LIUNA)
- Mechanical Contractors Association of New Jersey
- Middlesex College
- National Career Institute
- New Community Career & Technical Institute
- Pennsauken High School
- Salem County Career and Technical High School
- Sheet Metal, Air, and Rail Transportation Local 25 and Local 27
- Union County Career Technical Institute

Figure 31. Map of Existing Trainings for Construction Laborers and General Construction Pathways in New Jersey[126]



Career Transition Potential

This section identifies occupations that require similar skills and experience levels to those of Construction Laborers, making it easier for workers in these occupations to transition into Construction Laborer roles with minimal additional preparation. These jobs are within the construction and extraction; farming, fishing, and forestry; and transportation and material moving occupational groups and most have no formal entry-level education requirement (Table 23).

126 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Table 23. Transferable Occupations and Their Employment and Wages in New Jersey[127] [128]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Construction Laborers	20,230	$29.24	No requirement
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	120	$20.61	No requirement
Cleaners of Vehicles and Equipment	9,930	$17.11	No requirement
Terrazzo Workers and Finishers	State data not available 1,460 (national)	State data not available $23.51 (national)	High school diploma or equivalent
Helpers--Carpenters	State data not available 21,770 (national)	$18.75	No requirement
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	3,430	$16.90	No requirement
Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	State data not available 7,700 (national)	State data not available $17.79 (national)	No requirement

127 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

128 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

CONSTRUCTION MANAGERS (11-9021)[129]

Overview

Construction Managers are an important occupation in New Jersey's energy economy. While Construction Manager jobs are prevalent in New Jersey and are expected to grow in demand nationally over the next decade, this occupation faces notable challenges related to diversity and representation within the field. In New Jersey, there are significant disparities in the representation of females and workers of color among Construction Managers, with only one in every ten Construction Managers identifying as female and over 80% being of White race. However, pathways to higher wages in this management job exist for workers in similar roles, such as Civil Engineers and Occupational Health and Safety Specialists, who could transition into a Construction Manager role with little additional training.

Demand for Construction Managers is expected to grow, and these positions are more prevalent in New Jersey than they are nationally. Additionally, training programs for Construction Managers are largely focused in the state's overburdened community corridors, highlighting a need for targeted development in underrepresented groups.

129 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 24. Summary of Occupation Data[130]

Employment (NJ, 2023)	9,250 workers
Location Quotient (NJ, 2023)[131]	1.02
Median Annual Wage (NJ, 2023)	$142,810
Median Hourly Wage (NJ, 2023)	$68.66
Demographics (NJ, 2024)	9.5% Female 16.9% Hispanic or Latino Ethnicity 19.6% People of Color 31.3% Ages 55 Years and Over
Minimum Education	Bachelor's degree
Minimum Training	4 years of on-the-job training
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	7.0 to < 8.0[132]
Industries with Highest Employment Levels (National, 2023)	Nonresidential Building Construction: 79,800 Residential Building Construction: 59,800 Building Equipment Contractors: 37,520

Job Description

Construction Managers oversee and coordinate all the efforts on construction projects to ensure they are completed efficiently and correctly. This includes components such as scheduling, budgeting, and implementation. They ensure the team meets safety and quality standards as well as client expectations.[133]

At the national level, the top industries for Construction Managers are residential and non-residential building construction. More than 15% of all construction managers work in these two industries.[134]

Wages

The median annual wage for Construction Managers in New Jersey is $142,810, reaching over $171,900 at the 75th percentile. Wages for Construction Managers in New Jersey exceed the national averages for the occupation and for the construction and extraction major occupational group, as shown in Table 25.

130 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes119021.htm

131 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

132 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/details/47-2061.00.

133 U.S. Department of Labor, O*Net Construction Manager, Detailed Work Activities. https://www.onetonline.org/link/details/11-9021.00

134 U.S. Bureau of Labor Statistics, Construction Managers Occupational Employment and Wages, May 2023. https://www.bls.gov/oes/current/oes119021.htm#st

Table 25. Wage Distribution, 2023[135]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Construction Managers (New Jersey)	Annual	$115,700	$142,810	$171,930
Construction Managers (New Jersey)	Hourly	$55.63	$68.66	$82.66
Construction Managers (National)	Annual	$81,640	$104,900	$135,550
Construction Managers (National)	Hourly	$39.25	$50.43	$65.17
Management Occupations (National)	Annual	$78,330	$116,880	$169,090
Management Occupations (National)	Hourly	$37.66	$56.19	$81.29

Demographics

Construction Managers in New Jersey are primarily males (90.5%) and workers who do not identify as Hispanic or Latino (83%). Additionally, a large majority of Construction Managers in the state are White (80%). Half (50%) of the workers in this occupation are between the ages of 35 and 54 (Table 26).

Table 26. Demographic Distribution in New Jersey, 2024Q1[136]

Demographic Type	Demographic	% of Current Workers
Sex	Male	90.5%
	Female	9.5%
Ethnicity	Hispanic or Latino	16.9%
	Not Hispanic or Latino	83.1%
Race	White	80.4%
	Black	6.2%
	Asian	3.7%
	American Native[137]	0.2%
	Pacific Islander	0%
	Two or More Races	9.4%
Ages	16 to 24 Years	3.4%
	25 to 34 Years	15.4%
	35 to 54 Years	49.9%
	55 Years and Over	31.3%

Education, Certifications, Experience & Skill Requirements

Education

Nationally, Construction Managers need at least a bachelor's degree. In a nationwide survey conducted by O*Net, 90% of respondents said at least a bachelor's degree was required to work in the field.[138] More than half of current Construction Managers in New Jersey have at least a bachelor's degree; 42% have a 4-year degree while 10% have a Master's degree and 2% have a Doctorate degree (Figure 32).

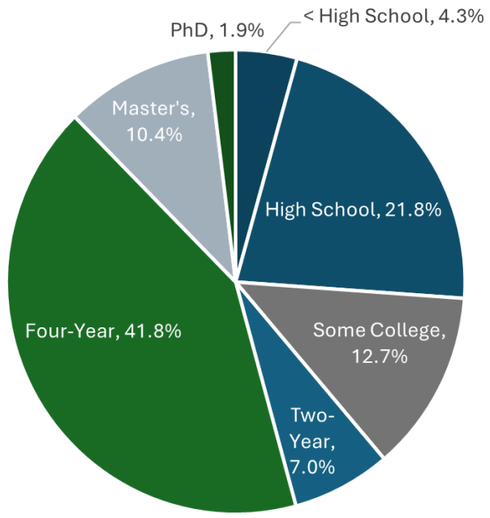
135 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

136 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Construction Managers across all industries in New Jersey and not specific to the green economy industries.

137 JobsEQ reports this as "American Indian," what is classified here as "American Native"

138 U.S. Department of Labor. O*Net. Construction Managers. Accessed September 2024. https://www.onetonline.org/link/summary/11-9021.00

Figure 32. Educational Attainment of Current Workers in New Jersey[139]



Certifications

In addition to a bachelor's degree, Construction Managers in New Jersey benefit from credentials for Certified Construction Manager (CCM), Certified Associate Constructor (CAC), Certified Professional Constructor (CPC), or other specialized areas, though there are no formal licensing or certification requirements in New Jersey. Examples of optional certifications that exist to help Construction Managers gain further expertise are shown in Table 27.

139 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

Table 27. Top Construction Manager Certifications

Certification	Area of Expertise	Provider
Certified Commissioning Authority	Technical, management, communication skills for commissioning professionals	AABC Commissioning Group
Certified Associate Constructor (CAC)	Management and implementation of construction processes (first level of Construction Certification Program)	American Institute of Constructors
Safety Trained Supervisor (STS)	Basic safety and health standards and practices	Board of Certified Safety Professionals
Certification	Area of Expertise	Provider
Construction Manager-in-Training (CMIT)	Fundamentals of construction management	Construction Manager Certification Institute
Certified Associate Construction Manager (CACM)	Management/oversight of project aspects; mid-level credential	
Certified Construction Manager (CCM)	Management in planning, design, and construction of projects	
Leadership in Energy and Environmental Design (LEED) Green Associate	Green building principles and sustainability practices	Green Business Certification Inc.
Certified Construction Industry Financial Professional (CCIFP)	Financial management in construction industry	Institute of Certified Construction Industry Financial Professionals
Construction Superintendent Certification Program	Leadership responsibilities of superintendents of construction projects	National Center for Construction Education & Research (NCCER)
Certified Professional Constructor (CPC)	Management and oversight of construction processes (highest level of Construction Certification Program)	Association of Energy Engineers
Certified Building Commissioning Professional (CBCP)	Building commissioning within energy industry	

More general and widely recognized certifications that are commonly found in job postings for Construction Managers in New Jersey include:[140]

- OSHA 10
- OSHA 30
- Licensed Professional Engineer
- Driver's License
- Certification in Cardiopulmonary Resuscitation (CPR)
- Leadership in Energy and Environmental Design (LEED) Accredited Professional
- Safety Trained Supervisor
- Lift Planner & Lift Director

Experience

Construction Managers require a substantial level of work-related skill, knowledge, and/or experience in construction-related fields and management practices. This occupation

140 U.S. Department of Labor. O*Net. Construction Managers. National Certifications. https://www.onetonline.org/link/localcert/11-9021.00 & Based on active job postings in New Jersey and the U.S. for Construction Managers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

generally requires several years of relevant experience, on-the-job training, and/or vocational education.[141]

Skills

General skills, abilities, and knowledge required for Construction Managers include the following:[142]

- Commercial construction knowledge
- Plumbing knowledge
- Ability to read blueprints
- Presentation skills
- Change management skills
- Ability to lift 41-50 lbs.
- Budgeting skills
- Vendor management

Key technical skills may include proficiency in the following types of software:[143]

- Microsoft Office, including Excel, Project, Outlook, Word, SharePoint, OneNote, PowerPoint
- Project Management Software
- Computer-Aided Design Software such as Autodesk AutoCAD
- Autodesk Revit
- Oracle Primavera P6
- HCSS HeavyBid
- Intuit QuickBooks

Unionization

Unionization is uncommon for management occupations, including Construction Managers. Their position creates a conflict of interest, and they cannot participate in collective bargaining.

Employment Outlook in New Jersey

There is a slightly higher share of Construction Managers in New Jersey compared to the national average. Currently, the location quotient for Construction Managers, or concentration of these workers in New Jersey compared to the national average, is 1.02, meaning that this occupation is slightly more prevalent in the state compared to the national average.

Over the next decade, the U.S. Bureau of Labor Statistics projects a national employment growth of 9.1% for this occupation and 45,800 annual job openings. There will be high demand for Construction Managers at the national level to replace the share of workers retiring or leaving for other reasons. Meanwhile, New Jersey's energy economy is expected to support over 650 new Construction Managers by 2035, on top of a 7.3% growth in the state's overall economy (Table 28).

Table 28. Employment Outlook[144]

Employment (NJ, 2023)	9,250 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+670 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+1,261 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+7.3%
Location Quotient (NJ, 2023)	1.02
Employment (National, 2023)	520,900
Forecasted Employment Percent Change (National, 2023-2033)	+9.1%
Occupational Openings, Annual Average (National, 2023-2033)	45,800
Industries with Highest Employment Levels (National, 2023)	Nonresidential Building Construction: 79,800 Residential Building Construction: 59,800 Building Equipment Contractors: 37,520

Employers in New Jersey

Construction Managers are employed by utilities, government, colleges and universities, and private sector companies across New Jersey. Employers who have recently hired Construction Managers in New Jersey include:

- **CBRE,** commercial real estate services (multiple locations)
- **Power Home Remodeling**, home remodeling company (multiple locations)
- **Burlington Stores, Inc.**, retailer (Burlington, NJ)
- **Colliers Engineering & Design**, engineering and architecture design services (multiple locations)
- **EMCOR Group, Inc.**, mechanical and electrical construction services (Edison, NJ)

In New Jersey, employers in Middlesex County, Bergen County, and Essex County had the highest number of job postings for Construction Managers from August 2023 to August 2024.[145]

Available Training Options

Construction Managers are often required to go through a period of on-the-job training, especially if they do not have a post-secondary degree. Most found that up to four years of on-the-job training was necessary to gain the experience needed to perform

141 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/management/construction-managers.htm#tab-4

142 U.S. Department of Labor. O*Net. Construction Managers. Accessed September 2024. https://www.onetonline.org/link/localcert/11-9021.00 & Based on active job postings in New Jersey and the U.S. for Construction Managers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

143 .S. Department of Labor. O*Net. Construction Managers. Accessed September 2024. https://www.onetonline.org/link/localcert/11-9021.00 & Based on active job postings in New Jersey and the U.S. for Construction Managers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

144 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes119021.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

145 Based on active job postings in New Jersey for Construction Managers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

their jobs.[146] Colleges and universities across New Jersey offer degree programs in Business Management and Administration, which are common among Construction Managers. Additionally, degree and/or certificate programs in Construction Engineering Technology, Operations Management and Supervision, and General Construction Management are offered at in-state institutions such as New Jersey's Rowan College, Thomas Edison State University, and Stevens Institute of Technology.[147]

In addition to those institutions, workers in New Jersey have access to construction management trainings offered by various institutions, including:

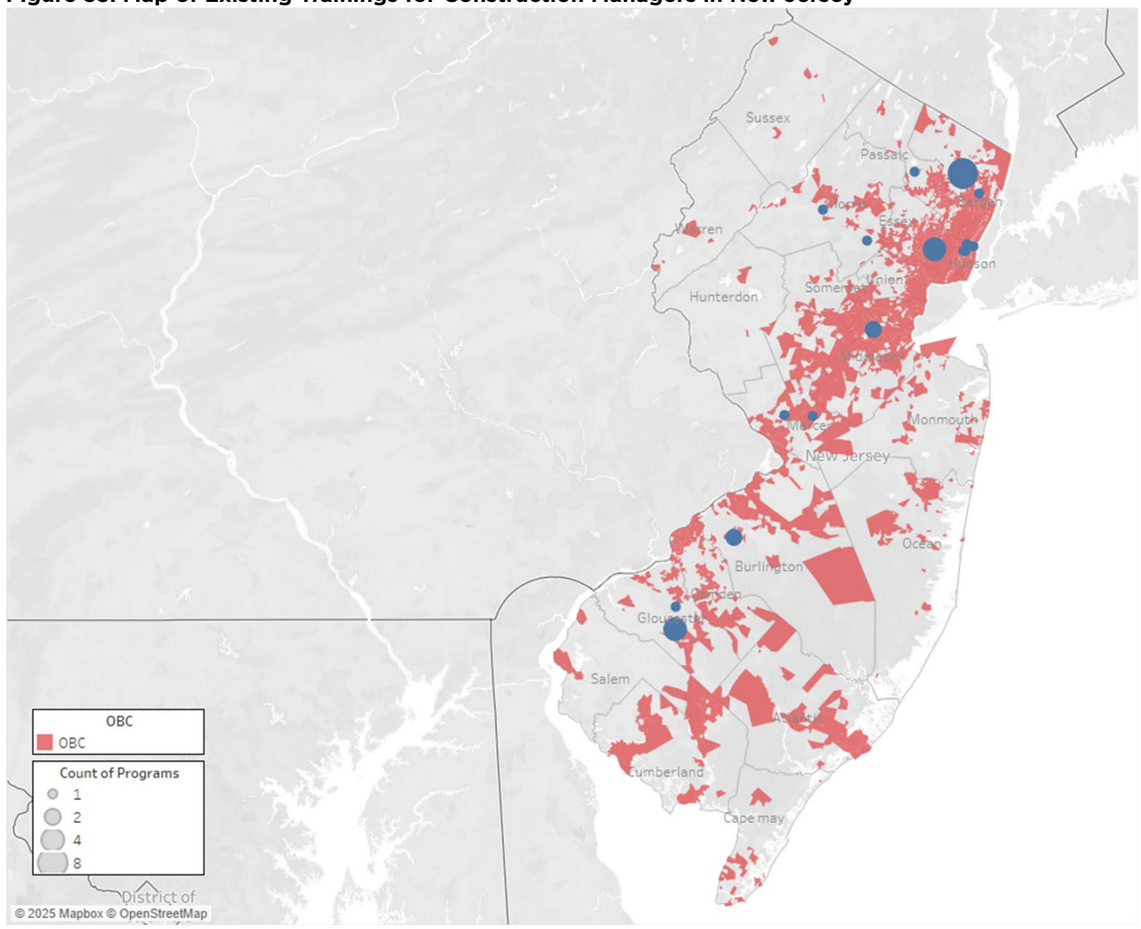
- Bergen Community College
- County College of Morris
- Essex Community College
- Fairleigh Dickinson University
- Hudson County Community College
- Institute for Contemporary Careers
- Mercer County Community College
- Middlesex College
- New Jersey Institute of Technology
- Rider University
- Rowan University

Training programs in New Jersey for Construction Managers are largely concentrated along the state's corridor of overburdened communities (OBCs). Bergen County, Essex County, and Gloucester County offer the most training programs for this occupation (Figure 33).

146 Based on Education, Training, and Experience ratings data from U.S. Department of Labor O*Net https://www.onetcenter.org/dictionary/20.1/excel/education_training_experience.html

147 U.S. Department of Labor. O*Net. Construction Managers. New Jersey Training. https://www.onetonline.org/link/localtraining/11-9021.00?st=NJ

Figure 33. Map of Existing Trainings for Construction Managers in New Jersey[148]



Career Transition Potential

This section identifies jobs that share similar educational demands and skills to Construction Managers, potentially facilitating a smooth transition into a Construction Manager role with minimal extra training. These include some management and engineering occupations, and all share a typical entry-level education requirement of a bachelor's degree (Table 29).

148 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Table 29. Transferable Occupations and Their Employment and Wages in New Jersey[149] [150]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Construction Managers	9,250	$68.66	Bachelor's degree
Civil Engineers	7,830	$48.10	Bachelor's degree
Occupational Health and Safety Specialists	2,590	$44.41	Bachelor's degree
Conservation Scientists	350	$30.57	Bachelor's degree
Engineers, All Other	3,670	$60.23	Bachelor's degree
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	840	$52.38	Bachelor's degree
Architects, Except Landscape and Naval	46.40	$46.40	Bachelor's degree

149 Transferable occupations are taken from O*Net's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

150 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. https://www.bls.gov/oes/current/oes_stru.htm

ELECTRICIANS (47-2111)[151]

Overview

Electricians represent a vital occupation within the energy economy, but have notable disparities in New Jersey, where fewer than 3% of the occupation are female and only 24.5% identify as people of color. Many pathways to becoming an Electrician exist, which can lead to higher wages. Roles such as Maintenance and Repair Workers, HVAC Mechanics, Electrical Repairers, and Telecommunications Installers provide relevant experience similar to that required of Electricians but, on average, have lower wages.

The demand for Electricians is projected to grow both nationally and locally. New Jersey has a location quotient of 0.73, indicating that the concentration of Electricians in the state is less than that in the nation. Training opportunities for Electricians are widely available across the state, with many located in overburdened communities, offering crucial access to those seeking to enter this field.

151 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 30. Summary of Occupation Data[152]

Employment (NJ, 2023)	14,350 workers
Location Quotient (NJ, 2023)[153]	0.73
Median Annual Wage (NJ, 2023)	$68,250
Median Hourly Wage (NJ, 2023)	$32.81
Demographics (NJ, 2024)	2.7% Female 28.4% Hispanic or Latino Ethnicity 24.5% People of Color 22.7% Ages 55 Years and Over
Minimum Education	High school diploma or its equivalent
Minimum Training	5 years of on-the-job training
Certification/Licensure Requirements	State licensure
Certification Levels	Apprentice, Journey worker, Master Electrician
Specific Vocational Preparation (National)	6.0-7.0[154]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 522,600 Employment Services: 24,590 Local Government, excluding Schools and Hospitals: 15,280

Job Description

Electricians are skilled professionals responsible for installing, maintaining, and repairing electrical wiring, equipment, and fixtures. They ensure that all work complies with relevant electrical codes and safety standards. In addition to residential and commercial electrical systems, Electricians may also install and service streetlights, intercom systems, and various electrical control systems, contributing to the overall functionality and safety of electrical infrastructure. Their expertise is essential for both new installations and the upkeep of existing systems.[155]

Wages

Annual wages for Electricians in the State of New Jersey are greater than the national wages for the occupation, ranging from almost $51,600 at the 25th percentile to just over $109,000 at the 75th percentile, with a median wage of $68,250. The state wages for Electricians are also significantly higher than those for overall construction and extraction occupations, especially toward the upper percentiles, as shown in Table 31.

152 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472111.htm

153 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

154 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Construction Laborers. Accessed September 2024. https://www.onetonline.org/link/summary/47-2111.00

155 U.S. Department of Labor. O*Net. Electricians. Detailed Work Activities. https://www.onetonline.org/link/details/47-2111.00

Table 31. Wage Distribution, 2023[156]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Electricians (New Jersey)	Annual	$51,570	$68,250	$109,010
Electricians (New Jersey)	Hourly	$24.80	$32.81	$52.41
Electricians (National)	Annual	$48,100	$61,590	$80,260
Electricians (National)	Hourly	$23.13	$29.61	$38.59
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Almost all Electricians in New Jersey identify as male (97%). While 28% of these workers identify as Hispanic or Latino, over three-quarters (75.5%) are of White race. Over two-fifths (43%) of Electricians in the state are between the ages of 35 and 54 years (Table 32).

Table 32. Demographic Distribution in New Jersey, 2024Q1[157]

Demographic Type	Demographic	% of Current Workers
Sex	Male	97.3%
	Female	2.7%
Ethnicity	Hispanic or Latino	28.4%
	Not Hispanic or Latino	71.6%
Race	White	75.5%
	Black	11.8%
	Asian	2.6%
	American Native[158]	0.9%
	Pacific Islander	0.0%
	Two or More Races	9.1%
Ages	16 to 24 Years	10.9%
	25 to 34 Years	23.2%
	35 to 54 Years	43.2%
	55 Years and Over	22.7%

156 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

157 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Electricians across all industries in New Jersey and not specific to the green economy industries.

158 JobsEQ reports this as "American Indian," what is classified here as "American Native"

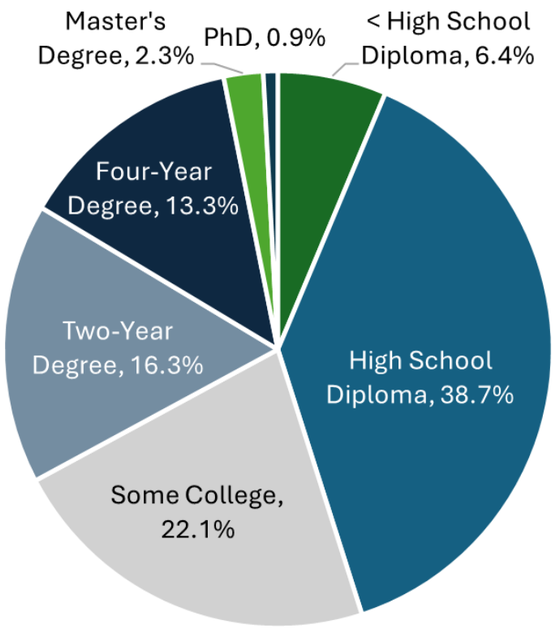
Education, Certifications, Experience & Skill Requirements

Education

To receive either of the two Electrician licenses offered in New Jersey, on-the-job training is required. The most common way to fulfill this requirement is through an apprenticeship program. A high school diploma or its equivalent is necessary to be eligible to enter into most apprenticeship programs,[159] although, it is not uncommon to gain this experience through college degree programs. According to data from O*NET, the importance of an apprenticeship for an Electrician is nationally ranked a 3.73 on a scale of 1-5, indicating its importance nationwide.

The largest share of Electricians working in New Jersey have at most a high school diploma or equivalent (39%). The next largest subgroup with regards to educational attainment are Electricians who have attended some college but have not yet received a degree, representing 22% of the workforce. Yet, Electricians with a completed college degree are not uncommon, as 16% and 13% of the workforce have an associate degree and bachelor's degree, respectively. Only a small portion of the current workforce has not attained a high school diploma (Figure 34).

Figure 34. Educational Attainment of Current Workers in New Jersey[160]



159 Warshauer Technical School. "How to Become an Electrician in New Jersey." Accessed September 2024. https://www.warshauertech.com/warshauer-trade-school-how-to-become-an-electrician

160 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

Certifications

New Jersey requires that Electricians complete a four-year approved apprenticeship program through the U.S. Department of Labor, followed by an additional one year as a Journey worker, before taking the state licensure exam.[161] The state licensure exam contains three parts: an electric contractor/trade section, an alarm systems section, and a business and law section. All electrical contractor licenses and business permits in New Jersey must be renewed every three years.[162]
Additionally, other optional certifications are available to help Electricians gain further expertise (Table 33).

Table 33. Top Electrician Certifications

Certification	Area of Expertise	Provider
Certified Electrical Safety Compliance Professional (CESCP)	Electrical safety standards	National Fire Protection Association (NFPA)
Certified Electrical Safety Worker (CESW)		
Certified Electrical Safety Technician (CEST)		
Electrical Project Management Institute (EPMI) Certification	Electrical project management, leadership	Independent Electrical Contractors (IEC)
Journey worker Electrician License	Electrical theory, code standards, installation techniques	National Electrical Contractors Association (NECA)
Certified Automation Professional (CAP)	Automation and control systems	International Society of Automation (ISA)
LEED Green Associate	Green building practices, energy efficiency, conservation	US Green Building Council
Photovoltaic (PV) Installer Certification	Solar panel installation	North American Board of Certified Energy Practitioners
Certified Energy Manager (CEM)	Energy management, energy-efficient systems	Association for Energy Engineers (AEE)
Electrical Levels 1-4	Safe work practices, applied electrical theory, residential/commercial/industrial electrical knowledge and skills; coverage of the National Electrical Code	National Center for Construction Education and Research
Fundamentals of Electricity	Alternating and direct current	NC3 in partnership with Festo Didactic

General and widely recognized certifications for Electricians that are currently in-demand by employers include:[163]

- OSHA 10
- OSHA 30
- Driver's License
- Commercial Driver's License (CDL)
- Certification in Cardiopulmonary Resuscitation (CPR)
- DOT Medical Card
- NABCEP Certification

161 New Jersey Division of Consumer Affairs, Board of Examiners of Electrical Contractors. https://www.njconsumeraffairs.gov/elec/Pages/default.aspx

162 New Jersey Division of Consumer Affairs, Board of Examiners of Electrical Contractors. https://www.njconsumeraffairs.gov/elec/Pages/FAQ.aspx

163 Based on active job postings in New Jersey and the U.S. for Electricians between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

- Certified Welder

Experience
All Electricians in the State of New Jersey are required to complete an apprenticeship program prior to obtaining an Electrician's license. However, further on-the-job training is typically preferred. The typical level of experience sought is between 3 and 5 years.[164]

Skills
A general skillset expected for Electricians can include the following:[165]
- Communication (verbal and written skills)
- Troubleshooting
- Knowledge of gauges and soldering
- Customer and personal service skills and knowledge
- Manual dexterity
- Ability to work in a fast-paced environment
- Knowledge of meggers, ammeters, and conduit benders
- Reading schematics and blueprints
- Ability to work with generators and circuits
- Ability to lift 41-100 lbs.
- Familiarity with HVAC Systems
- Ability to use hand and power tools
- General mechanical and manufacturing knowledge
- Ability to work with electrical wiring

Key technical skills may include proficiency in the following technologies:[166]
- Microsoft Excel and Outlook
- Programmable Logic Controllers (PLC)
- Computer Aided Design (CAD) software
- Systems Applications and Products (SAP) software
- Human Machine Interface Software (HMI)
- Analytical software such as Construction Master Pro

Unionization

Due to their ability to bargain for higher pay than their non-unionized peers, many Electricians choose to become members of unions or look for jobs with union-represented firms. In 2022, the average hourly wage for unionized Electricians in the United States was $38.21, compared to $28.10 for nonunion Electricians.[167] In New Jersey, the average hourly wage for unionized Electricians in 2022 was $47.52, with non-unionized Electricians earning $33.18 an hour.[168]

Unions also provide training courses, many of which follow the National Electrical Contractors Association's established guidelines. The International Brotherhood of Electrical Workers (IBEW), which represents around 820,000 active members and retirees in diverse areas, is one of the biggest national unions for Electricians.[169] United Steelworkers, the Industrial Division of the Communication Workers of America, and the Association of Western Pulp and Paper Workers Union are some of the other nationally recognized unions representing Electricians.[170]

Employment Outlook in New Jersey

Currently, the location quotient of Electricians in New Jersey is 0.73, meaning that the concentration of Electricians in the state is about three-quarters of the national average concentration.

Over the next decade, the U.S. Bureau of Labor Statistics projects a national employment growth of almost 11% and over 80,000 annual job openings on average for Electricians. Thus, at the national level, there is expected to be a high demand for Electricians overall to replace the retiring and vacating share of workers employed each year as well as gain a net of over 84,000 jobs between 2023 and 2033. At the same time, 10% growth is expected in New Jersey's overall economy with additional growth in its energy economy. More specifically, the state's energy economy is forecasted to support nearly 3,000 new Electricians between 2022 and 2035, with over 2,000 of these workers supported by the electricity sector (Table 34).

Table 34. Employment Outlook[171]

Employment (NJ, 2023)	14,350 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+2,953 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+1,709 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+9.9%
Location Quotient (NJ, 2023)	0.73
Employment (National, 2023)	779,800
Forecasted Employment Percent Change (National, 2023-2033)	+10.8%
Occupational Openings, Annual Average (National, 2023-2033)	80,200
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 522,600 Employment Services: 24,590 Local Government, excluding Schools and Hospitals: 15,280

164 Based on active job postings in New Jersey and the U.S. for Electricians between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

165 Based on active job postings in New Jersey and the U.S. for Electricians between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

166 Based on active job postings in New Jersey and the U.S. for Electricians between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

167 U.S. Bureau of Labor Statistics, Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

168 U.S. Bureau of Labor Statistics, Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

169 International Brotherhood of Electrical Workers. https://www.ibew.org/Who-We-Are

170 U.S. Department of Labor. O*Net. Electricians. Professional Associations. https://www.onetonline.org/link/summary/47-2111.00#ProfessionalAssociations

171 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472111.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

Employers in New Jersey

Electricians across New Jersey are employed by utilities, schools and universities, and private sector companies across New Jersey. Employers who were recently hiring for Electrician-related roles in New Jersey include:

- **Innovative Refrigeration Systems**, industrial refrigeration (Newark, NJ and New Brunswick, NJ)
- **Lincoln Technical Institute**, group of vocational institutions (multiple locations)
- **Lane Valente Industries**, electrical and maintenance solutions (multiple locations)
- **Rutgers University**, public research university (multiple locations)

In New Jersey, employers in Middlesex County, Essex County, and Somerset County had the highest number of job postings for Electricians from August 2023 to August 2024.[172]

Available Training Options

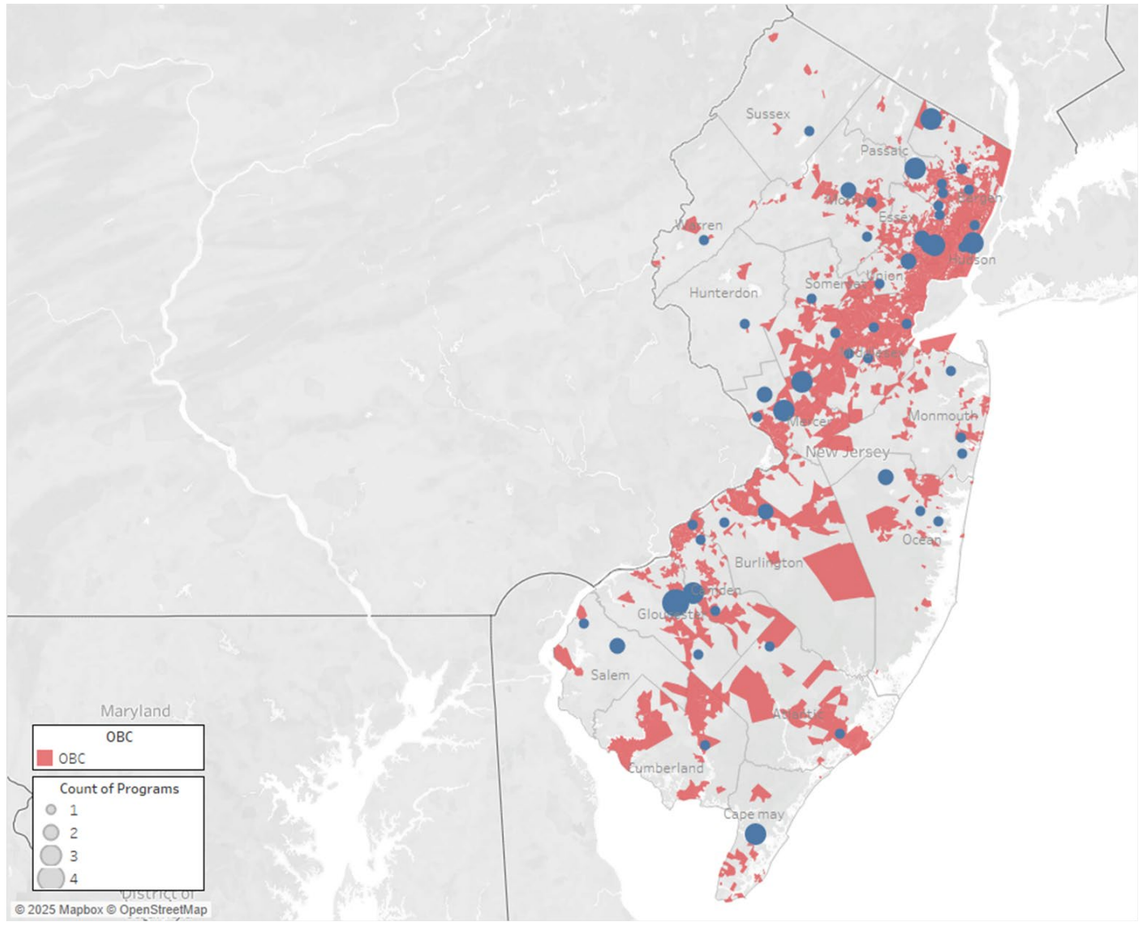
Headquartered in Parsippany, New Jersey, Lincoln Technical Institute is one of the largest technical training providers in the country and the state. Of the 6 sites across New Jersey, electrical training programs are offered in Mahwah, Moorestown, and Union. The course offers practical instruction in high-voltage electrical and electronic systems, maintaining home theater systems, closed-circuit television systems, fire alarms, and other types of electrical systems.[173]

In New Jersey, trainings for Electricians are spread widely across the state, with a decent share of trainings offered within the beltline of Overburdened Communities (OBCs) as defined by the state's Environmental Justice Law. Fewer trainings for Electricians exist in the northwestern corner of the state (Figure 35).

Locally, workers in New Jersey have access to Electricians trainings offered by various institutions, including:

- Community Colleges of Bergen, Brookdale, Essex, Raritan Valley, and Salem
- Vocational Technical Schools of Bergen, Cape May, Essex, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Salem, Somerset, Sussex, and Warren Counties
- Institutes of Technology of Burlington and Gloucester Counties
- International Brotherhood of Electrical Workers (Local Unions 102, 164, 269, 351, 400, 456)
- American Institute
- Barringer High School
- Brookdale, Center for Career Development
- Camden County College
- Delsea CTE
- Eastwick College-Nutley
- Eastwick Education - HoHoKus School of Trade
- Edison Job Corp Center
- Eferon Solar Solutions
- Electrical Training Academy Corp.
- Essex County College
- Fairleigh Dickinson College-Metropolitan Campus
- Fireworks Electric LLC
- Fortis Institute
- Hudson Training Center
- Ideal Institute of Technology
- Inspection 21
- Lincoln Technical Institute
- Community Development Corp.
- Morris County School of Technology, Adult Education
- National Career Institute
- Passaic County Technical Institute
- Pennco Tech-Blackwood
- Pennsauken High School
- Princeton University
- Rowan College South Jersey
- Stevens Institute of Technology
- The College of New Jersey

Figure 35. Map of Existing Trainings for Electricians in New Jersey[174]



172 Based on active job postings in New Jersey for Electricians between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

173 Lincoln Technical Institute. https://www.lincolntech.edu/campus/mahwah-nj

174 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Career Transition Potential

This section lists occupations that have comparable educational requirements and skill sets, which may make it easier to go from one career to an Electrician without requiring a lot of additional training. These jobs are mainly found in the occupational groups that include construction and extraction and installation, maintenance, and repair (Table 35).

Table 35. Transferable Occupations and Their Employment and Wages in New Jersey[175] [176]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Electricians	14,350	$32.81	High school diploma or equivalent
Heating, Air Conditioning, and Refrigeration Mechanics and Installers*	10,360	$29.78	Post-secondary nondegree award
Telecommunications Equipment Installers and Repairers, Except Line Installers	2,520	$32.62	Post-secondary nondegree award
Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,350	$29.77	Post-secondary nondegree award
Maintenance and Repair Workers, General*	34,890	$23.26	High school diploma or equivalent

**Denotes Transferable occupations that are other priority occupations in this jobs study.*

175 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

176 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

FIRST-LINE SUPERVISORS OF CONSTRUCTION TRADES AND EXTRACTION WORKERS(47-1011)[177]

Overview

First-Line Supervisors of Construction Trades and Extraction Workers (Construction Supervisors) represent over 16,000 workers in New Jersey. Workers in this occupation earn high wages for the relatively low barriers to entry, with a median annual wage in New Jersy of $92,770. Like most priority occupations, Construction Supervisors are not a diverse workforce, with 95% of workers identifying as male, and over three-quarters (76%) of workers White. Over half of these workers (55%) are between the ages of 35 to 54, with the next largest age, representing 55 years and older, making up about a quarter of workers (27%).

The pathway to Construction Supervisors positions commonly includes gaining years of experience in the construction industry, including in positions such as Plumbers, Pipefitters and Steamfitters, or General Maintenance and Repair Workers. In terms of demand, New Jersey's location quotient for Construction Supervisors is 0.77, indicating a lower prevalence of this occupation compared to national averages. Nationally, employment in this field is projected to grow by 5.9% from 2023 to 2033, with an estimated 72,000 annual job openings during this period, while employment in New Jersey is projected to grow 4.4% from 2022 to 2032.

177 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 36. Summary of Occupation Data[178]

Employment (NJ, 2023)	16,640 workers
Location Quotient (NJ, 2023)[179]	0.77
Median Annual Wage (NJ, 2023)	$92,770
Median Hourly Wage (NJ, 2023)	$44.60
Demographics (NJ, 2024)	5.0% Female 32.3% Hispanic or Latino Ethnicity 23.6% People of Color 26.9% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	A one to two years of on-the-job training or a recognized apprenticeship program[180]
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	6.0 to < 7.0[181]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 136,450 Nonresidential Building Construction: 101,430 Residential Building Construction: 80,590

Job Description

Construction Supervisors directly supervise and coordinate the activities of construction or extraction workers. Their responsibilities include inspecting workers' progress in completing tasks and assignments as well as construction site equipment to verify specifications are met. More specifically, they review blueprints and work plans; assign work to those they supervise based on specific project needs; coordinate the assigned work activities; and estimate project costs, to name a few of their duties. These supervisors are involved in many types of projects, such as construction, coal mining, electrical, insulation and sheet metal activities.[182]

Wages

Construction Supervisors earn a median annual wage of $92,770 in New Jersey, which is greater than what they earn nationally. Similarly, these workers earn more than overall construction and extraction occupations nationwide. This occurs at multiple wage percentiles, as shown in Table 37.

178 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/current/oes472031.htm

179 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

180 U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

181 The "Specific Vocational Preparation" value is defined by the U.S. Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

182 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/2023/may/oes471011.htm & U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

Table 37. Wage Distribution, 2023[183]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
First-Line Supervisors of Construction Trades and Extraction Workers (New Jersey)	Annual	$69,050	$92,770	$125,570
First-Line Supervisors of Construction Trades and Extraction Workers (New Jersey)	Hourly	$33.20	$44.60	$60.37
First-Line Supervisors of Construction Trades and Extraction Workers (National)	Annual	$60,870	$76,760	$97,750
First-Line Supervisors of Construction Trades and Extraction Workers (National)	Hourly	$29.26	$36.90	$47.00
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Most Construction Supervisors in New Jersey are male with only 5% identifying as female. One-third (32%) of workers are Hispanic or Latino, while almost one-quarter (24%) identify as a person of color, primarily Black (9.1%) or multiracial (11%).[184]

The Construction Supervisor workforce has a higher share of older workers than many other construction trades, with over half (55%) of workers between 35 to 54 years old, and an additional quarter (27%) of workers aged 55 years and over (Table 38).

Table 38. Demographic Distribution in New Jersey, 2024Q1[185]

Demographic Type	Demographic	% of Current Workers
Sex	Male	95.0%
	Female	5.0%
Ethnicity	Hispanic or Latino	32.3%
	Not Hispanic or Latino	67.7%
Race	White	76.4%
	Black	9.1%
	Asian	2.3%
	American Native[186]	0.9%
	Pacific Islander	0.0%
	Two or More Races	11.2%
Ages	16 to 24 Years	2.1%
	25 to 34 Years	16.3%
	35 to 54 Years	54.7%
	55 Years and Over	26.9%

183 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed September 2024. https://www.bls.gov/oes/2023/may/oes471011.htm

184 The U.S. Bureau of Labor Statistics and JobsEQ multiracial workers as "two or more races."

185 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current First-Line Supervisors of Construction Trades and Extraction Workers across all industries in New Jersey and not specific to the green economy industries.

186 JobsEQ reports this as "American Indian," what is classified here as "American Native"

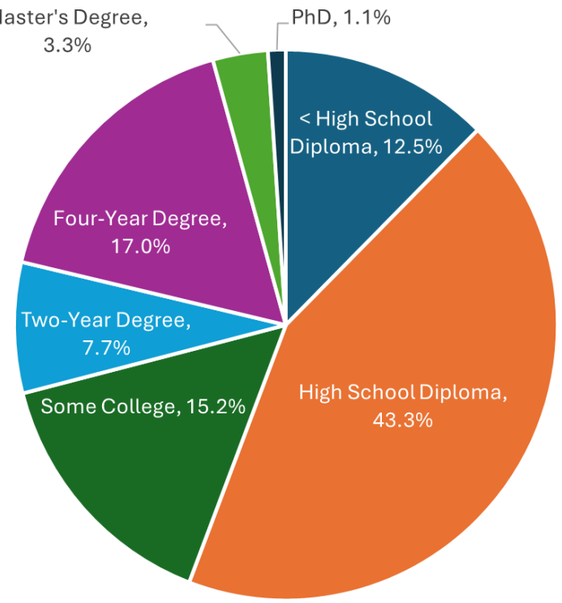
Education, Certifications, Experience & Skill Requirements

Education

To become a Construction Supervisor, workers typically need at least a high school diploma or its equivalent. Many begin in a trade occupation, either in construction or a related field, prior to becoming a supervisor. Frequently, skilled trades workers complete an apprenticeship or obtain a vocational school education, both of which provide a solid foundation of skills and knowledge. Alternatively, they may be trained through on-the-job experience alongside experienced trades workers. Once experienced in a trade, workers may advance into a supervisory position. According to the O*NET database, the importance of an apprenticeship for this position is 2.58 on a scale of 5, less than some other construction occupations, such as Carpenters.[187]

In New Jersey, the largest share (43%) of Construction Supervisors have attained at most a high school diploma. Significantly, the second-largest group (17%), with respect to educational attainment, have a four-year degree. Advanced education can be an advantage in this field but is not a primary entry point (Figure 36).

Figure 36. Educational Attainment of Current Workers in New Jersey[188]



187 U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00 & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

188 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

Certifications

In New Jersey, Construction Supervisors are not required to obtain licensure or certification to work in the state.[189] However, training and certifications, as detailed in Table 39 below, can increase a worker's expertise and employability.

Table 39. Top First-Line Supervisors of Construction Trades and Extraction Workers Certifications

Certification	Area of Expertise	Provider
Master Certified Remodeler	Demonstrated levels of experience, professional commitment, and leadership in remodeling	National Association of the Remodeling Industry
Certified Graduate Builder	Home building business management	National Association of Home Builders
Supervisor Certification (SCP)	Supervision of masonry construction	International Masonry Institute
Certification	Area of Expertise	Provider
Master Trainer	Training of craft instructors	National Center for Construction Education and Research
Managing Construction & Demolition Materials	Management of Construction and Demolition (C&D) debris materials operations	Solid Waste Association of North America
Master Certified Green Professional	Sustainable building and remodeling	National Association of Home Builders
WSO – Certified Safety Manager (Construction)	Years of safety experience in Construction	World Safety Organization
Construction Foreman Certification	Field leadership	National Center for Construction Education and Research
Construction Superintendent Certification	Construction management, business acumen, leadership, and communication	National Center for Construction Education and Research

Even without a requirement, there are general certifications that are often in demand by New Jersey employers, including:[190]

- OSHA 10 and 30
- Certified Welder
- Commercial Driver's License (CDL)
- First Aid Certification
- Institute of Inspection Cleaning and Restoration Certification (IICRC) Certified
- Certification in Cardiopulmonary Resuscitation (CPR)
- Transportation Worker Identification Credential (TWIC)
- 40-hour HAZWOPER

Experience

Construction Supervisors nearly aways gain experience in related construction occupations before moving into a supervisory position. Across the U.S., almost three-in-five (56%) Construction Supervisors have between one and eight years of related

189 My Career New Jersey. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed 2 January 2025.https://mycareer.nj.gov/occupation/47-2031 https://mycareer.nj.gov/occupation/47-1011
U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

190 U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00 & Based on active job postings in New Jersey and the U.S. for First-Line Supervisors of Construction Trades and Extraction Workers between January 2024 and January 2025. JobsEQ. Real Time Intelligence (RTI) Job Postings.

experience while over 30% have more than 10 years of related work experience. [191]

Skills
General skills, abilities, and knowledge commonly desired by employers for Construction Supervisors include:[192]

- Blueprint Reading
- Plumbing
- Ability to Lift 41-50 lbs.
- Commercial Construction
- Ladders

In addition, New Jersey employers typically seek a proficiency in the following technologies from Construction Supervisor candidates:[193]

- Computer-aided design (CAD) software
- Office Suite software including Microsoft Word, Excel, and PowerPoint
- Construction management software such as Procore

Unionization

Unionization is uncommon for Construction Supervisors, as they are generally considered part of a firm's management team and, therefore, may not be able to participate in collective bargaining with employees.[194]

Employment Outlook in New Jersey

A location quotient of 0.77 indicates that the concentration of Construction Supervisors in New Jersey is less than the national. The U.S. Bureau of Labor Statistics projects employment in Construction Supervisors to grow by 5.9% across the country from 2023 to 2033, while in New Jersey, these workers are projected to grow by 4.4% across the state. Within the state's energy economy, an additional 1,300 Construction Supervisors are projected to be supported through 2035, largely in the buildings sector (448 workers) and electricity sector (489 workers) (Table 40).

191 U.S. Department of Labor. O*Net. Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

192 Based on active job postings in New Jersey and the U.S. for First-Line Supervisors of Construction Trades and Extraction Workers between January 2024 and January 2025. JobsEQ. Real Time Intelligence (RTI) Job Postings.
& U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

193 Based on active job postings in New Jersey for First-Line Supervisors of Construction Trades and Extraction Workers between January 2024 and January 2025. JobsEQ. Real Time Intelligence (RTI) Job Postings.
& U.S. Department of Labor. O*Net. First-Line Supervisors of Construction Trades and Extraction Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-1011.00

194 "National Labor Relations Act." National Labor Relations Board. Accessed February 2025. https://www.nlrb.gov/guidance/key-reference-materials/national-labor-relations-act.

Table 40. Employment Outlook[195]

Employment (NJ, 2023)	16,640 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+1,312 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+594 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+4.4%
Location Quotient (NJ, 2023)	0.77
Employment (National, 2023)	853,200
Forecasted Employment Percent Change (National, 2023-2033)	+5.9%
Occupational Openings, Annual Average (National, 2023-2033)	72,000
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 136,450 Nonresidential Building Construction: 101,430 Residential Building Construction: 80,590

Employers in New Jersey

Some of the employers who posted job openings for First-Line Supervisors in New Jersey in the last year include:

- **Young's Water & Sewer**, plumbing services (multiple locations)
- **V.J. Scozzari & Sons Inc**, general contractor (multiple locations)
- **D.R. Horton**, home construction services (multiple locations)

In New Jersey, Middlesex, Bergen, and Essex County had the most job openings for these roles between August 2023 and 2024.[196]

Available Training Options[197]

While Construction Supervisors typically obtain the necessary industry-related knowledge and skills through related on-the-job experience and apprenticeship or informal training with experienced workers, they may not obtain supervisory-related training through these avenues. Examples of in-state training opportunities for supervisory roles in the construction industry include:

- "Construction Supervision Fundamentals" course offered by the Associated Construction Contractors of New Jersey
- "New Jersey Supervisory Training Empowering Performance (NJSTEP)" offered by the NJ Civil Service Commission, located at Mercer County College

195 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/2023/may/oes471011.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

196 Based on active job postings in New Jersey for First-Line Supervisors between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

197 This occupation was added to this report after the training inventory was completed and is therefore not included in the training inventory map or analysis.

Career Transition Potential

This section showcases occupations with educational requirements and skillsets comparable to those of Construction Supervisors, offering the potential for a more seamless transition into this role with minimal training and preparation. These roles are primarily within the construction and installation occupational group, as well as other supervisory positions in the building and grounds cleaning and maintenance; farming, fishing and forestry; and installation, maintenance, and repair fields (Table 41).

Table 41. Transferable Occupations and Their Employment and Wages in New Jersey[198] [199]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
First-line Supervisors of Construction Trades and Extraction Workers	16,640	$44.60	High school diploma or equivalent
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	2,850	$35.33	High school diploma or equivalent
First-Line Supervisors of Farming, Fishing, and Forestry Workers	580	$21.44	High school diploma or equivalent
Plumbers, Pipefitters, and Steamfitters	9,560	$37.72	High school diploma or equivalent
Forest and Conservation Technicians	40	$23.61	Associate's degree
Explosives Workers, Ordnance Handling Experts, and Blasters	State data not available 4,610 (national)	$29.61 (national)	High school diploma or equivalent
First-Line Supervisors of Mechanics, Installers, and Repairers	14,580	$40.62	High school diploma or equivalent
Maintenance and Repair Workers, General	34,890	$23.26	High school diploma or equivalent
Surveying and Mapping Technicians	890	$28.24	High school diploma or equivalent

198 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

199 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)[200]

Overview

Heating, Air Conditioning, and Refrigeration (HVAC/R) Mechanics and Installers are crucial to New Jersey's building sector and energy efficiency efforts. They face significant demographic disparities in New Jersey, with less than 3% of workers in the state identifying as female. The workforce is also predominantly White (72%), though Hispanic or Latino individuals comprise almost three-tenths of the workforce (28%).

Pathways to HVAC/R work often involve roles with similar education and training, such as Motorboat Mechanics, Automotive Service Technicians, and General Maintenance and Repair Workers, which can leverage their prior experience to obtain higher-paying HVAC/R jobs. To enter the trade, HVAC/R Mechanics and Installers typically complete an apprenticeship or obtain a postsecondary non-degree award or certification. Many training opportunities exist for these workers throughout New Jersey, particularly in or near urban areas like Newark, Trenton, and Philadelphia across the Delaware river.

New Jersey's location quotient for HVAC installers is 0.94, indicating that the share of these workers in New Jersey is closely aligned with national averages. Nationally, employment in this field is projected to grow by 9.1% from 2023 to 2033, with an anticipated 42,500 annual job openings during this period, while the projected growth rate in New Jersey is 7.3% from 2022-2032.

200 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 42. Summary of Occupation Data[201]

Employment (NJ, 2023)	10,360 workers
Location Quotient (NJ, 2023)[202]	0.94
Median Annual Wage (NJ, 2023)	$61,940
Median Hourly Wage (NJ, 2023)	$29.78
Demographics (NJ, 2024)	2.3% Female 27.9% Hispanic or Latino Ethnicity 27.6% People of Color 21.3% Ages 55 Years and Over
Minimum Education	Post-secondary non-degree award
Minimum Training	1-2 years of on-the job training and/or vocational school[203]
Certification/Licensure Requirements	New Jersey State Master HVACR Technician License EPA Refrigerant Handling Certification
Certification Levels	Apprentice, Journey worker, and Master Technician
Specific Vocational Preparation (National)	6.0-<7.0[204]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 294,280 Merchant Wholesalers, Durable Goods (4232, 4233, 4235, 4236, 4237, and 4239 only): 11,120 Fuel Dealers: 9,490

Job Description

Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R) Mechanics and Installers work to install and maintain a wide variety of temperature control systems. They can work on oil burners, stoves, refrigeration units, or many other types of systems and can also specialize in certain types of systems. They work in all kinds of buildings, from homes to hospitals. Employers commonly prefer mechanics with additional training, certification, or education, as systems become more complicated over time. Additionally, those who work directly with refrigerants must be certified to handle these hazardous substances.[205]

Wages

In the State of New Jersey, HVAC/R Mechanics and Installers earn more than the national estimates, with workers earning $47,490 to $61,940 at the 25th and 75th percentiles, respectively. The median annual wage for HVAC/R Mechanics and Installers at the national level is $57,300 compared to $61,940 in New Jersey. In New Jersey, these workers also earn more than most of the workers in the installation, maintenance and, and repair occupational group across the United States. The wages for all three groups are seen in Table 43.

Table 43. Wage Distribution, 2023[206]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (New Jersey)	Annual	$47,490	$61,940	$79,850
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (New Jersey)	Hourly	$22.83	$29.78	$38.39
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (National)	Annual	$46,550	$57,300	$71,120
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (National)	Hourly	$22.38	$27.55	$34.19
Installation, Maintenance, and Repair Occupations (National)	Annual	$41,090	$53,920	$71,460
Installation, Maintenance, and Repair Occupations (National)	Hourly	$19.76	$25.92	$34.36

Demographics

HVAC/R Mechanics and Installers in New Jersey are primarily males (98%). Most (72%) are of White race, followed by less than one-fifth (17%) identifying as Black. The largest share of these workers in the state are between the ages of 35 and 54 years (45%) (Table 44).

Table 44. Demographic Distribution in New Jersey, 2024Q1[207]

Demographic Type	Demographic	% of Current Workers
Sex	Male	97.7%
	Female	2.3%
Ethnicity	Hispanic or Latino	27.9%
	Not Hispanic or Latino	72.1%
Race	White	72.4%
	Black	16.8%
	Asian	1.0%
	American Native[208]	0.6%
	Pacific Islander	0.0%
	Two or More Races	9.2%
Ages	16 to 24 Years	10.2%
	25 to 34 Years	23.2%
	35 to 54 Years	45.3%
	55 Years and Over	21.3%

201 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499021.htm

202 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

203 My Career New Jersey. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed 19 August 2024. https://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm.

204 The "Specific Vocational Preparation" value is defined by the U.S. Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor, O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00

205 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499021.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm

206 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

207 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current HVAC/R Mechanics and Installers across all industries in New Jersey and not specific to the green economy industries.

208 JobsEQ reports this as "American Indian," what is classified here as "American Native"

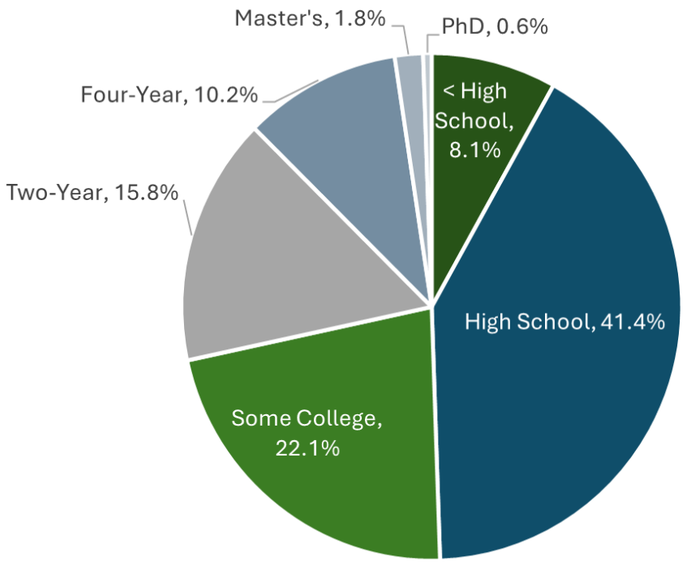
Education, Certifications, Experience & Skill Requirements

Education

To begin working as an HVAC/R Mechanic and Installer, prospective applicants typically need a post-secondary nondegree award. Workers often learn the trade through a full apprenticeship, vocational school education, or an associate's degree. Depending on the program, post-secondary education can take up to two years.[209] Survey data obtained by the U.S. Department of Labor's Occupational Information Network (O*NET), comprised of both workers and occupation experts, revealed that the average importance level of an apprenticeship for an HVAC/R Mechanic and Installer is a 3.81 on a scale of 1 to 5.

Among currently employed HVAC/R Mechanics and Installers in New Jersey, about half (49.5%) have a high school education or less, while 22% have attended some college, and 16% have earned a two-year degree (Figure 37).

Figure 37. Educational Attainment of Current Workers in New Jersey[210]



Certifications

A board certification is needed to do business as a Master HVAC/R Mechanic or Installer in New Jersey. Additionally, anyone in the United States who works with refrigerants must receive the Environmental Protection Agency's Section 608 certification.[211] Many additional certifications are available for HVAC/R Mechanics and Installers to gain further expertise, as detailed in Table 45.

209 U.S. Department of Labor, O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00

210 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

211 My Career New Jersey. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed 19 August 2024. https://mycareer.nj.gov/occupation/49-9021
& U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

Table 45. Top HVAC/R Mechanic and Installer Certifications

Certification	Area of Expertise	Provider
EPA Section 608 Certification	Refrigerants	Air Conditioning Contractors of America
Certified HVAC Designer (CHD)	Building requirements for HVAC systems	
Light Commercial Refrigeration Certification (NATE Certified)	Refrigerants	North American Technician Excellence, Inc.
Certified HVAC Professional (CHP-5)	Career Proficiency	
Certified Assistant Refrigeration Operator (CARO)	Refrigeration operation and service standards	Refrigerating Engineers & Technicians Association
Certified Industrial Refrigeration Operator (CIRO)	Refrigeration operation and service standards	Refrigerating Engineers & Technicians Association
Certified Refrigeration Service Technician (CRST)	Refrigeration operation and service standards	International Society of Certified Electronics Technicians
Certified Building Decarbonization Professional (CDP)	Sustainable strategies to reduce/eliminate carbon footprint	ASHRAE
Airflow Certification	A residential HVAC certification; Understanding airflow and duct systems	National Coalition of Certification Centers (NC3) and Trane Technologies
Refrigeration Diagnostics Certification	A residential HVAC certification; Refrigeration operation and service standards	
Variable Speed Motors Certification	A residential HVAC certification; Motor operation and service standards	
Air-to-Air Heat Pump Certification	A residential HVAC certification; Heat pump operation and service standards	
Building Automation Systems	A commercial HVAC certification; Fundamentals to building automation and operations	
Refrigeration System Electrical Operation and Maintenance Certification & Refrigeration System Mechanical Operation and Maintenance Certification	Fundamentals to electrical and mechanical operation of an HVAC/R system	NC3 and Copeland
Compressor Inspection Certification	Principles of compressor operations, design, and construction	
HVAC/R Troubleshooting Certification	Mechanical and electrical troubleshooting for HVAC/R systems and refrigeration maintenance	
Pressing for HVAC and Plumbing Certification	Piping design and service	NC3 and RIDGID
HVACR (meets HVAC Excellence accreditation standards)	Installation, maintenance, and troubleshooting HVAC/R systems	National Center for Construction Education and Research (NCCER)

To become a Master HVAC/R Contractor in New Jersey, workers need a New Jersey Master HVAC/R License. Applying for this license requires an application fee of $100 and applicants must fulfill one of the following requirements:[212]

212 New Jersey State Board of Examiners of Heating, Ventilation, Air Conditioning, and Refrigeration

- A U.S. Department of Labor approved 4-year apprenticeship program and 1-year journey worker professional experience under a Master HVACR contractor.
- A 4-year HVAC/R-specific degree from an accredited university or college and 1-year journey worker professional experience under a Master HVACR contractor.
- A 4-year HVAC/R-related degree from an accredited university or college and 3-year journey worker professional experience under a Master HVACR contractor.
- A 2-year degree from trade, community, or county school/college following two 2-year HVAC/R apprenticeships approved by the U.S. Department of Labor and 1-year journey worker professional experience under a Master HVACR contractor.

There are also general certifications often in demand by New Jersey employers and employers across the country, including:[213]

- Driver's License
- EPA Universal Certification
- OSHA 10
- OSHA 30
- Hazardous Material (HAZMAT) Certification

Experience

Most HVAC/R jobs require up to two years of training. New HVAC/R Mechanics and Installers will work alongside their more experienced coworkers for one to two years, during which they are expected to learn from hands-on experience. Over 40% of HVACR/R workers said they required more than four years of on-the-job training.[214]

Skills

General skills, abilities, and knowledge desired for HVAC/R Mechanics and Installers by employers in New Jersey and across the country include:[215]

- HVAC Systems
- Plumbing
- Boilers
- Refrigeration Systems
- Ability to Lift 41-100 lbs.
- Mechanical
- Using Ladders
- Gauges
- Reading Schematics

In addition, New Jersey employers typically seek HVAC/R Mechanics and Installers with proficiency in Microsoft Office, including Excel and Outlook.[216]

Contractors, FAQ. https://www.njconsumeraffairs.gov/hvacr/Pages/FAQ.aspx

213 U.S. Department of Labor, O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00 & Based on active job postings in New Jersey and the U.S. for HVAC/R Mechanics and Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

214 U.S. Department of Labor, O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html

215 U.S. Department of Labor. O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00 & Based on active job postings in New Jersey and the U.S. for Heating, Air Conditioning, and Refrigeration Mechanics and Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

216 U.S. Department of Labor. O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00 & Based on active job postings in New Jersey and the U.S. for Heating, Air Conditioning, and Refrigeration Mechanics and Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

Unionization

The United Association (UA) Local 9 and Sheet Metal Workers Local 25 are examples of union organizations in New Jersey of which HVAC/R Mechanics and Installers may be members. Union membership can sometimes offer greater job benefits. Union workers in the Installation, Maintenance, and Repair occupational group, on average, earned $35.94 in 2022 in New Jersey, compared to the non-union wage of $27.67.[217]

Employment Outlook in New Jersey

With a location quotient of 0.94, the prevalence of HVAC/R Mechanics and Installers in New Jersey is slightly lower than that of the country. Given the increasing demand and average concentration of HVAC/R workers in the state, national and state employment projections may indicate a level of strain on this occupation.

Employment of HVAC/R Mechanics and Installers is projected to increase by 9.1%, and an average of 42,500 annual job openings will be seen over the next decade. This shows an increasing high demand for these workers as current workers retire or leave the job for other reasons. On top of this, projections show that over 2,000 new HVAC/R Mechanics and Installers will be supported by New Jersey's energy economy through 2035, largely supported by the buildings sector with over 1,500 of these workers, in addition to a baseline projection of 7.3% growth among HVAC/R workers across New Jersey (Table 46).

Table 46. Employment Outlook[218]

Employment (NJ, 2023)	10,360 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+2,250 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+747 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+7.3%
Location Quotient (NJ, 2023)	0.94
Employment (National, 2023)	441,200
Forecasted Employment Percent Change (National, 2023-2033)	+9.1%
Occupational Openings, Annual Average (National, 2023-2033)	42,500
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 294,280 Merchant Wholesalers, Durable Goods (4232, 4233, 4235, 4236, 4237, and 4239 only): 11,120 Fuel Dealers: 9,490

217 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

218 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499021.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDltNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

Employers in New Jersey

Many popular employers of HVAC/R Mechanics in New Jersey are private companies. These popular employers who recently were hiring for HVAC roles include:

- **Ambient Comfort**, HVAC contractor (multiple locations)
- **A.J. Perri Plumbing, Heating, Cooling**, air conditioning repair services (multiple locations)
- **CBRE**, commercial real estate services (multiple locations)
- **Professor Gatsby's Heating Cooling & Plumbing**, residential and commercial HVAC (multiple locations)

In New Jersey, employers in Middlesex County, Camden County, and Morris County had the highest number of job postings for HVAC/R Mechanics from August 2023 to August 2024.[219]

Available Training Options

HVAC/R Mechanics and Installers typically need to complete an apprenticeship or obtain a postsecondary nondegree award or certification to enter the trade as journey workers. There are many opportunities to obtain these credentials and training across New Jersey, with a higher concentration in or near urban areas like Newark, Trenton, and Philadelphia (Figure 38).

Locally, workers in New Jersey have access to HVAC/R trainings offered by:

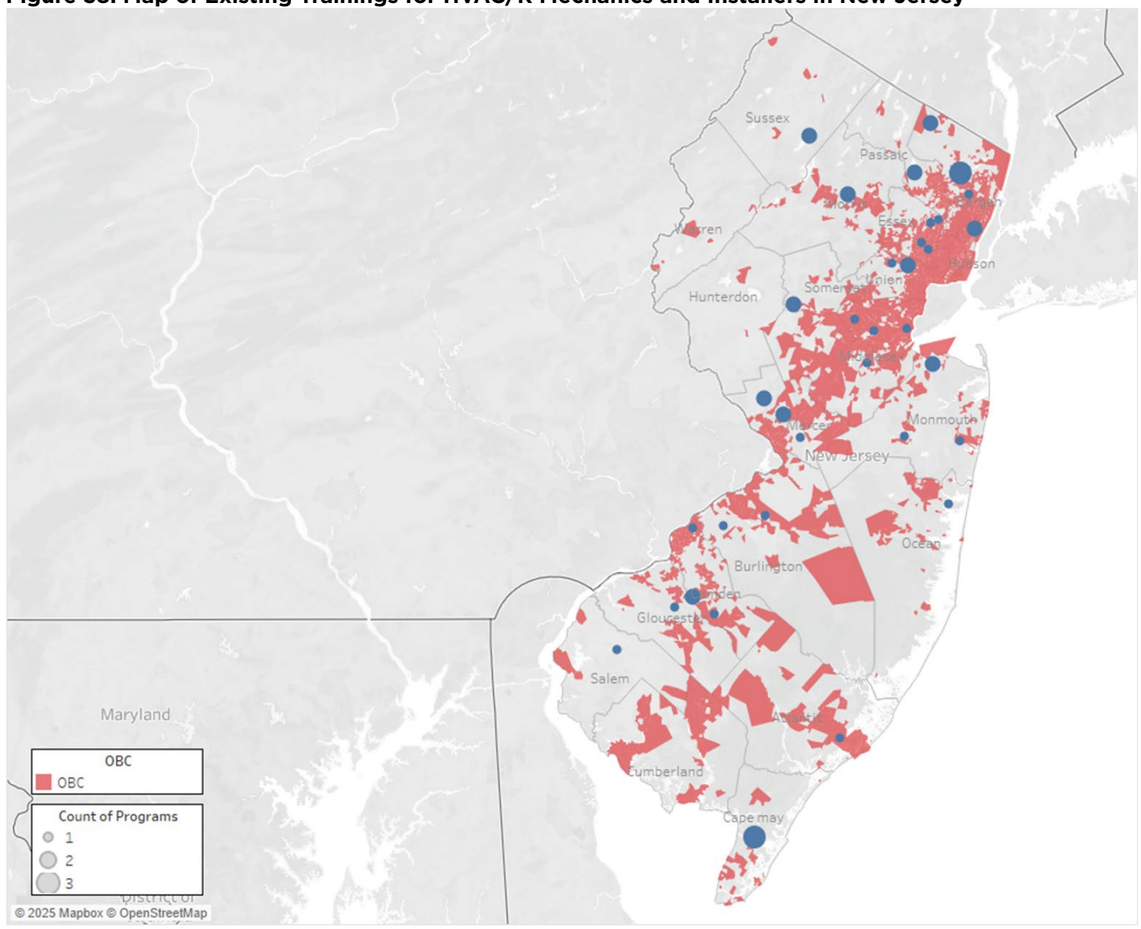
- Bergen County Technical School
- Burlington County Institute of Technology
- Camden County College
- Cape May County Technical High School
- Eastwick College-Nutley
- Essex County Vocational - Technical School
- Fortis Institute
- Gloucester County Institute of Technology
- Hudson Training Center
- Ideal Institute of Technology
- Inspection 21
- Lincoln Technical Institute
- Mechanical Contractors Association of New Jersey
- Mercer County Technical Schools
- Middlesex County Vocational and Technical Schools
- Monmouth County Vocational School District
- Morris County School of Technology, Adult Education
- Morris County Vocational School District
- National Career Institute
- Ocean County Vocational Technical School District
- Pennco Tech-Blackwood
- Pennsauken High School
- Pipefitters Local 274
- Raritan Valley Community College
- Salem County Career and Technical High School
- Sussex County Technical School
- UA of New Jersey AC/Refrigeration Division
- Universal Technical Institute

219 Based on active job postings in New Jersey for HVAC/R Mechanics between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

At the national level, workers who seek HVAC/R system training can enroll with common national institutions including:[220]

- Air Conditioning Contractors of America
- Building Performance Institute
- ESCO Group
- North American Technician Excellence, Inc.
- Refrigerating Engineers and Technicians Association

Figure 38. Map of Existing Trainings for HVAC/R Mechanics and Installers in New Jersey[221]



Career Transition Potential

This section identifies occupations that require skills and experience levels similar to those of HVAC/R Installers and Mechanics, making it easier for workers in these occupations to transition into HVAC/R Installers and Mechanics roles with minimal additional preparation. All of these jobs are within the installation, maintenance, and repair occupational group and typically require a high school diploma or equivalent for entry-level positions (Table 47).

220 U.S. Department of Labor. O*Net. Heating, Air Conditioning, and Refrigeration Mechanics and Installers. Accessed August 2024. https://www.onetonline.org/link/summary/49-9021.00

221 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Table 47. Transferable Occupations and Their Employment and Wages in New Jersey[222] [223]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	10,360	$29.78	Postsecondary nondegree award
Motorboat Mechanics and Service Technicians	530	$26.72	High school diploma or equivalent
Electronic Equipment Installers and Repairers, Motor Vehicles	130	$21.87	High school diploma or equivalent
Farm Equipment Mechanics and Service Technicians	270	$28.86	High school diploma or equivalent
Security and Fire Alarm Systems Installers	2,710	$28.73	High school diploma or equivalent
Maintenance and Repair Workers, General*	34,890	$23.26	High school diploma or equivalent
Automotive Service Technicians and Mechanics	14,880	$25.62	Postsecondary nondegree award

**Denotes Transferable occupations that are other priority occupations in this jobs study.*

222 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

223 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

MAINTENANCE AND REPAIR WORKERS, GENERAL (49-9071)[224]

Overview

General Maintenance and Repair Workers in New Jersey perform regular maintenance and repair activities in facilities and with machinery and other infrastructure. Only 4.4% of the workforce in the state identifies as female while over one-third (35%) identifies a person of color. Workers who can more easily become General Maintenance and Repair Workers are workers in similar occupations that require a high school diploma and offer comparable training. These include Electric Motor Repairers, Transportation Inspectors, Electronic Equipment Installers and Repairers for Motor Vehicles, and Medical Appliance Technicians. In New Jersey, these roles generally offer lower wages, positioning Maintenance and Repair Workers as a potential pathway to higher wages and providing an opportunity to expand diversity in the state. Based on recent trends, a forecasted employment increase of 5.1% is anticipated nationally over the next decade, and a 3.0% forecast employment increase is expected in the state from 2022 to 2032, though training opportunities for this occupation are rare in New Jersey.

224 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 48. Summary of Occupation Data[225]

Employment (NJ, 2023)	34,890 workers
Location Quotient (NJ, 2023)[226]	0.84
Median Annual Wage (NJ, 2023)	$48,390
Median Hourly Wage (NJ, 2023)	$23.26
Demographics (NJ, 2024)	4.4% Female 29.9% Hispanic or Latino Ethnicity 34.9% People of Color 31.3% Ages 55 Years and Over
Minimum Education	High school diploma or its equivalent
Minimum Training	Vocational training or related on-the-job training
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	6.0-7.0[227]
Industries with Highest Employment Levels (National, 2023)	Real Estate: 303,120 Local Government, excluding Schools and Hospitals: 140,280 Traveler Accommodation: 86,170

Job Description

Maintenance and Repair Workers are essential professionals responsible for ensuring that buildings, equipment, and systems operate efficiently and safely. They perform a variety of tasks related to the upkeep and repair of facilities, machinery, and infrastructure and conduct regular inspections of buildings, equipment, and systems to identify issues and perform preventive maintenance. They troubleshoot and repair various systems, including plumbing, electrical, HVAC, and mechanical systems. These workers install new equipment, fixtures, and systems as needed, ensuring compliance with safety regulations and standards. These employees may work in various environments, including residential, commercial, and industrial settings. The job may require irregular hours, including evenings and weekends, to address urgent repairs or maintenance needs.[228] The top three industries employing this type of occupation across the country are real estate, local government, and travel accommodation. Together, these three industries employ over half a million (529,570) workers in the U.S.[229]

225 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/2023/may/oes499071.htm

226 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

227 The "Specific Vocational Preparation" value is defined by the U.S. Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
U.S. Department of Labor, O*Net Maintenance and Repair Workers, General, Detailed Work Activities. https://www.onetonline.org/link/summary/49-9071.00

228 U.S. Department of Labor, O*Net Maintenance and Repair Workers, General, Detailed Work Activities. https://www.onetonline.org/link/summary/49-9071.00

229 U.S. Bureau of Labor Statistics, Occupational Employment and Wage Statistics, May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499071.htm

Wages

Annual wages for General Maintenance and Repair Workers in the State of New Jersey align closely with national wages for the occupation, with a median wage of $48,390 in the state. The state wages for this occupation are slightly lower than the national wages for their corresponding major occupation group: installation, maintenance, and repair (Table 49).

Table 49. Wage Distribution, 2023[230]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Maintenance and Repair Workers, General (New Jersey)	Annual	$39,170	$48,390	$62,170
Maintenance and Repair Workers, General (New Jersey)	Hourly	$18.83	$23.26	$29.89
Maintenance and Repair Workers, General (National)	Annual	$37,160	$46,700	$59,640
Maintenance and Repair Workers, General (National)	Hourly	$17.87	$22.45	$28.67
Installation, Maintenance, and Repair Occupations (National)	Annual	$41,090	$53,920	$71,460
Installation, Maintenance, and Repair Occupations (National)	Hourly	$19.76	$25.92	$34.36

Demographics

General Maintenance and Repair Workers in New Jersey are largely male (96%), and around 30% are Hispanic or Latino workers. Slightly more than one-third (35%) of these workers identify as people of color. While the largest share of General Maintenance and Repair Workers in the state are between the ages of 35 and 54 years (46%), still around one-third (31%) are aged 55 years and over (Table 50).

Table 50. Demographic Distribution in New Jersey, 2024Q1[231]

Demographic Type	Demographic	% of Current Workers
Sex	Male	95.6%
	Female	4.4%
Ethnicity	Hispanic or Latino	29.9%
	Not Hispanic or Latino	70.1%
Race	White	65.1%
	Black	16.8%
	Asian	6.2%
	American Native[232]	0.5%
	Pacific Islander	0.1%
	Two or More Races	11.4%
Ages	16 to 24 Years	7.2%
	25 to 34 Years	15.3%
	35 to 54 Years	46.4%
	55 Years and Over	31.3%

230 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499071.htm

231 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current General Maintenance and Repair Workers across all industries in New Jersey and not specific to the green economy industries.

232 JobsEQ reports this as "American Indian," what is classified here as "American Native"

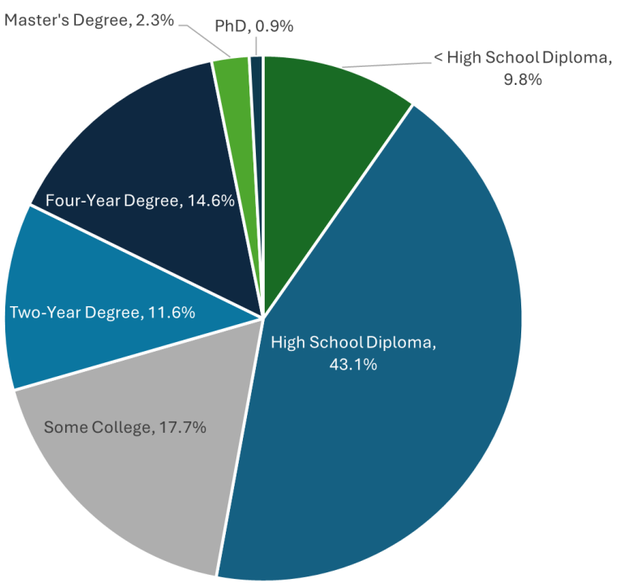
Education, Certifications, Experience & Skill Requirements

Education

A high school diploma or its equivalent is often required for entry-level employment as a General Maintenance and Repair Worker in New Jersey. They often spend a few months to a year learning the craft alongside more experienced workers through an apprenticeship program, vocational school, community college, or related on-the-job training. In these classroom settings and technical education programs, basic skills in subjects like mechanics, blueprint reading, and mathematics are taught to students. These individuals gain expertise in performing upkeep and repairs on a broad range of machinery, systems, and equipment over time. General Maintenance and Repair Workers can launch their own businesses, become licensed craftspeople in a specific field, or advance into managerial roles after gaining experience.[233]

Over two-in-five (43%) General Maintenance and Repair Workers have earned at most a high school diploma or its equivalent. Workers who have attended some college (18%) make up the second largest share of these maintenance workers, followed by those who received a four-year degree (15%) and a two-year degree (12%) (Figure 39).

Figure 39. Educational Attainment of Current Workers in New Jersey[234]



Certifications

As Maintenance and Repair Workers encompass a very wide range of potential skills and responsibilities, numerous different certifications could potentially be required to perform specific tasks for this job. General Maintenance and Repair Workers often work in many different trade areas, such as electrical, plumbing, carpentry, and machinery work, and as a result, may require a certification directly applicable to the job at hand. Some of the most useful and commonly sought-after certifications can be found below in Table 51.

233 U.S. Department of Labor, O*Net Maintenance and Repair Workers, General, Education. https://www.onetonline.org/link/summary/49-9071.00

234 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

Table 51. Top General Maintenance and Repair Worker Certifications

Certification	Area of Expertise	Provider
Certified Apartment Maintenance Technician (CAMT)	General home maintenance and repair	National Apartment Association
Aviation Airframe Mechanic	Maintenance or alteration of airframes	Federal Aviation Administration
Level II Machine Lubrication Technician (MLT)	Troubleshooting and monitoring lubricants and hydraulic fluids	International Council for Machinery Lubrication
Fluid Power Industrial Hydraulic Technician	Fluid power theory; industrial hydraulic systems	International Fluid Power Society
Certified Maintenance and Reliability Technician (CMRT)	Preventative and corrective maintenance	Society for Maintenance and Reliability Professionals
HVAC/R Compressor Operation and Maintenance	Construction and operation of compressors	National Coalition of Certification Centers (NC3) and Copeland
Industrial Maintenance Electrical & Instrumentation	Electrical instrument and equipment concepts	National Center for Construction Education and Research (NCCER)
Certification	Area of Expertise	Provider
Industrial Maintenance Mechanic	Professional maintenance mechanic concepts	NCCER

Other more general certifications that employers often look for when hiring are listed below:[235]

- OSHA 10
- OSHA 30
- Transportation Worker Identification Credential (TWIC)
- Forklift Operator Certification
- First Aid Certification
- Hazardous Material (HAZMAT)
- Class A Commercial Driver's License (CDL-A)
- Commercial Driver's License (CDL)

Experience

Maintenance and Repair Workers typically gain experience through apprenticeships, vocational school courses, or on-the-job training. Most employers prefer at least 1-2 years of related experience prior to being hired.[236]

Skills

The skillset, abilities, and knowledge required to become a General Maintenance and Repair Worker is often broad, as these workers must know foundational concepts in multiple fields. They will typically have a baseline understanding of electrical, plumbing, heating, ventilation, and air conditioning systems. As such, they are expected to be competent in carrying out the most fundamental tasks associated with each of these areas. Some of these skills include:[237]

235 Based on active job postings in New Jersey for General Maintenance and Repair Workers between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

236 U.S. Department of Labor, O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html

237 Based on active job postings in New Jersey for General Maintenance and Repair Workers between August 2023 and August 2024. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed 19 August 2024.

- Ability to work with HVAC and plumbing systems
- Knowledge of boilers, generators, air compressors, and other equipment
- Knowledge of Mechanical Systems
- Familiarity of pneumatic, hydraulic, and compressed air systems
- Customer and personal service skills and knowledge
- Basic fabrication knowledge
- Electrical troubleshooting
- Ability to weld and solder
- Ability to use hand and power tools
- Heavy equipment operation

Specific technical skills depend on the worker's direct line of work, but some of the common software that employers look for candidates to have knowledge of include:[238]
- Computer-aided design (CAD) software
- Facilities management software
- Industrial control software

Unionization

Some of the largest unions in the country that represent General Maintenance and Repair Workers are the International Association of Machinists and Aerospace Workers (IAM), the International Brotherhood of Electrical Workers (IBEW), 32BJ, and the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW).

There are many advantages to union coverage, as organized labor has greater bargaining power for higher wages and other employment benefits. Unionized General Maintenance and Repair Workers earn an average hourly wage of $25.51 in New Jersey, while their non-union counterparts earn an average of $24.40 per hour.[239]

Employment Outlook in New Jersey

In 2023, New Jersey's employment landscape featured 34,890 General Maintenance and Repair Workers, reflecting a location quotient of 0.84, indicating a slightly lower concentration of these jobs in the state compared to the national average. Nationally, the total employment stood at 1,616,500, with a projected 5.1% growth in employment anticipated from 2023 to 2033. This growth will create approximately 157,200 annual job openings across the country. In New Jersey, the energy economy is expected to support almost 100 new General Maintenance and Repair Workers from 2022 to 2035, largely in the buildings, electricity, and green infrastructure sectors, in addition to a projected baseline growth of 3.0% across New Jersey's overall economy (Table 52).

238 U.S. Department of Labor, O*Net Maintenance and Repair Workers, General, Technology Skills. https://www.onetonline.org/link/summary/49-9071.00#TechnologySkills

239 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

Table 52. Employment Outlook[240]

Employment (NJ, 2023)	34,890 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+87 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+1,120 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+3.0%
Location Quotient (NJ, 2023)	0.84
Employment (National, 2023)	1,616,500
Forecasted Employment Percent Change (National, 2023-2033)	+5.1%
Occupational Openings, Annual Average (National, 2023-2033)	157,200
Industries with Highest Employment Levels (National, 2023)	Real Estate: 303,120 Local Government, excluding Schools and Hospitals: 140,280 Traveler Accommodation: 86,170

Employers in New Jersey

Private companies are common employers of Maintenance and Repair Workers, however these kinds of jobs can be found across many sectors, depending on the specific area of interest. Employers who were recently hiring for these roles include:
- **JLL**, real estate and investment management firm (multiple locations)
- **Cushman & Wakefield**, commercial real estate services (multiple locations)
- **CBRE**, commercial real estate services (multiple locations)
- **Clean Harbors**, environmental and industrial services (multiple locations)
- **The Michaels Organization**, housing solutions (multiple locations)

Middlesex County, Bergen County, and Essex County were the regions of New Jersey that had the highest number of job postings for Maintenance & Repair Worker roles from August 2023 to August 2024.[241]

Available Training Options

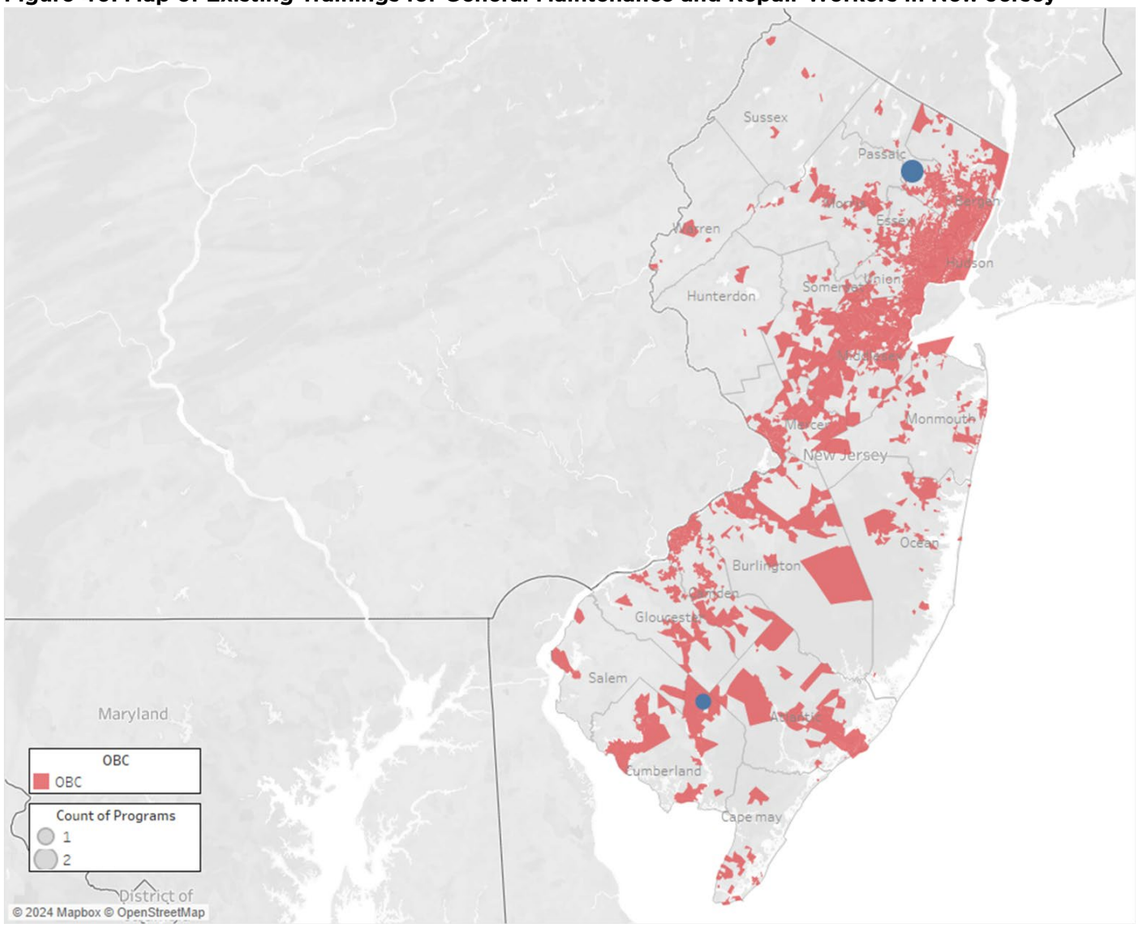
In New Jersey, trainings for General Maintenance and Repair Workers are rare, with the few training programs located in only two counties across the state—Passaic County and Cumberland County (Figure 40). Additional fully virtual trainings for this occupation, which are not displayed in Figure 40, are offered as well. Programs for General Maintenance and Repair Workers are offered at the following institutions in New Jersey:

240 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes499071.htm & New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

241 Based on active job postings in New Jersey for Maintenance and Repair Workers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

- Passaic County Technical Institute
- Institute for Contemporary Careers
- Rowan College of South Jersey-Cumberland Campus
- Bergen Community College
- Warren County Community College

Figure 40. Map of Existing Trainings for General Maintenance and Repair Workers in New Jersey[242]



Career Transition Potential

This section focuses on professions with minimal additional training that could readily transfer into a General Maintenance and Repair Worker role due to their comparable skill and experience levels. The majority of these jobs are found in the installation, maintenance, and repair occupational group; the remaining are found in the building and grounds cleaning and maintenance occupational group, the production occupational group, or the transportation and material moving occupational group (Table 53).

242 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Table 53. Transferable Occupations and Their Employment and Wages in New Jersey[243] [244]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Maintenance and Repair Workers, General	34,890	$23.26	High school diploma or equivalent
Motorcycle Mechanics	180	$22.96	Post-secondary certificate
Electric Motor, Power Tool, and Related Repairers	320	$18.94	High school diploma or equivalent
Transportation Inspectors	1,300	$22.48	High school diploma or equivalent
Electronic Equipment Installers and Repairers, Motor Vehicles	130	$21.87	High school diploma or equivalent
Medical Appliance Technicians	270	$20.52	High school diploma or equivalent

243 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

244 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

OPERATING ENGINEERS AND OTHER CONSTRUCTION EQUIPMENT OPERATORS (47-2073)[245]

Overview

The Operating Engineers and Other Construction Equipment Operators workforce in New Jersey is notably dominated by White males, with 99% of workers identifying as male and over three-quarters (76.5%) identifying as White. There is much room for diversity growth within this occupation in the state.

For those seeking higher wages, several related roles—such as Paving, Surfacing, and Tamping Equipment Operators, Pile Driver Operators, Highway Maintenance Workers, and Crane and Tower Operators—share similar educational requirements and can serve as effective stepping stones to an Operating Engineer position. As of 2023, New Jersey has approximately 6,960 workers in this field, with a location quotient of 0.56, while the national employment stands at 468,000.

Projections indicate a 4.2% growth in national employment from 2023 to 2033 for Operating Engineers, an even larger growth projection in New Jersey at 5.0% from 2022 to 2032, and additional growth expected in the state's energy economy from climate and clean energy-related investments. However, access to training programs for these roles in New Jersey is limited and unevenly distributed across the state, creating challenges for individuals, particularly those in Overburdened Communities (OBCs), who may lack reliable transportation to attend training in other counties. This disparity is a critical consideration for recruitment efforts aimed at expanding workforce participation in this sector.

245 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 54. Summary of Occupation Data[246]

Employment (NJ, 2023)	6,960 workers
Location Quotient (NJ, 2023)[247]	0.56
Median Annual Wage (NJ, 2023)	$81,580
Median Hourly Wage (NJ, 2023)	$39.22
Demographics (NJ, 2024)	1.0% Female 28.8% Hispanic or Latino Ethnicity 23.5% People of Color 25.5% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	Up to a year of on-the-job training and/or an apprenticeship
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	4.0-<6.0[248]
Industries with Highest Employment Levels (National, 2023)	Other Specialty Trade Contractors: 113,460 Local Government Excluding Schools and Hospitals (OEWS Designation): 63,420 Utility System Construction: 58,910

Job Description

Operating Engineers and Other Construction Equipment Operators (Operators) operate the heavy equipment used in construction such as derricks, scrappers, and bulldozers. Using this machinery, they transport earth and various other materials, clear sites in preparation for new projects, pour hard surface pavements like concrete, and more. In addition, Operators typically repair and maintain their large equipment.[249]

Wages

The median annual wage for these Operators is nearly $81,600 in New Jersey, greater than the national median wage of $56,200 a year. The annual wages in New Jersey range from $65,000 at the 25th percentile to $118,900 at the 75th percentile. This 75th percentile wage for Operators in New Jersey is significantly higher (by $45,900) than that at the national level, which reaches almost $73,000 a year. With respect to national construction and extraction occupations overall, New Jersey Operators earn more by an even larger margin than national Operators. The wages for all three groups are shown in Table 55.

246 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472073.htm

247 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

248 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Operating Engineers and Other Construction Equipment Operators. Accessed August 2024. https://www.onetonline.org/link/details/47-2073.00

249 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472073.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-equipment-operators.htm

Table 55. Wage Distribution, 2023[250]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Operating Engineers and Other Construction Equipment Operators (New Jersey)	Annual	$65,060	$81,580	$118,870
Operating Engineers and Other Construction Equipment Operators (New Jersey)	Hourly	$31.28	$39.22	$57.15
Operating Engineers and Other Construction Equipment Operators (National)	Annual	$46,270	$56,160	$72,970
Operating Engineers and Other Construction Equipment Operators (National)	Hourly	$22.25	$27.00	$35.08
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

There are almost no females employed as Operators in the State of New Jersey as 99% of current workers in this occupation are males. While Hispanic or Latino workers comprise 29% of these workers in New Jersey, over three-quarters (76.5%) are white. Among the workers of color, Black workers and multiracial[251] workers make up the majority, together representing 22% of total Operators in the state. Most current workers are over the age of 34, with 45% between 35 and 54 years of age and one-quarter (25.5%) aged 55 years and older (Table 56).

Table 56. Demographic Distribution in New Jersey, 2024Q1[252]

Demographic Type	Demographic	% of Current Workers
Sex	Male	99.0%
	Female	1.0%
Ethnicity	Hispanic or Latino	28.8%
	Not Hispanic or Latino	71.2%
Race	White	76.5%
	Black	10.9%
	Asian	1.1%
	American Native[253]	0.8%
	Pacific Islander	0.0%
	Two or More Races	10.8%
Ages	16 to 24 Years	7.6%
	25 to 34 Years	21.7%
	35 to 54 Years	45.2%
	55 Years and Over	25.5%

250 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

251 The U.S. Bureau of Labor Statistics and JobsEQ multiracial workers as "two or more races."

252 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Operating Engineers and Other Construction Equipment Operators across all industries in New Jersey and not specific to the green economy industries.

253 JobsEQ reports this as "American Indian," what is classified here as "American Native"

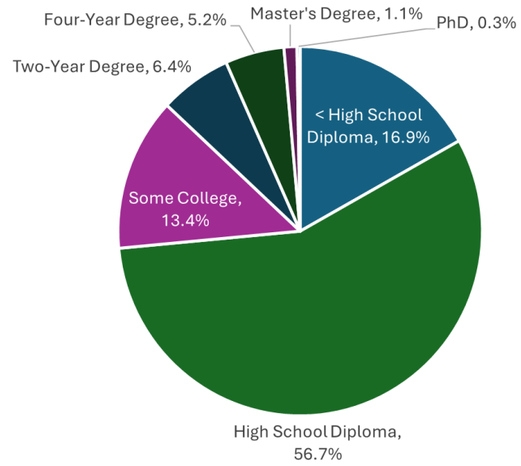
Education, Certifications, Experience & Skill Requirements

Education

To become an Operating Engineer or Other Construction Equipment Operator, workers in New Jersey typically need a high school diploma or equivalent to begin learning and training. These Operators often learn the trade through an apprenticeship or a vocational school education, both of which provide a solid foundation of skills and knowledge.[254]

Almost three-fifths (57%) of all Operating Engineers and Other Construction Equipment Operators have earned at most a high school diploma or equivalent. Nearly one-fifth have attended some college (13%) or attained a two-year degree (6.4%), while 17% have not received a high school diploma or equivalent (Figure 41).

Figure 41. Educational Attainment of Current Workers in New Jersey[255]



Certifications

New Jersey requires a certification for workers operating certain types of construction equipment such as cranes, forklifts, boilers, and pressure vessels but does not require licensure or certification for every type of equipment that Operating Engineers and Other Construction Equipment Operators use.[256] Despite this, Operators can still benefit from receiving additional certifications to demonstrate their specialization or expertise, as shown below in Table 57.

254 U.S. Department of Labor. O*Net. Operating Engineers and Other Construction Equipment Operators. Accessed September 2024. https://www.onetonline.org/link/details/47-2073.00

255 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

256 My Career New Jersey. Operating Engineers and Other Construction Equipment Operators. Accessed 19 August 2024. https://mycareer.nj.gov/occupation/47-2073
& Business.NJ.gov. Licensing and Certification Guide. Accessed September 2024. https://business.nj.gov/licensing-and-certification-guide

Table 57. Top Operating Engineer and Other Construction Equipment Operator Certifications

Certification	Area of Expertise	Provider
Operating Engineers Certification Program	Operating competency	International Union of Operating Engineers (IUOE)
Machine-Specific Operator	Operation of a particular type of machinery (crane, concrete pumps, lift, rigger, etc.)	National Commission for the Certification of Crane Operators
Forklift Inspector & Operator	Inspection and operation of industrial or rough-terrain forklifts	Crane Institute of America
Forklift Operator	Forklift safety in industrial, transportation, warehouse industries	National Safety Council
Certification	Area of Expertise	Provider
Oil Monitoring Analyst	Machinery oil monitoring	Society of Tribologists and Lubrication Engineers
Certified Equipment Manager (CEM)	Heavy off-road equipment or gov. fleets management	Association of Equipment Management Professionals
Heavy Equipment Operations curriculum	Foundational skills for working with light-duty and heavy equipment including utility tractors, forklifts, loaders, dozers, motor graders, etc.	National Center for Construction Education and Research (NCCER)

General certifications often in demand for these Operators by employers both in New Jersey and nationally include:[257]

- Driver's License
- Commercial Driver's License (CDL)
- Class A Commercial Driver's License (CDL-A) (Both)
- OSHA 30

Experience

New workers may gain experience through on-the-job training or apprenticeship programs. According to the U.S. Department of Labor's O*NET database, 30% of workers in this occupation reported needing up to one month of training, over 20% reported needing up to three months, and 21% revealed that up to a year of on-the-job training was necessary.[258] They typically start with operating lighter equipment and move to heavier and more complex equipment as they become more experienced.[259] Of over 200 active job postings in New Jersey for Operating Engineers and Other Construction Equipment Operators from August 2023 to August 2024, employers who posted 85% of all the job ads sought workers with some level of previous work experience. Three-in-ten job ads did not specify the length of time that the employers required while one-third (33%) of postings indicated that the employers were seeking 1-3 years of experience and another almost half (49%) sought workers with 1-5 years of experience.[260]

257 U.S. Department of Labor. O*Net. Operating Engineers and Other Construction Equipment Operators. Accessed August 2024. https://www.onetonline.org/link/details/47-2073 & based on active job postings in the U.S. and New Jersey for Operating Engineers and Other Construction Equipment Operators between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

258 U.S. Department of Labor. O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html

259 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-equipment-operators.htm

260 Based on 243 active job postings in the U.S. and in New Jersey for Operating Engineers and Other Construction Equipment Operators between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

Skills

General skills, abilities, and knowledge desired for Operating Engineers and Other Construction Equipment Operators by employers include:[261]

- Heavy Equipment Operation
- Excavators
- Backhoes
- Skid Steers
- End Loaders
- Ability to Lift 41-100 lbs.
- Bulldozers
- Using Ladders
- Dump Truck Operation

In addition, New Jersey employers typically seek Operating Engineers and Other Construction Equipment Operators with proficiency in the following technologies:[262]

- Oracle PeopleSoft
- Microsoft Office Suite software including Excel and Outlook

Unionization

Opportunities for unionization among Operating Engineers and Other Construction Equipment Operators exist with the International Union of Operating Engineers (IUOE) for instance. Those who are members of a union tend to receive higher wages and other benefits than their nonunion counterparts. In New Jersey, unionized construction and extraction jobs received an average hourly wage of $42.15 in 2022, while the non-unionized jobs earned $30.44.[263]

Employment Outlook in New Jersey

The location quotient of Operating Engineers and Other Construction Equipment Operators in New Jersey is 0.56, meaning that the state has a smaller concentration of these workers in the state in comparison to the country.

The U.S. Bureau of Labor Statistics projects that this occupation will grow by just over 4% from 2023 to 2033 and have 41,500 job openings each year to replace workers who leave due to various circumstances, such as retirement. In comparison, over the next decade, the state's overall economy is projected to grow by 5.0%, and its energy economy is estimated to support over 500 additional Operating Engineers and Other Construction Equipment Operators from 2022 to 2035, largely in the green infrastructure sector (214 workers) (Table 58).

261 Based on active job postings in the U.S. and in New Jersey for Operating Engineers and Other Construction Equipment Operators between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Operating Engineers and Other Construction Equipment Operators. Accessed August 2024. https://www.onetonline.org/link/details/47-2073

262 Based on active job postings in the U.S. and in New Jersey for Operating Engineers and Other Construction Equipment Operators between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Operating Engineers and Other Construction Equipment Operators. Accessed August 2024. https://www.onetonline.org/link/details/47-2073

263 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

Table 58. Employment Outlook[264]

Employment (NJ, 2023)	6,960 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+508 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+305 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+5.0%
Location Quotient (NJ, 2023)	0.56
Employment (National, 2023)	468,000
Forecasted Employment Percent Change (National, 2023-2033)	+4.2%
Occupational Openings, Annual Average (National, 2023-2033)	41,500
Industries with Highest Employment Levels (National, 2023)	Other Specialty Trade Contractors: 113,460 Local Government Excluding Schools and Hospitals (OEWS Designation): 63,420 Utility System Construction: 58,910

Employers in New Jersey

Employers of Operating Engineers are similar to those of other construction and extraction occupations in New Jersey, including:

- **HPC Industrial**, industrial cleaning company (multiple locations)
- **Clean Harbors**, environmental and industrial services (multiple locations)
- **Len The Plumber**, plumbing and HVAC solutions (multiple locations)
- **Republic Services**, environmental service and waste solutions (multiple locations)

All ten of the employers with the most Operating Engineer-related job postings from August 2023-2024 were private sector companies. Middlesex County, Camden County, and Somerset County had the most job postings for Operating Engineers from August 2023 to August 2024.[265]

Available Training Options

It may take up to a year of on-the-job training for Operators to learn the trade through hands-on experience. Some Operators choose to complete apprenticeships that last 3 or 4 years, depending on the program.[266]

While there are not many training programs available for Operating Engineers and Other Construction Equipment Operators in New Jersey, the ones that do exist are spread across the state. There are several counties that do not have any training, however, which may add constraints on individuals who need to travel to another

264 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472073.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

265 Based on active job postings in New Jersey for Operating Engineers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

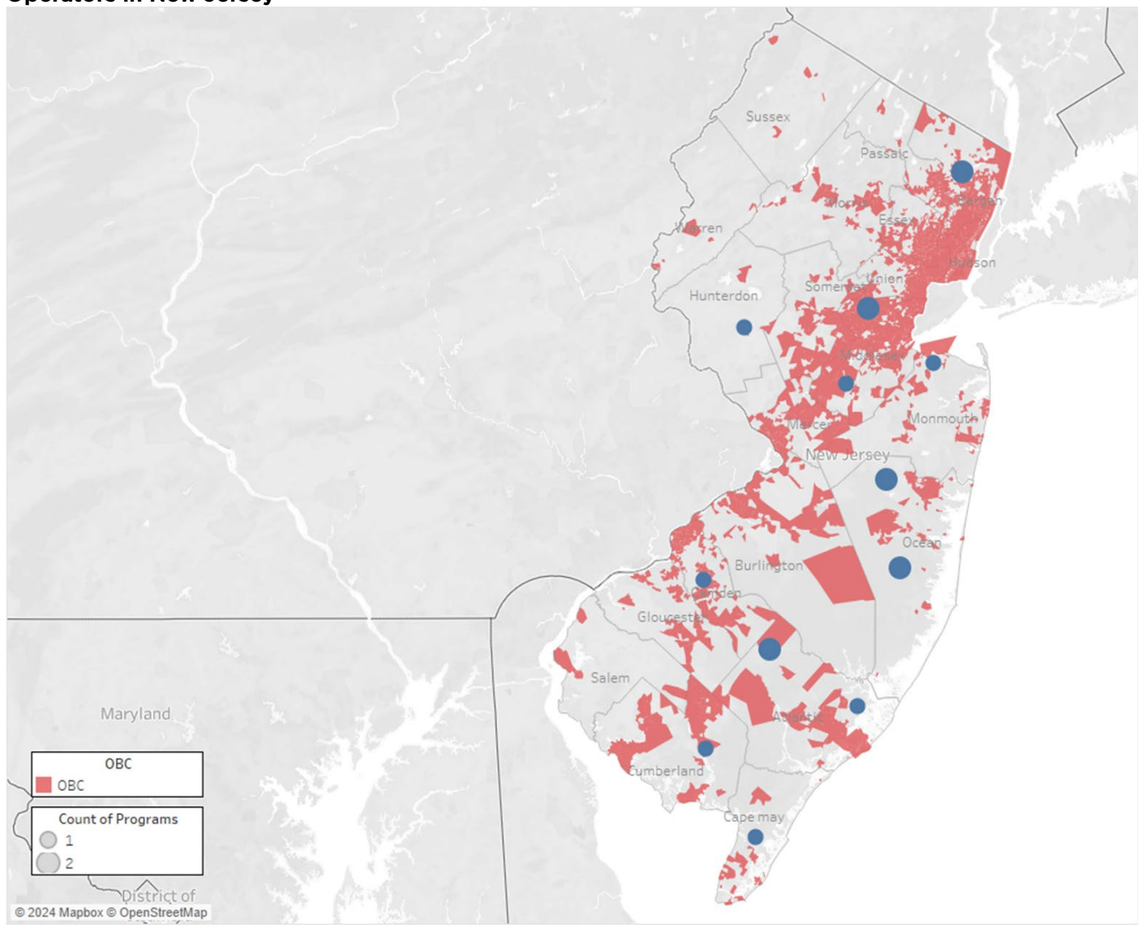
266 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/construction-equipment-operators.htm

county to attend the programs. This is an important factor to consider throughout recruitment efforts for this occupation, especially when targeting residents of Overburdened Communities (OBCs), as defined by the state's Environmental Justice Law, who may not have access to reliable transportation to travel to other counties (Figure 42).

Locally, workers in New Jersey have access to training programs for construction equipment operations offered by various institutions, including:

- Vocational Technical Schools of Cape May, Hunterdon, Monmouth, and Ocean Counties
- Eastern Atlantic States Carpenters Technical Centers
- Absegami High School
- Lincoln Technical Institute
- Medical Construction Industrial Training Center, LLC
- Bergen Community College
- International Union of Operating Engineers 825

Figure 42. Map of Existing Trainings for Operating Engineers and Other Construction Equipment Operators in New Jersey[267]



267 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Career Transition Potential

This section identifies occupations that require similar skills and experience levels to those of Operating Engineers and Other Construction Equipment Operators, making it easier for workers in these occupations to transition into these Operator roles with minimal additional preparation. These jobs are primarily within the construction and extraction and transportation occupational group, with one categorized as a material moving occupation, and they typically require a high school diploma or equivalent for entry-level positions (Table 59).

Table 59. Transferable Occupations and Their Employment and Wages in New Jersey[268] [269]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Operating Engineers and Other Construction Equipment Operators	6,960	$39.22	High school diploma or equivalent
Paving, Surfacing, and Tamping Equipment Operators	780	$24.17	High school diploma or equivalent
Pile Driver Operators	70	$33.35	High school diploma or equivalent
Highway Maintenance Workers	6,120	$23.53	High school diploma or equivalent
Crane and Tower Operators	670	$39.37	High school diploma or equivalent

268 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

269 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

PLUMBERS, PIPEFITTERS, AND STEAMFITTERS (47-2152)[270]

Overview

Plumbers, Pipefitters, and Steamfitters (Plumbers and Fitters) work with the piping systems that carry liquids, gases, and other substances in all types of buildings and infrastructure. The plumbing workforce in New Jersey reveals notable disparities, with only 2.2% of workers identifying as female and 28% as people of color. Just over one-in-five Plumbers and Fitters in New Jersey are aged 55 years and over. Entry into this profession is a strong pathway to a well-paying job for workers from other fields or roles, many of which are considered high-priority roles in this job study as well.

As of 2023, there are almost 10,000 individuals in New Jersey employed as a Plumber or Fitter, with a national forecasted employment growth of 5.6% from 2023 to 2033 and a state forecasted employment growth of 4.8% from 2022 to 2032, based on recent trends. Additional growth of around 2,500 Plumbers and Fitters is projected within the state's energy economy. In New Jersey, plumbing training programs are predominantly located in the northeast, leaving certain regions, such as the northwest and southwestern counties, with limited options. Training opportunities are available through various institutions, including vocational-technical schools, local unions, and community colleges, though access varies across the state.

270 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 60. Summary of Occupation Data[271]

Employment (NJ, 2023)	9,560 workers
Location Quotient (NJ, 2023)[272]	0.79
Median Annual Wage (NJ, 2023)	$78,450
Median Hourly Wage (NJ, 2023)	$37.72
Demographics (NJ, 2024)	2.2% Female 34.4% Hispanic or Latino Ethnicity 28.0% People of Color 22.7% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	Long-term on-the-job training or apprenticeship[273]
Certification/Licensure Requirements	State licensure
Certification Levels	Apprentice, Journey-level Plumber, Master Plumber
Specific Vocational Preparation (National)	6.0-7.0[274]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 318,630 Utility System Construction: 15,500 Local Government, excluding Schools and Hospitals: 9,740

Job Description

Plumbers and Fitters ensure residential, commercial, and industrial buildings have the necessary infrastructure to enable the transportation of liquids, gases, and other substances. They are responsible for installing, maintaining, and repairing the piping systems in which these elements travel. They use instruments like saws, cutting torches, pipe benders, and pipe threaders to cut, thread, or hammer pipes to precise lengths. Additionally, to assemble these pipe sections, they perform basic welding activities like soldering and brazing using various materials such as couplings, clamps, screws, bolts, cement, plastic solvent, caulk, and other welding equipment. After a completed job, they will often use various techniques and equipment, including hydrostatic testing, pressure gauges, and more, to inspect, evaluate, and test the installed piping systems.[275]

Both Plumbers and Fitters are generally responsible for performing all the previously mentioned activities; however, there are differences in their areas of expertise. Plumbers will typically work with low-pressure systems, such as drainage, waste, and other water systems. Conversely, Pipefitters and Steamfitters, also referred to simply as "Fitters," more frequently work with high-pressure systems that carry substances such as steam, heat, fuel, or chemicals.[276]

271 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472152.htm

272 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

273 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/plumbers-pipefitters-and-steamfitters.htm#tab-4

274 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2152.00

275 U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed August 2024. https://www.onetonline.org/link/summary/47-2152.00 & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/plumbers-pipefitters-and-steamfitters.htm#tab-4

Wages

The salary for Plumbers and Fitters varies significantly in New Jersey across the 25th, 50th, and 75th percentiles. Table 61 illustrates this disparity in earnings, with an annual wage of approximately $61,500 at the 25th percentile, and nearly doubling to over $117,000 at the 75th percentile. The median annual wage for Plumbers and Fitters working in New Jersey is almost $78,500.

The wages in the state are much higher than those seen in the rest of the country, as the median annual wage for Plumbers and Fitters nationally is around $61,500, or nearly $17,000 below the New Jersey wage. Compared to the construction and extraction occupational group at the national level, there is an even greater difference, with New Jersey Plumbers and Fitters earning approximately $22,800 more than overall construction and extraction workers at the 50th percentile.
Table 61. Wage Distribution, 2023[277]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Plumbers, Pipefitters, and Steamfitters (New Jersey)	Annual	$61,510	$78,450	$117,110
Plumbers, Pipefitters, and Steamfitters (New Jersey)	Hourly	$29.57	$37.72	$56.30
Plumbers, Pipefitters, and Steamfitters (National)	Annual	$47,810	$61,550	$80,190
Plumbers, Pipefitters, and Steamfitters (National)	Hourly	$22.99	$29.59	$38.56
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

The percentage of female Plumbers and Fitters in New Jersey is astonishingly low at only 2%. Around one-third (34%) of these Plumbers and Fitters identify as Hispanic or Latino and 28% identify as a race other than White. Notably, 16% the workers are Black and 8% are multiracial.[278] Lastly, of the current Plumbers and Fitters working in New Jersey, the largest share (43.9%) are 35 to 54 years of age, while almost 23% are 55 years of age or older (Table 62).

276 Ibid.

277 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

278 The U.S. Bureau of Labor Statistics and JobsEQ multiracial workers as "two or more races."

Table 62. Demographic Distribution in New Jersey, 2024Q1[279]

Demographic Type	Demographic	% of Current Workers
Sex	Male	97.8%
	Female	2.2%
Ethnicity	Hispanic or Latino	34.4%
	Not Hispanic or Latino	65.6%
Race	White	72.0%
	Black	16.4%
	Asian	3.3%
	American Native[280]	0.5%
	Pacific Islander	0.0%
	Two or More Races	7.8%
Ages	16 to 24 Years	10.2%
	25 to 34 Years	23.2%
	35 to 54 Years	43.9%
	55 Years and Over	22.7%

Education, Certifications, Experience & Skill Requirements

Education: Completion of a four-year degree program is mandated by the State of New Jersey prior to becoming a licensed Plumber or Fitter. This can be done by attaining a bachelor's degree from an accredited college or university that offers mechanical, sanitary, or plumbing engineering programs. Once graduated, these students must complete a year of on-the-job training as either an apprentice or journey-level worker in order to obtain the state license. Workers also have the option to complete an approved four-year apprenticeship program instead, though they must also be actively employed as a journey-level plumber for one year to become licensed.[281] The U.S. Department of Labor's O*NET database sets the importance of an apprenticeship for Plumbers and Fitters at 4.17 on a scale of 1 to 5, highlighting their importance not just in New Jersey, but at the national level.[282]

In New Jersey, the highest level of education for nearly half (48%) of current Plumbers and Fitters is a high school diploma, making up the largest category of education level by percentage. The share of workers who have attended some college, received a two-year degree, or received a four-year degree, make up about 38% of the workforce combined (Figure 43).

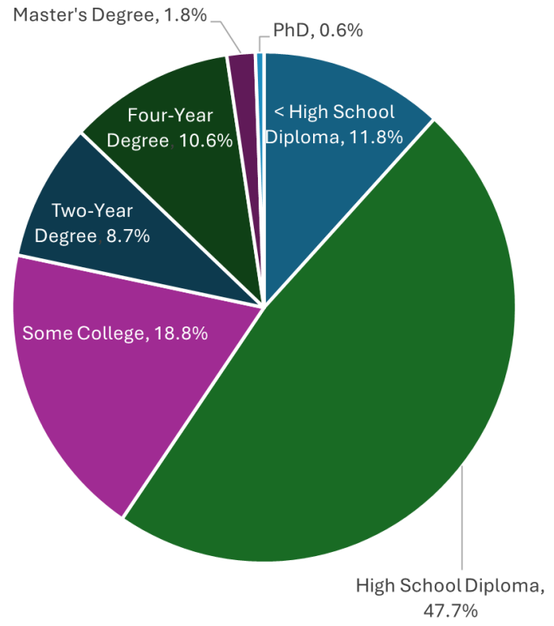
279 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Plumbers, Pipefitters, and Steamfitters across all industries in New Jersey and not specific to the green economy industries.

280 JobsEQ reports this as "American Indian," what is classified here as "American Native"

281 New Jersey Department of Law and Public Safety. State Board of Examiners of Master Plumbers Law. https://www.njconsumeraffairs.gov/Statutes/master-plumber-law.pdf

282 U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed September 2024. https://www.onetonline.org/link/summary/47-2152.00

Figure 43. Educational Attainment of Current Workers in New Jersey[283]



Certification

The State of New Jersey mandates that anyone who wishes to practice plumbing, pipefitting, or steamfitting independently obtains a Master Plumber License. Apprentices and journey-level plumbers who are still in the process of learning the trade and gaining experience cannot yet apply for a Master Plumber License. Still, they must be registered with the State Board of Examiners of Master Plumbers and work under the supervision of a Master Plumber with a license. In addition, apprentices must be in a program approved by the U.S. Department of Labor. Once the apprenticeship is completed, a journey-level plumber working under the supervision of a Master Plumber for at least 3 years can obtain a Supervisor Journey worker Plumber designation.[284] Plumbers and Fitters can also seek additional specialized certifications, such as the ones shown in (Table 63).

283 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

284 Service Titan. "New Jersey Plumbing License: How to Become a Plumber in New Jersey." Accessed August 2024. https://www.servicetitan.com/licensing/plumbing/new-jersey

Table 63. Top Plumber, Pipefitter, and Steamfitter Certifications

Certification	Area of Expertise	Provider
Master Plumber	General plumbing expertise	New Jersey Division of Consumer Affairs
Landscape Irrigation Contractor	Water supply and wastewater treatment	Board of Landscape Irrigation Contractors
Plumbing Inspector	Construction codes and standards	National Inspection, Testing and Certification Corporation; International Association of Plumbing and Mechanical Officials; International Code Council
Pump Installer	Well pump installation and repair	New Jersey Department of Environmental Protection
Well Driller	Well construction and installation	
Underground Storage Tank Servicer	Underground storage and heating oil tank installation and repair	
Tankerman	Maritime vessel plumbing	United States Coast Guard National Maritime Center
Plumbing	Foundational plumbing knowledge and skills	National Center for Construction Education and Research (NCCER)
Pipefitting	High- and low-pressure piping system installation	
Manual & Hand-Held Power Threading Certification	Piping materials and threading concepts and equipment	National Coalition of Certification Centers (NC3) and RIDGID
Power Machine Threading Certification	Operating machines for piping threading	
Pressing for HVAC and Plumbing Certification	Piping materials and principles & powered press tool operations	

General and widely recognized certifications for Plumbers and Fitters that are highly sought after by employers in New Jersey include:[285]

- Driver's License
- OSHA 10
- OSHA 30
- Transportation Worker Identification Credential (TWIC)
- Commercial Driver's License (CDL)
- EPA Section 608 Certification (EPA 608)
- Certified Welder

Experience

In addition to the experience gained through their education, the State requires 1 year or 1,200 hours of experience prior to applying for a Master Plumber License. However, many employers seek candidates with more work experience ranging from 2 to 5 years.[286]

285 U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed September 2024. https://www.onetonline.org/link/summary/47-2152.00 & based on active job postings in New Jersey for Plumbers, Pipefitters, and Steamfitters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

286 U.S. Department of Labor. O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html & based on active job postings in the U.S. and New Jersey for Plumbers, Pipefitters, and Steamfitters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

Skills

General skills, abilities, and knowledge desired for Plumbers and Fitters by employers in New Jersey and across the country include:[287]

- Knowledge of plumbing systems and pipe fitting
- Knowledge of HVAC systems
- Knowledge of water systems
- Ability to use water treatment equipment
- Ability to weld and solder
- Ability to use hand and power tools
- Mechanical knowledge
- Familiarity with equipment such as boilers, sump pumps, evaporators, etc.
- Ability to Lift 41-100 lbs.

In addition, employers, both in New Jersey and nationally, frequently seek Plumbers and Fitters with proficiency in the following technologies:[288]

- Oracle PeopleSoft
- Microsoft Office Suite software including Word, Excel, and PowerPoint
- Accounting software such as Intuit QuickBooks, job costing software, and Quicken
- Computer-aided design (CAD) software
- Project management and piping construction cost estimation software
- Webpage creation and editing software

Unionization

Plumbers tend to be highly unionized, especially those who work on commercial, industrial, and municipal projects and live in major cities. The United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry in the United States and Canada (UA) is one of the largest labor organizations for Plumbers and Fitters.[289] There are many advantages that workers receive as a member of a union, including higher wages and better benefits than non-members. In New Jersey, overall construction and extraction workers who were members of a union earned an average hourly wage of $42.15 in 2022, approximately $12 an hour more than what non-union workers made at $30.44 an hour.[290]

Employment Outlook in New Jersey

With respect to the national average, New Jersey has a smaller concentration of Plumbers and Fitters, with a location quotient of 0.79. This lower prevalence may create a constraint on the state as its demand for these workers increases and competes with the projected national growth. The US. Bureau of Labor Statistics projects that over the next decade, Plumber and Fitter employment will increase by 5.6% nationally and have over 43,000 annual job openings as employed workers retire or leave for other reasons. Thus, nationwide, there will be increasing demand for new Plumbers and Fitters to

287 Based on active job postings in the U.S. and in New Jersey for Plumbers, Pipefitters, and Steamfitters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed September 2024. https://www.onetonline.org/link/summary/47-2152.00

288 Based on active job postings in the U.S. and in New Jersey for Plumbers, Pipefitters, and Steamfitters between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Plumbers, Pipefitters, and Steamfitters. Accessed September 2024. https://www.onetonline.org/link/summary/47-2152.00

289 The United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry. https://ua.org/about-the-ua/

290 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

replace retiring and exiting workers, with an expected total employment growth of over 26,000 net new jobs by 2033. Meanwhile, New Jersey's overall economy is expected to grow by almost 5% while its energy economy is projected to support an additional 2,500 new Plumbers between 2022 and 2035 (Table 64).

Table 64. Employment Outlook[291]

Employment (NJ, 2023)	9,560 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+2,489 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+468 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+4.8%
Location Quotient (NJ, 2023)	0.79
Employment (National, 2023)	473,400
Forecasted Employment Percent Change (National, 2023-2033)	+5.6%
Occupational Openings, Annual Average (National, 2023-2033)	43,300
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 318,630 Utility System Construction: 15,500 Local Government, excluding Schools and Hospitals: 9,740

Employers in New Jersey

Some of the popular employers that have had numerous job openings for plumbing positions in New Jersey over the last year include:

- **Roto Rooter Services Company**, plumbing company (Runnemede and Cranbury, NJ)
- **Len The Plumber**, plumbing and HVAC solutions (multiple locations)
- **Rutgers University**, public research university (multiple locations)
- **Allied Experts Heating & Air Conditioning of NJ**, heating contractor (multiple locations)

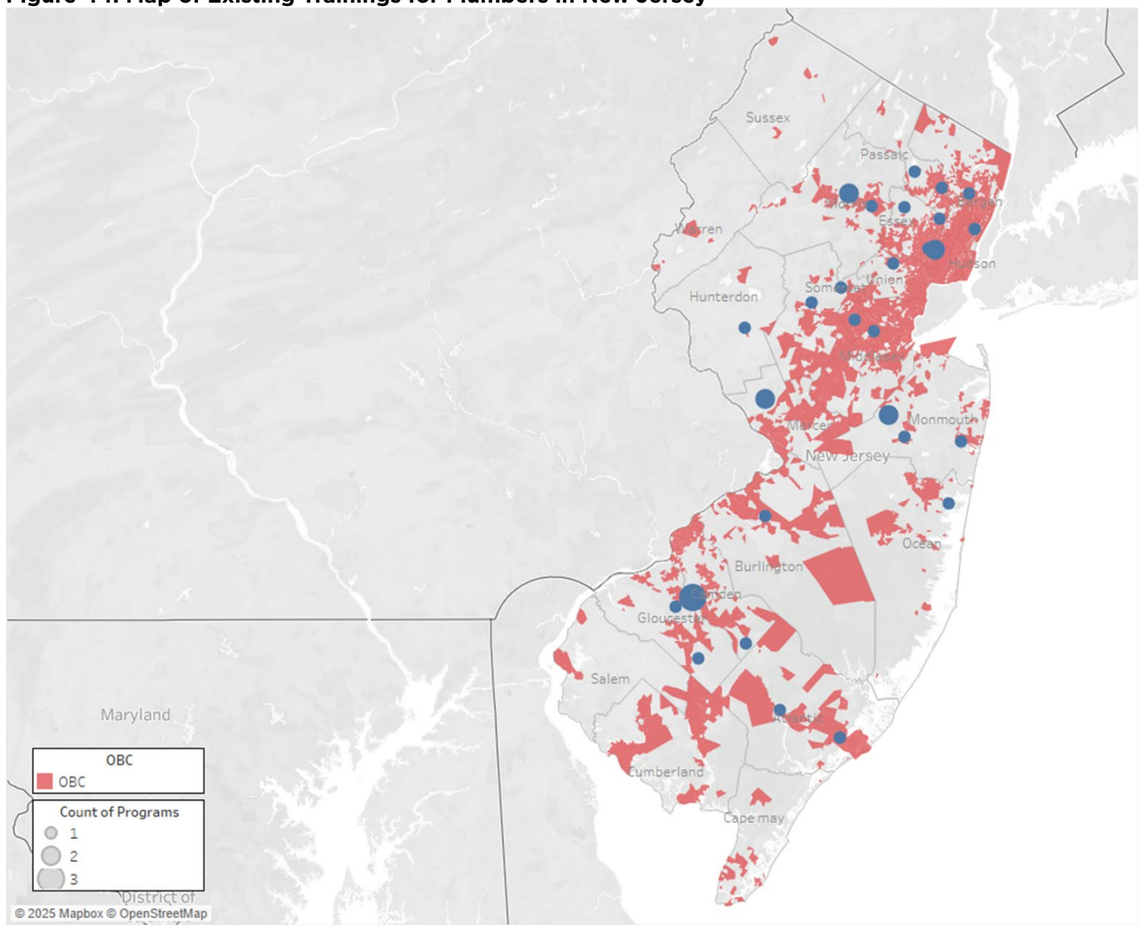
Middlesex County, Mercer County, and Essex County had the most job postings for Plumbers in New Jersey from August 2023 to August 2024.[292]

Available Training Options

Publicly listed plumbing trainings in New Jersey tend to be concentrated in the northeast corner of the state. There are no programs in the northwest, Sussex, and Warren Counties, and in the southern counties of Salem, Cumberland, and Cape May. In the southern part of the state, there are offerings between Philadelphia and Atlantic City, but most southern counties have limited options (Figure 44).
Locally, workers in New Jersey have access to plumbing trainings offered by various institutions, including:

- Vocational Technical Schools of Bergen, Essex, Mercer, Middlesex, Monmouth, Morris, Ocean, Somerset, and Sussex Counties
- Institutes of Technology of Atlantic, Burlington, and Gloucester Counties
- The United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry (Local Unions 9, 24, 274, 332, 475)
- Camden County College
- Delsea CTE
- Eastwick College-Nutley
- Eastwick Education - HoHoKus School of Trade
- Edison Job Corp Center
- Essex Community College
- Hudson Training Center
- Hunterdon County Vocational School District - Adult and Continuing Education
- Ideal Institute of Technology
- Mechanical Contractors Association of New Jersey
- Passaic County Technical Institute

Figure 44. Map of Existing Trainings for Plumbers in New Jersey[293]



291 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472152.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

292 Based on active job postings in New Jersey for Plumbers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

293 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Career Transition Potential

This section identifies occupations that require similar skills and experience levels to those of Plumbers, Pipefitters, and Steamfitters, making it easier for workers in these occupations to transition into Plumber and Fitter roles with minimal additional preparation. These transferable jobs are part of the construction and extraction and the installation, maintenance, and repair occupational groups (Table 65).

Table 65. Transferable Occupations and Their Employment and Wages in New Jersey[294] [295]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Plumbers, Pipefitters, and Steamfitters	9,560	$37.72	High school diploma or equivalent
Millwrights	310	$35.42	High school diploma or equivalent
Security and Fire Alarm Systems Installers	2,710	$28.73	High school diploma or equivalent
Carpenters*	13,400	$33.47	High school diploma or equivalent
Electricians*	14,350	$32.81	High school diploma or equivalent
Heating, Air Conditioning, and Refrigeration Mechanics and Installers*	10,360	$29.78	Postsecondary nondegree award
Maintenance and Repair Workers, General*	34,890	$23.26	High school diploma or equivalent

**Denotes Transferable occupations that are other priority occupations in this jobs study.*

294 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

295 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

SHEET METAL WORKERS (47-2211)[296]

Overview

A Sheet Metal Worker plays an important role in advancing the state's energy economy. Contributing to sustainable building practices and energy-efficient technologies, Sheet Metal Workers fabricate and assemble components and equipment needed for many energy technologies. New Jersey has a low concentration of Sheet Metal Workers compared to the overall United States, with a location quotient of 0.74. Most identify as white (75%) and male (93%), though the share of female workers among Sheet Metal Workers is higher than in many other construction and extraction occupations.

To become a Sheet Metal Worker, job seekers typically need a high school diploma or equivalent to begin learning the trade. Many workers gain the required skills through on-the-job training or apprenticeship programs. The wages for Sheet Metal Workers in New Jersey are greater than the national wages for both Sheet Metal Workers and general construction and extraction workers.

296 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 66. Summary of Occupation Data[297]

Employment (NJ, 2023)	2,380 workers
Location Quotient (NJ, 2023)[298]	0.74
Median Annual Wage (NJ, 2023)	$81,810
Median Hourly Wage (NJ, 2023)	$39.33
Demographics (NJ, 2024)	6.6% Female 22.2% Hispanic or Latino Ethnicity 17.3% People of Color 26.7% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent[299]
Minimum Training	A few months to one year of on-the-job training or a recognized apprenticeship program[300]
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	4.0-6.0[301]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 52,500 Fabricated Metal Product Manufacturing: 19,470 Foundation, Structure, and Building Exterior Contractors: 15,080

Job Description

Sheet Metal Workers fabricate, assemble, install, and repair sheet metal products and equipment, including ducts, control boxes, drainpipes, and furnace casings. Daily activities for these workers involve setting up and operating fabricating machines to cut, bend, and straighten sheet metal; using hammers to shape metal according to design; and soldering and welding to join metal parts. Sheet Metal Workers also inspect, assemble, and smooth the seams and joints of the final products for quality control.[302]

The skills of Sheet Metal Workers are utilized in many energy technologies. They may specialize as Duct Installers, fitting prefabricated sheet metal ducts for heating, air conditioning, and other systems, or contribute to the production of wind turbine, solar panel,[303] and battery storage components,[304] to name a few examples.

297 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed January 2025. https://www.bls.gov/oes/current/oes472211.htm.

298 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

299 U.S. Department of Labor. O*Net. Sheet Metal Workers. Accessed January 2025, https://www.onetonline.org/link/summary/47-2211.00.

300 U.S. Department of Labor. O*Net. Sheet Metal Workers. Accessed January 2025, https://www.onetonline.org/link/summary/47-2211.00.

301 The "Specific Vocational Preparation" value is defined by the US Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs. Source: U.S. Department of Labor. O*Net. Sheet Metal Workers. Accessed January 2025. https://www.onetonline.org/link/summary/47-2211.00

302 U.S. Department of Labor. O*Net. Sheet Metal Workers. Detailed Work Activities. https://www.onetonline.org/link/details/47-2211.00

303 Solar Energy Research Institute. Organized Labor and Solar Energy. 1979. https://www.nrel.gov/docs/legosti/old/148.pdf.

304 S.M.A.R.T. "Green, UNION jobs: SMART members continue to build our green future on Earth Day 2023." April 2023. https://www.smart-union.org/green-union-jobs-smart-members-continue-to-build-our-green-future-on-earth-day-2023/.

Wages

Sheet Metal Workers in New Jersey can earn a decent salary with their median annual wage being over $81,800. This wage is 39% higher than the national median for Sheet Metal Workers ($58,780) and 47% higher than the median for all Construction and Extraction occupations nationally ($55,680). This trend is even intensified at the 75th percentile (Table 67).

Table 67. Wage Distribution, 2023[305]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Sheet Metal Workers (New Jersey)	Annual	$50,720	$81,810	$115,490
Sheet Metal Workers (New Jersey)	Hourly	$24.38	$39.33	$55.52
Sheet Metal Workers (National)	Annual	$45,840	$58,780	$78,620
Sheet Metal Workers (National)	Hourly	$22.04	$28.26	$37.80
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Sheet Metal Workers in New Jersey primarily identify as male (93%) as opposed to female (7%). and roughly two-thirds of workers (68%) are above the age of 35. Less than one-quarter (22%) of these workers identify as Hispanic or Latino while exactly one-quarter (25%) identify as a race other than White (Table 68).

Table 68. Demographic Distribution in New Jersey, 2024Q1[306]

Demographic Type	Demographic	% of Current Workers
Sex	Male	93.4%
	Female	6.6%
Ethnicity	Hispanic or Latino	22.2%
	Not Hispanic or Latino	77.8%
Race	White	75.0%
	Black	14.8%
	Asian	2.0%
	American Native[307]	0.5%
	Pacific Islander	0.0%
	Two or More Races	7.6%
Ages	16 to 24 Years	8.3%
	25 to 34 Years	23.7%
	35 to 54 Years	41.3%
	55 Years and Over	26.7%

305 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed January 2025. https://www.bls.gov/oes/current/oes_stru.htm

306 JobsEQ®. 2024Q2. Based on Place of Residence estimates. Note that these data are for current Sheet Metal Workers across all industries in New Jersey and not specific to the green economy industries.

307 JobsEQ reports this as "American Indian," what is classified here as "American Native"

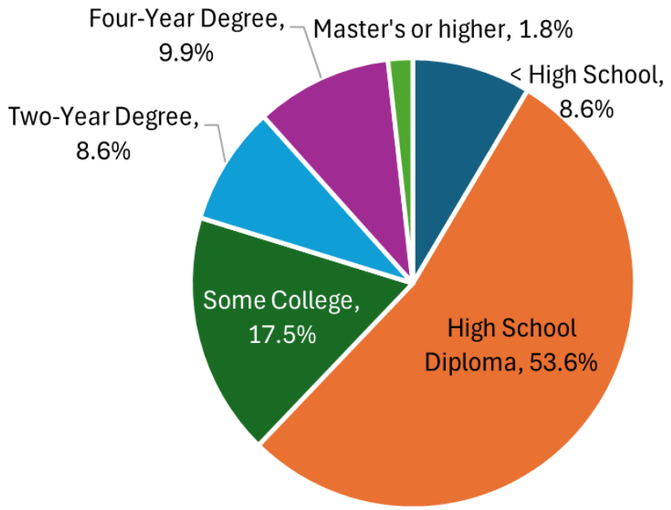
Education, Certifications, Experience & Skill Requirements

Education

According to data from O*NET, the typical education requirement for this occupation is a high school diploma.[308] In terms of job training, Sheet Metal Workers typically gain the necessary skills through apprenticeship or vocational-technical school programs.[309]

More than half (54%) of the Sheet Metal Workers employed in New Jersey have at most a high school diploma or equivalent. The second-largest share of these workers have attended some college but have not yet obtained a degree, representing 17.5% of the workforce. Only a small portion of the current Sheet Metal workforce in the state (8.6%) do not have a high school diploma (Figure 45).

Figure 45. Educational Attainment of Current Workers in New Jersey[310]



Certifications

New Jersey does not require any certifications or licenses from the Sheet Metal workforce. Some workers who are in, or looking to join, this occupation may obtain optional certifications to increase their job prospects (Table 69).

308 U.S. Department of Labor. O*Net. Sheet Metal Workers. Accessed January 2025, https://www.onetonline.org/link/summary/47-2211.00.

309 My Career New Jersey. Sheet Metal Workers. Accessed January 2025. https://mycareer.nj.gov/occupation/47-2211.

310 JobsEQ®. 2024Q2. Based on Place of Residence estimates.

Table 69. Top Electrician Certifications

Certification	Area of Expertise	Provider
OSHA Safety Certification	Workplace Safety, OSHA Standards	NJ Department of Labor and Workforce Development
Sheet Metal Workers Apprenticeship Completion Certificate	Welding Techniques, Confined Spaces Training, Installation, Maintenance, and Repair Techniques, and Testing, Adjusting, and Balancing Techniques	Sheet Metal Workers International Association
Advanced Welding Certification	STICK, MIG & TIG welding, Oxy/Acetylene & Plasma Cutting	

General and widely recognized certifications for Sheet Metal Workers that are currently in-demand by employers include:[311]

- Driver's License
- Certified Welder
- OSHA 30

Experience

Sheet Metal Workers primarily gain their experience through apprenticeship or technical school programs, which include hands-on learning modules. Further on-the-job training is generally not required, and the typical level of experience sought by employers is less than one year. [312]

Skills

General skills, abilities, and knowledge desired for Sheet Metal Workers by employers in New Jersey and across the country include:

- Familiarity with HVAC systems
- General mechanical and manufacturing knowledge
- Metal fabrication and welding skills and abilities
- Ability to use power tools
- Ability to use punch presses
- Ability to use gauges and tape measures
- Blueprint reading
- Familiarity with heat exchangers
- Ability to lift 51-100 lbs.
- Key technical skills may include the following:[313]
- Computer aided design CAD software
- Computer aided manufacturing CAM software
- Microsoft office suite software

Unionization

Sheet Metal Workers may choose to become members of unions or look for jobs with union-represented firms due to their ability to bargain for higher pay and greater

311 Based on active job postings in New Jersey and the U.S. for Sheet Metal Workers between January 2024 and January 2025. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed January 2025.

312 Based on active job postings in New Jersey and the U.S. for Sheet Metal Workers between January 2024 and January 2025. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed January 2025.

313 Based on active job postings in New Jersey and the U.S. for Sheet Metal Workers between January 2024 and January 2025. Source: JobsEQ. Real Time Intelligence (RTI) Job Postings. Data accessed January 2025.

benefits than their non-unionized peers. In 2022, the average hourly wage for unionized Sheet Metal Workers in the United States was $36.35, compared to $24.50 for nonunion Sheet Metal Workers.[314] The International Association of Sheet Metal, Air, and Transportation Workers (SMART) is the largest national union for Sheet Metal Workers with approximately 230,000 members.[315]

Employment Outlook in New Jersey

Currently, the location quotient of Sheet Metal Workers in New Jersey is 0.74, meaning that the concentration of these workers is 26% less than the average nationally. Between 2023 and 2033, Sheet Metal Workers across the country are anticipated to rise by 2.3% and the New Jersey Data Center anticipates employment to rise 3.0% in the state from 2022 to 2032. In addition to this growth, the number of energy economy Sheet Metal Workers is projected to grow in New Jersey, adding over 500 workers between 2022 and 2035, largely in the buildings sector (Table 70).

Table 70. Employment Outlook[316]

Employment (NJ, 2023)	2,380 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2033)	+531 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+121 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+3.0%
Location Quotient (NJ, 2023)	0.74
Employment (National, 2023)	124,200 workers
Forecasted Employment Percent Change (National, 2023-2033)	+2.3%
Occupational Openings, Annual Average (National, 2023-2033)	2,900
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 52,500 Fabricated Metal Product Manufacturing: 19,470 Foundation, Structure, and Building Exterior Contractors: 15,080

Employers in New Jersey

Some of the employers who posted job openings for Sheet Metal Workers in New Jersey in the last year include:

- **The Brothers that just do Gutters**, gutter contractor services (multiple locations)
- **Kooltronic**, thermal management product manufacturer (Pennington, NJ)
- **Interstate Air Conditioning & Heating**, HVAC contractor (multiple locations)
- **E.P. Homiek**, sheet metal fabrication and HVAC supply (Union, NJ and Lakewood, NJ)

In New Jersey, the three counties with the greatest number of job postings for Sheet Metal Workers in the last year include Burlington County, Middlesex County, and Ocean County.[317]

Available Training Options[318]

In New Jersey, trainings for Sheet Metal Workers are offered by schools and local sheet metal unions. These include the following:

- Burlington County Institute of Technology, Westampton
- International Association of Sheet Metal, Air, and Transportation Workers Local 22 & 25 & 27, Carlstadt, Kenilworth, Toms River
- Eastwick College, Paterson
- HoHoKus School of Trade, Paterson

Career Transition Potential

This section lists occupations that have comparable educational requirements and skillsets to Sheet Metal Workers, which may make it easier for workers to go from their current career to this one without needing to obtain a lot of additional training or knowledge. These jobs are mainly found in the construction and extraction and the installation, maintenance, and repair occupational groups (Table 71).

Table 71. Transferable Occupations and Their Employment and Wages in New Jersey[319] [320]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Sheet Metal Workers	2,380	$39.33	High school diploma or equivalent
Boilermakers	390	$39.26	Post-secondary nondegree award
Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Carpenters*	13,400	$33.47	High School Diploma
Layout Workers, Metal and Plastic	40	$24.69	High School Diploma
Plumbers, Pipe Fitters, Steamfitters*	9,560	$37.72	Post-secondary nondegree award

**Denotes transferable occupations that are other priority occupations in this jobs study.*

314 U.S. Bureau of Labor Statistics, Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

315 International Association of Sheet Metal, Air, Rail, and Transportation Workers. https://www.smart-union.org/who-we-are/

316 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed January 2025. https://www.bls.gov/oes/current/oes472211.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

317 Based on active job postings in New Jersey for Sheet Metal Workers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

318 This occupation was added to this report after the training inventory was completed and is therefore not included in the training inventory map or analysis.

319 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

320 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed January 2025. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

Solar Photovoltaic Installers (47-2231)[321]

Overview

Solar Photovoltaic (PV) Installers make up almost 1,500 workers in New Jersey as of 2023. This occupation's workforce faces significant racial disparities and lack of female representation, with less than 5% of workers identifying as female and just over one-quarter (27%) identifying as people of color. However, there is a larger representation of Hispanic and Latino workers who comprise 41% of the state's Solar PV Installers.

Roles in other fields, such as Commercial and Industrial Equipment, Electrical and Electronics Repairs, or General Maintenance and Repair Workers, offer potential for transition to a Solar PV Installer position, given their similar training and skill prerequisites. To enter the solar industry in New Jersey, workers typically need specified training and an electrical license from the state. Trainings for this occupation are primarily found in the state's northeastern corner.

The demand for Solar PV Installers is expected to increase dramatically over the next decade, with a forecasted employment growth of almost 50% across the country and 27% in New Jersey from 2022 to 2032. Clean energy and climate-related investments and policies will accentuate this growth. New Jersey's location quotient is high for this occupation at 2.16, meaning that the state has a higher-than-average concentration of Solar PV Installers than the national average.

321 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code.

Table 72. Summary of Occupation Data[322]

Employment (NJ, 2023)	1,460 workers
Location Quotient (NJ, 2023)[323]	2.16
Median Annual Wage (NJ, 2023)	$58,630
Median Hourly Wage (NJ, 2023)	$28.19
Demographics (NJ, 2024)	4.2% Female 40.6% Hispanic or Latino Ethnicity 27.4% People of Color 10.9% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	A few months to one year working in the occupation; a recognized apprenticeship program
Certification/Licensure Requirements	Home Improvement Contractor (HIC) registration and Electrical Contractor license
Certification Levels	Core, Advanced, and Specialty
Specific Vocational Preparation (National)	4.0-6.0[324]
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 14,730 Employment services: 3,430 Electrical Power Generation, Transmission and Distribution: 2,510

Job Description

Solar PV Installers assemble, install, and maintain solar PV systems on roofs or other structures in compliance with site regulations. Frequent elements of the job include measuring, cutting, assembling, and bolting structural framing and solar panels, as well as performing basic electrical work such as checking currents.[325]

Wages

The median hourly wage for Solar PV Installers in New Jersey is $28.19, higher than the national wage for Solar PV Installers, but aligned more closely with the national wage for the construction and extraction major occupational group, as shown in Table 73.
Table 73. Wage Distribution, 2023[326]

322 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472231.htm

323 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

324 The "Specific Vocational Preparation" value is defined by the U.S. Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs.
Source: U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. Accessed August 2024. https://www.onetonline.org/link/summary/47-2231.00

325 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. Detailed Work Activities. https://www.onetonline.org/link/summary/47-2231.00 & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/construction-and-extraction/solar-photovoltaic-installers.htm

326 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472231.htm

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Solar Photovoltaic Installers (New Jersey)	Annual	$47,210	$58,630	$73,890
Solar Photovoltaic Installers (New Jersey)	Hourly	$22.70	$28.19	$35.52
Solar Photovoltaic Installers (National)	Annual	$42,740	$48,800	$60,180
		25th Percentile	Median	75th Percentile
Solar Photovoltaic Installers (National)	Hourly	$20.55	$23.46	$28.93
Construction and Extraction Occupations (National)	Annual	$44,220	$55,680	$74,750
Construction and Extraction Occupations (National)	Hourly	$21.26	$26.77	$35.94

Demographics

Solar PV Installers in New Jersey are around 96% male. Hispanic or Latino workers represent two-in-five (41%) of total Solar PV Installers in the state, a higher share than in many other priority occupations. Just over one-quarter (27%) of Solar PV Installers are people of color, with Black workers comprising 15% of total Solar PV Installers and multiracial[327] workers comprising 10%. The largest share of workers are ages 35 to 54 years (Table 74).

Table 74. Demographic Distribution in New Jersey, 2024Q1[328]

Demographic Type	Demographic	% of Current Workers
Sex	Male	95.8%
	Female	4.2%
Ethnicity	Hispanic or Latino	40.6%
	Not Hispanic or Latino	59.4%
Race	White	72.6%
	Black	15.1%
	Asian	1.5%
	American Native[329]	0.7%
	Pacific Islander	0.0%
	Two or More Races	10.1%
Ages	16 to 24 Years	16.5%
	25 to 34 Years	33.1%
	35 to 54 Years	39.5%
	55 Years and Over	10.9%

327 The U.S. Bureau of Labor Statistics and JobsEQ multiracial workers as "two or more races."

328 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Solar Photovoltaic Installers across all industries in New Jersey and not specific to the green economy industries.

329 JobsEQ reports this as "American Indian," what is classified here as "American Native"

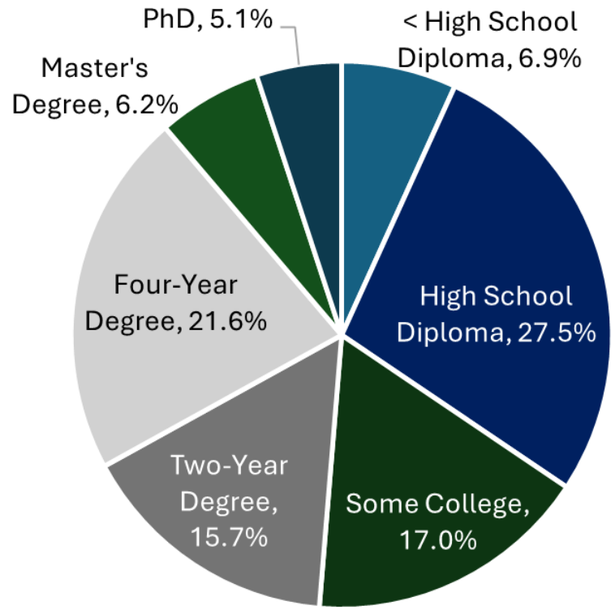
Education, Certifications, Experience & Skill Requirements

Education

Solar PV Installers typically need at least a high school diploma or its equivalent. A recognized apprenticeship program may also be associated with this occupation.[330] In New Jersey, some Solar PV Installers attend technical schools or community colleges for training courses.[331]

Over one-quarter (27.5%) of current Solar PV Installers in New Jersey have attained at most a high school diploma or equivalent, while 22% have attained a four-year college degree. Almost one-third of installers in New Jersey have completed at most either some college (17%) or a two-year degree (16%) (Figure 46).

Figure 46. Educational Attainment of Current Workers in New Jersey[332]



Certifications

In New Jersey, Solar PV Installation requires home improvement registration and an electrical license for handling the wiring for pumps and other low-voltage components.[333]

Certifications for Solar PV Installers are generally categorized into one of three groups: core certifications, advanced certifications, and specialty certifications. Core certifications include basic electrical safety, proper installation sequence, and understanding of National Fire Protection Association (NFPA) 70E. The advanced certifications involve a national standard for Solar PV Installers, ability to assess the

330 U.S. Department of Labor. O*Net Solar Photovoltaic Installers. Education. https://www.onetonline.org/link/summary/47-2231.00

331 My Career NJ. Solar Photovoltaic Installers. https://mycareer.nj.gov/occupation/47-2231

332 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

333 Interstate Renewable Energy Council. Solar Licensing Database. https://irecusa.org/solar-licensing-database/

competence of personnel to safely install PV systems in compliance with national and local requirements, and commercial-scale system design and installation. Lastly, the specialty certification is voluntary and designed to help distinguish PV installation specialists from their competition.[334] Other specialized certifications for Solar PV Installers are shown in Table 75.

Table 75. Top Solar Photovoltaic Installer Certifications

Certification	Area of Expertise	Provider
Solar PV Certification	Basic competencies in electrical work	Electrical Training Alliance
Photovoltaic Installer - Level 1 (PVI1)	Assessments in solar system installation	ETA International
Photovoltaic Installer/Designer (PV2)		
Photovoltaic Associate (PA)	Application, design, installation, operation of PV, Solar Heating, Wind energy systems	North American Board of Certified Energy Practitioners
PV Installation Professional (PVIP)	Renewable energy, system installation oversight	
PV Installer Specialist	Renewable energy, national standards	
Certified Electrical Safety Technician (CEST)	Electrical hazards	National Fire Protection Agency
Photovoltaic System Installation Certification (PVSI)	PV system installation with code requirements	Underwriters Laboratories, Inc.

More general and widely recognized certifications that Solar PV Installers may possess, and that are highly sought after by employers, include:[335]

- Driver's License
- OSHA 10
- OSHA 30
- Forklift Operator Certification

Experience

Solar PV Installers typically need anywhere from a few months to a year of work experience, in addition to at least one year of training or an apprenticeship. However, some employers may require more years of experience.[336]

Skills

General skills, abilities, and knowledge required for Solar Photovoltaic Installers include the following:[337]

334 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. National Certifications. https://www.onetonline.org/link/localcert/47-2231.00

335 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. National Certifications. https://www.onetonline.org/link/localcert/47-2231.00 & Based on active job postings in New Jersey and the U.S. for Solar Photovoltaic Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

336 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. https://www.onetonline.org/link/summary/47-2231.00

337 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. Knowledge. https://www.onetonline.org/link/summary/47-2231.00#Knowledge & Based on active job postings in New Jersey and the U.S. for Solar Photovoltaic Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

- Ability to Lift 41-100 lbs.
- Ability to monitor/assess performance
- Knowledge of materials, methods, and tools involved in construction and repair
- Knowledge of the practical application of engineering science and technology
- Knowledge of machines and tools, including their designs, uses, repair, and maintenance
- Using ladders
- Power tools and hand tools
- Spanish language
- Electrical wiring

Key technical skills may include fluency in the following types of software:[338]

- Microsoft Office, including Excel, Word, Outlook, and PowerPoint
- Data acquisition systems
- Computer-aided design (CAD) software
- Project management software such as Bosch Punch List, Craftsman CD Estimator, Turtle Creek Software Goldenseal, and VirtualBoss
- Customer relationship management (CRM) software such as Salesforce

Unionization

In New Jersey, there are no labor unions dedicated solely to Solar PV Installers. However, since an electrical license is necessary for solar panel installation in New Jersey, workers in the International Brotherhood of Electrical Workers (IBEW) union frequently install solar systems and receive solar-related training through registered apprenticeship programs. Despite this, standalone Solar PV Installer apprenticeships are generally not recognized as registered apprenticeships by the Department of Labor, which limits access to certain workforce development funding and creates a gap in dedicated training opportunities for solar-specific roles.

Employment Outlook in New Jersey

As of 2023, New Jersey has nearly 1,500 Solar Photovoltaic Installers. New Jersey's location quotient of Solar PV Installers is 2.16, indicating that the concentration of Solar PV Installers is more than double the national average. Employment for this occupation nationwide is forecasted to increase by 48% from 2023 to 2033, with over 4,000 annual openings when considering current workers retiring or leaving the occupation for other reasons. Meanwhile, between 2022 and 2035, New Jersey is projected to support an additional 125 new Solar Installers in its energy economy, on top of an anticipated growth of 27% in the state's overall economy (Table 76). However, this figure may underrepresent the true scale of solar installation activity in the state. Dedicated Solar Photovoltaic Installers are one of several occupations involved with the installation of solar energy. The classification of Solar Photovoltaic Installers captures a portion of all occupations involved in photovoltaic installation. For example, a construction firm doing a solar installation may utilize electricians, construction laborers, etc. rather than a worker classified as a dedicated Solar Photovoltaic Installer. As a result, while official projections for Solar PV Installers appear modest, the actual number of workers engaged in solar installation work may be significantly higher.

338 U.S. Department of Labor. O*Net. Solar Photovoltaic Installers. https://www.onetonline.org/link/details/47-2231.00 & Based on active job postings in New Jersey and the U.S. for Solar Photovoltaic Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

Table 76. Employment Outlook[339]

Employment (NJ, 2023)	1,460 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+125 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+310 workers
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+27.3%
Location Quotient (NJ, 2023)	2.16
Employment (National, 2023)	25,000
Forecasted Employment Percent Change (National, 2023-2033)	+48%
Occupational Openings, Annual Average (National, 2023-2033)	4,100
Industries with Highest Employment Levels (National, 2023)	Building Equipment Contractors: 14,730 Employment services: 3,430 Electrical Power Generation, Transmission and Distribution: 2,510

Employers in New Jersey

Most of the top hiring employers over the last year were solar energy-specific private companies, including:

- **Sunrun**, solar panel and battery storage services (multiple locations)
- **Sunnova Energy**, commercial and residential solar company (multiple locations)
- **Freedom Forever**, solar energy company (Moorestown, NJ and Williamstown, NJ)
- **AllSeason Solar**, solar installation and roofing (multiple locations)

In New Jersey, employers in Burlington County, Somerset County, and Monmouth County had the highest number of job postings for Solar PV Installers from August 2023 to August 2024.[340]

Available Training Options

Solar PV Installers are often required to undergo on-the-job training, especially if they do not have a post-secondary degree. Workers in this field typically receive on-the-job training lasting up to 1 year.[341]

In New Jersey, training programs for Solar PV Installers are in the following counties: Essex, Hudson, Monmouth, Middlesex, Atlantic, and Union. Trainings for this occupation are largely concentrated in the northeastern areas of the state, with many located in or near overburdened communities (Figure 47).

339 New Jersey data sourced from U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes472231.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

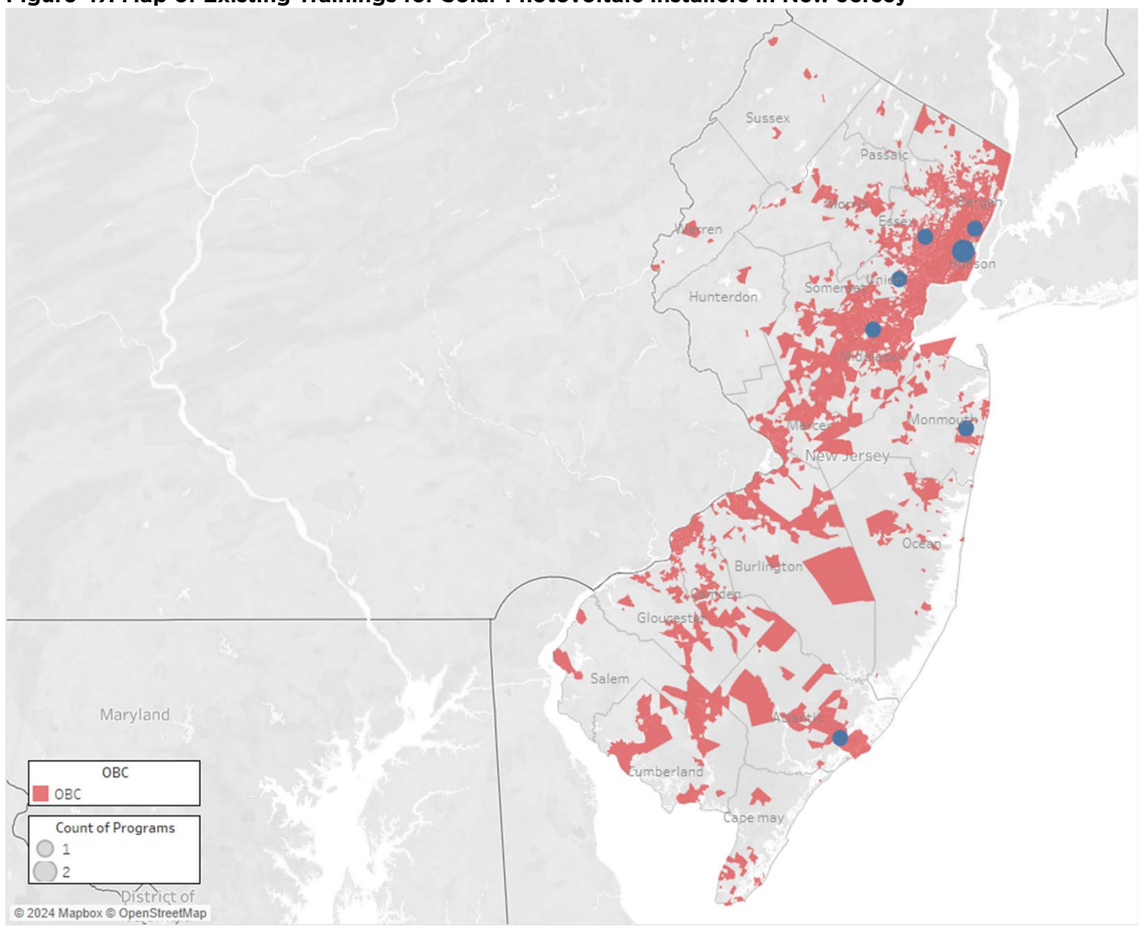
340 Based on active job postings in New Jersey for Solar PV Installers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

341 Based on Education, Training, and Experience ratings data from U.S. Department of Labor O*Net https://www.onetcenter.org/dictionary/20.1/excel/education_training_experience.html

Locally, Solar PV Installers in New Jersey have access to training programs offered by various institutions, including:

- Bergen Community College
- Com-Tec Institute
- Eferon Solar Solutions
- Hudson Training Center
- Interfaith Neighbors Launch Center
- Middlesex College
- Raritan Valley Community College
- T Byrd Computer School
- Union College

Figure 47. Map of Existing Trainings for Solar Photovoltaic Installers in New Jersey[342]



Career Transition Potential

This section identifies jobs with similar aspects to those of Solar Photovoltaic Installers, including skills, educational requirements, and knowledge. This will potentially allow for a smooth transition into a Solar PV Installer position with minimal new training. These

342 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

occupations fall within the installation, maintenance, and repair occupational group (Table 77).

Table 77. Transferable Occupations and Their Employment and Wages in New Jersey[343] [344]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Solar Photovoltaic Installers	1,460	$28.19	High school diploma or equivalent
Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,350	$29.77	Postsecondary nondegree award
Maintenance and Repair Workers, General*	34,890	$23.26	High school diploma or equivalent

**Denotes Transferable occupations that are other priority occupations in this jobs study.*

343 Transferable occupations are taken from O*NET's Related Occupations: https://www.onetonline.org/link/summary/47-2231.00

344 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics, May 2023. https://www.bls.gov/oes/current/oes_stru.htm

Welders, Cutters, Solderers, and Brazers (51-4121)[345]

Overview

In New Jersey, Welders, Cutters, Solderers, and Brazers (Welders) are predominantly male (94%). Notably, 39% of this workforce are Hispanic or Latino and 37% identify as a person of color. While there is greater ethnic and racial diversity among Welders in New Jersey when compared to the other priority occupations in this jobs study, there is a notable disparity between males and females within the occupation.

Pathways to sustainable wages in this field often involve transitioning from similar roles that require comparable skills and experience. Occupations such as Sawing Machine Setters, Print Binding Workers, and Extruding Machine Operators can serve as stepping stones, typically requiring a high school diploma or equivalent for entry-level positions.

In terms of demand, New Jersey's location quotient for welders is 0.32, indicating a significantly lower share of Welders in the state compared to national averages. Nationally, employment in this occupation is projected to grow by 2.0% from 2023 to 2033, with approximately 45,800 annual job openings expected during this period. The expected growth rate in New Jersey is even greater, at 5.5% from 2022 to 2032, without accounting for additional energy economy jobs generated by climate and clean energy policies and investments.

Welding training opportunities in New Jersey are primarily concentrated in the northern regions, particularly near clusters of Overburdened Communities (OBCs). In contrast, southern and northwestern areas of the state, such as Burlington, Cumberland, and Warren Counties, offer fewer training options. At the national level, apprenticeships are also available through various established institutions.

345 U.S. Bureau of Labor Statistics' Standard Occupation Classification (SOC) Code

Table 78. Summary of Occupation Data[346]

Employment (NJ, 2023)	3,690 workers
Location Quotient (NJ, 2023)[347]	0.32
Median Annual Wage (NJ, 2023)	$57,300
Median Hourly Wage (NJ, 2023)	$27.55
Demographics (NJ, 2024)	6.1% Female 38.8% Hispanic or Latino Ethnicity 36.8% People of Color 20.1% Ages 55 Years and Over
Minimum Education	High school diploma or equivalent
Minimum Training	Technical education and on-the-job training or an apprenticeship[348]
Certification/Licensure Requirements	N/A
Certification Levels	N/A
Specific Vocational Preparation (National)	4.0-6.0[349]
Industries with Highest Employment Levels (National, 2023)	Fabricated Metal Product Manufacturing: 68,110 Machinery Manufacturing: 60,390 Motor Vehicle Body and Trailer Manufacturing: 24,950

Job Description

Welders, Cutters, Solderers, and Brazers use specialized equipment to join or cut metal parts. They follow blueprints, measure metal, and inspect for flaws. Using welding torches or similar tools, they apply heat to melt and fuse metals for shaping and bonding. This equipment can be either hand-held or remotely controlled. Due to the intense heat and light, extreme caution is required with this occupation. In the United States, these workers typically work 40-hour weeks, although some firms employ them in rotating 8- or 12-hour shifts to maintain continuous production.[350]

Wages

In the State of New Jersey, Welders earn more than the national estimates, with workers earning $46,880 to $69,280 at the 25th and 75th percentiles, respectively. The median annual wage for Welders at the national level is $48,940, compared to $57,300 in New Jersey. Also in New Jersey, these workers earn more than the average wage of the production occupational group across the United States. The wages for all three groups are seen in Table 79.

346 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes514121.htm

347 The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

348 My Career New Jersey. Welders, Cutters, Solderers, and Brazers. Accessed 19 August 2024. https://mycareer.nj.gov/occupation/51-4121

349 The "Specific Vocational Preparation" value is defined by the U.S. Bureau of Labor Statistics. It provides an index value indicating the estimated time required for an average worker to become versed in a specific set of job skills, techniques, and knowledge, based on vocational, apprenticeship, and on-the-job training needs. Source: U.S. Department of Labor. O*Net. Welders, Cutters, Solderers, and Brazers. Accessed August 2024. https://www.onetonline.org/link/summary/51-4121.00

350 U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes514121.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/production/welders-cutters-solderers-and-brazers.htm

Table 79. Wage Distribution, 2023[351]

Occupation	Pay Structure	25th Percentile	Median	75th Percentile
Welders, Cutters, Solderers, and Brazers (New Jersey)	Annual	$46,880	$57,300	$69,280
Welders, Cutters, Solderers, and Brazers (New Jersey)	Hourly	$22.54	$27.55	$33.31
Welders, Cutters, Solderers, and Brazers (National)	Annual	$42,760	$48,940	$59,900
Welders, Cutters, Solderers, and Brazers (National)	Hourly	$20.56	$23.53	$28.80
Production Occupations (National)	Annual	$35,980	$43,630	$54,880
Production Occupations (National)	Hourly	$17.30	$20.98	$28.80

Demographics

Welders, Cutters, Solderers, and Brazers in New Jersey are primarily male (93%), but are relatively more ethnically and racially diverse compared to other energy economy occupations. Around two-in-five (39%) identify as Hispanic or Latino and 37% as people of color, with one-fifth (21%) of New Jersey's Welders identifying as Black. The largest share of these workers in the state are between the ages of 35 and 54 years (43%) (Table 80).

Table 80. Demographic Distribution in New Jersey, 2024Q1[352]

Demographic Type	Demographic	% of Current Workers
Sex	Male	93.9%
	Female	6.1%
Ethnicity	Hispanic or Latino	38.8%
	Not Hispanic or Latino	61.2%
Race	White	63.2%
	Black	20.7%
	Asian	3.2%
	American Native[353]	0.8%
	Pacific Islander	0.0%
	Two or More Races	12.1%
Ages	16 to 24 Years	12.0%
	25 to 34 Years	24.9%
	35 to 54 Years	43.0%
	55 Years and Over	20.1%

Education, Certifications, Experience & Skill Requirements

Education

To become a Welder, Cutter, Solderer, or Brazer in New Jersey, workers typically need a high school diploma or equivalent and technical training. This training may be obtained

351 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm

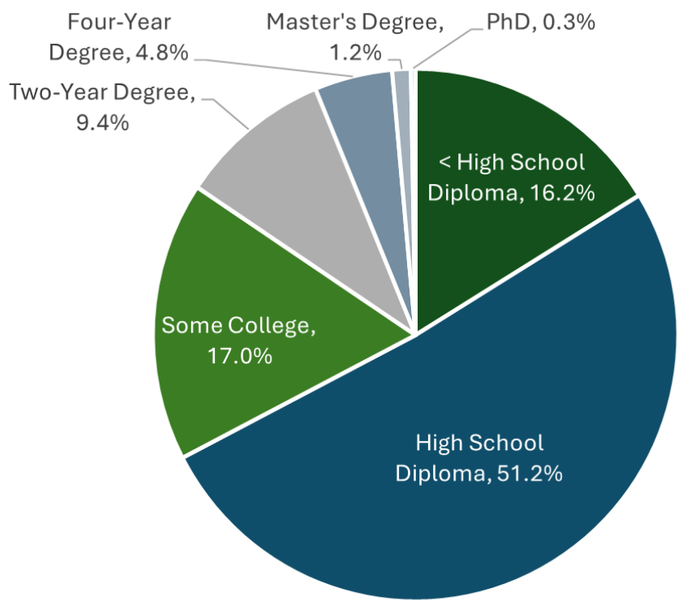
352 JobsEQ®. 2024Q1. Based on Place of Residence estimates. Note that these data are for current Welders, Cutters, Solderers, and Brazers across all industries in New Jersey and not specific to the green economy industries.

353 JobsEQ reports this as "American Indian," what is classified here as "American Native"

through technical high schools, technical institutes, community colleges, or private trade schools. Additionally, apprenticeships are available for entry-level training or to provide specialized training for more experienced workers.[354]

In New Jersey, over half (51%) of all Welders, Cutters, Solderers, and Brazers have earned at most a high school diploma. Meanwhile, 17% have completed some college education, while 16% have not yet finished high school. Less than 2% have earned a Master's degree or PhD (Figure 48).

Figure 48. Educational Attainment of Current Workers in New Jersey[355]



Certifications

In New Jersey, there is no state certification or licensure requirement, though employers and industry experts strongly recommend obtaining certification or licensure.[356]

The most common certification is the Certified Welder certification from the American Welding Society (AWS). In some states, such as New York, aspiring Welders must be certified by the AWS or the New York Department of Transportation. Once certified, workers must apply for a state license.

Overall, many optional certifications are available to help welders gain further expertise, as detailed in Table 81.

354 U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

355 JobsEQ®. 2024Q1. Based on Place of Residence estimates.

356 My Career New Jersey. Welders, Cutters, Solderers, and Brazers. Accessed 19 August 2024. https://mycareer.nj.gov/occupation/51-4121
& Tulsa Welding School. "What Certifications and Licenses Do Welders Need?" Accessed 20 August 2024. https://www.tws.edu/blog/welding/what-certifications-and-licenses-do-welders-need/

Table 81. Top Welder, Cutter, Solderer, Brazer Certifications

Certification	Area of Expertise	Provider
Certified Welder	General welding knowledge, skills, and abilities (KSAs)	American Welding Society (AWS)
Certified Welding Inspector (CWI)	Welding inspection	
Certified Welding Engineer (CWE)	Production and construction	
Certified Robotic Arc Welding Operators and Technicians	Robotics and welding cross-section	
Certified Associate Welding Inspector	Welding inspection	
Schools Excelling through National Skills Education (SENSE) Program	National training curriculum	
Certified Radiographic Interpreter	Radiographic interpretation for welding standards	
Certified Welding Supervisor (CWS)	Oversees quality, cost, productivity, and safety (project management)	
Senior Certified Welding Inspector	Welding inspection	
Structural Welding Special Inspector	Structural integrity	International Code Council
Soldering Certificate	Soldering	Institute for Printed Circuits
Lincoln Electric Education Partner Schools Start (LEEPStart)	Foundational-level welding	National Coalition of Certification Centers (NC3)
Lincoln Electric Education Partner Schools (LEEPS)	Advanced welding	National Coalition of Certification Centers (NC3)
Entry Welder (meets AWS SENSE standards)	Shielded Metal Arc Welding, Gas Metal Arc Welding, Flux Core Arc Welding; Gas Tungsten Arc Welding; and related pipe welding techniques	National Center for Construction Education and Research (NCCER)

Even without a requirement, there are general certifications often in demand by New Jersey employers, including:[357]

- Driver's License
- Forklift Operator Certification
- OSHA 10
- Transportation Worker Identification Credential (TWC)
- Hazardous Material (HAZMAT)

Experience

While it's possible to become a Welder, Cutter, Solderer, or Brazer with just a few months of on-the-job training, it's more common for workers to complete an apprenticeship and gain at least one year of hands-on experience. Nationally, over half of the workers in this field reported that it typically takes one to six months of on-the-job training to achieve proficiency.[358]

357 U.S. Department of Labor. O*Net. Welders, Cutters, Solderers, and Brazers. Accessed August 2024. https://www.onetonline.org/link/summary/51-4121.00 & Based on active job postings in New Jersey and the U.S. for Welders, Cutters, Solderers, and Brazers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

358 U.S. Department of Labor. O*Net Education, Training, and Experience. https://www.onetcenter.org/dictionary/28.3/excel/education_training_experience.html

Skills

- General skills, abilities, and knowledge desired for Welders, Cutters, Solderers, and Brazers by employers in New Jersey and across the country include:[359]
- Welding knowledge
- Metal Inert Gas Welding (MIG welding)
- Ability to read and understand blueprints
- Use of plasma cutters
- Gas Metal Arc Welding (GMAW) knowledge
- Ability to Lift 41-50 lbs.
- Manufacturing knowledge
- Fabrication knowledge
- Flux Core Arc Welding knowledge
- Forklift operation

In addition, New Jersey employers typically seek Welders, Cutters, Solderers, and Brazers with proficiency in the following technologies:[360]

- Computer-aided design (CAD) software such as EZ Pipe
- Microsoft Office Suite software including Windows, Excel, and Outlook

Unionization

Across the United States, unions representing Welders typically represent many other trades workers, including the International Brotherhood of Boilermakers and United Association. These different unions cater to various welding fields, and workers can decide which to join based on their specific area of work. Unionized workers in production occupations may earn higher wages and receive better benefits than those who are not unionized. For instance, in New Jersey, unionized production jobs paid an average hourly wage of $26.92 in 2022, compared to $21.57 for nonunion production jobs.[361]

Employment Outlook in New Jersey

Welders, Cutters, Solderers, and Brazers are not highly concentrated in New Jersey. Currently, their location quotient, or concentration in New Jersey compared to the national average, is 0.32, meaning that this occupation is less prevalent in the state than nationally overall.

However, over the next decade, the U.S. Bureau of Labor Statistics projects a national employment growth of 2.0%, and almost 46,900 annual job openings, on average for this occupation across the country. Thus, at the national level, there is expected to be a high demand for Welders, Cutters, Solderers, and Brazers overall to replace the retiring and vacating share of workers employed in 2023, representing a gain of over 9,000 net new workers between 2023 and 2033. Largely supported by the electricity sector, around 260 new Welders are projected in the state's energy economy between 2022 and 2035, on top of a forecasted growth of 5.5% over the next decade in New Jersey's overall economy (Table 82).

Table 82. Employment Outlook[362]

Employment (NJ, 2023)	3,690 workers
Forecasted Employment Change (NJ, Energy Economy, 2022-2035)	+263 workers
Forecasted Employment Change (NJ, Overall Economy, 2022-2032)	+225 workers
Location Quotient (NJ, 2023)	0.32
Forecasted Employment Percent Change (NJ, Overall Economy, 2022-2032)	+5.5%
Employment (National, 2023)	454,500
Forecasted Employment Percent Change (National, 2023-2033)	+2.0%
Occupational Openings, Annual Average (National, 2023-2033)	45,800
Industries with Highest Employment Levels (National, 2023)	Fabricated Metal Product Manufacturing: 68,110 Machinery Manufacturing: 60,390 Motor Vehicle Body and Trailer Manufacturing: 24,950

Employers in New Jersey

Some of the employers who posted job openings for Welder positions in New Jersey in the last year include:

- **Wastequip**, commercial waste equipment (multiple locations)
- **Interstate Waste Services**, waste collection and recycling (multiple locations)
- **Waste Management (WM)**, waste management services (multiple locations)
- **Fairway Architectural Railing Solutions**, railing contractor (Trenton, NJ and Hamilton, NJ)

New Jersey's Essex County, Burlington County, and Camden County had the highest number of job postings for Welders from August 2023 to August 2024.[363]

Available Training Options

In New Jersey, welding training is spread across the state, with a larger concentration in the northern part of the state, in proximity to a cluster of Overburdened Communities (OBCs) as defined by the state's Environmental Justice Law. There are far fewer trainings in the southern and northwestern parts of the state, however, with counties, such as Burlington, Cumberland, and Warren Counties, hosting only one or two trainings (Figure 49).

359 Based on active job postings in New Jersey and the U.S. for Welders, Cutters, Solderers, and Brazers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Welders, Cutters, Solderers, and Brazers. Accessed August 2024. https://www.onetonline.org/link/summary/51-4121.00

360 Based on active job postings in New Jersey and the U.S. for Welders, Cutters, Solderers, and Brazers between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings. & U.S. Department of Labor. O*Net. Welders, Cutters, Solderers, and Brazers. Accessed August 2024. https://www.onetonline.org/link/summary/51-4121.00

361 U.S. Bureau of Labor Statistics. Modeled Wage Estimates 2022. https://www.bls.gov/mwe/tables.htm

362 New Jersey data sourced from U.S. Bureau of Labor Statistics, Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes514121.htm
& New Jersey forecasted employment based on BW modeled outputs.
& National data sourced from U.S. Bureau of Labor Statistics, Employment Projections, Employment by Detailed Occupation, 2023 and projected 2033. https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm
& New Jersey State Data Center. State Occupation Projections 2022-2023. https://app.powerbigov.us/view?r=eyJrIjoiZjYzMTFhZWQtYjAwNy00NTIxLWEzYmMtNjU0NGUwM2ViMWVjIiwidCI6IjUwNzZjM2Qx-LTM4MDItNGI5Zi1iMzZhLWUwYTQxYmQ2NDJhNyJ9&pageName=ReportSection1.

363 Based on active job postings in New Jersey for Welders between August 2023 and August 2024. JobsEQ. Real Time Intelligence (RTI) Job Postings.

Locally, workers in New Jersey have access to welding trainings offered by various institutions, including:

- Community Colleges of Bergen, Camden County, Passaic County, Raritan Valley, and Sussex County
- Vocational Technical Schools of Cape May, Cumberland, Essex, Mercer, Middlesex, Monmouth, Morris, Ocean, Salem, Sussex, and Warren Counties
- Institutes of Technology of Atlantic, Burlington, and Gloucester Counties
- AmeriArc Welding Academy
- County College of Morris
- Eastern Atlantic States Carpenters Technical Centers
- Eastwick College-Nutley
- Eastwick Education - HoHoKus School of Trade
- Elite Welder Training & Testing
- Lincoln Technical Institute
- Mr. G's Workshop
- Passaic County Technical Institute
- Pennsauken High School
- Rowan College of South Jersey-Cumberland Campus
- Sheet Metal, Air, and Rail Transportation Local 25
- Union County Career Technical Institute
- Universal Technical Institute

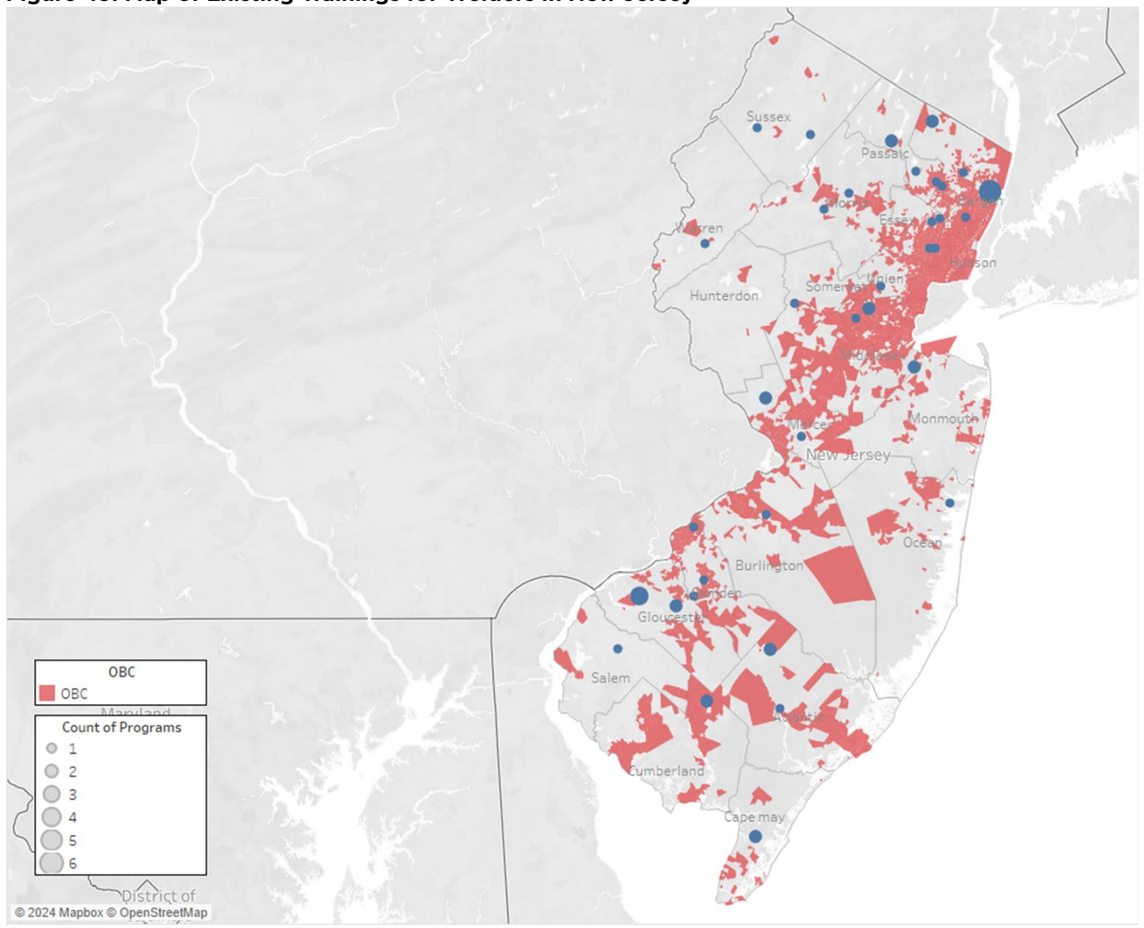
In addition, a welding apprenticeship offered in Paulsboro through the state's Department of Labor and Workforce Development, in partnership with the Wind Institute for Innovation and Training, the Borough of Paulsboro, and the Camden County Technical Schools, and EEW Group (EEW), supports wind energy development at EEW's new monopole fabrication facility for workers who want to get involved in the wind energy industry.

At the national level, workers who choose the apprenticeship route can attend common national institutions including:[364]

- American Welding Society (AWS)
- American Society for Metals (ASM) International
- Fabricators and Manufacturers Association
- International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers
- International Association of Machinists and Aerospace Workers
- Institute of Printed Circuits (IPC)
- Precision Machined Products Association
- International Brotherhood of Boilermakers

364 U.S. Department of Labor. O*Net. Welders, Cutters, Solderers, and Brazers. Accessed August 2024. https://www.onetonline.org/link/summary/51-4121.00

Figure 49. Map of Existing Trainings for Welders in New Jersey[365]



Career Transition Potential

This section identifies occupations that require similar skills and experience levels to those of Welders, Cutters, Solders, and Brazers. This makes it easier for workers in these occupations to transition into Welder, Cutter, Solder, and Brazer roles with minimal additional preparation. These jobs are primarily within the production occupational group and typically require a high school diploma or equivalent for entry-level positions (Table 83).

365 The trainings were identified by BW Research. See methodology in the report's appendix. Overburdened Communities (OBCs) in New Jersey are defined based on the New Jersey Environmental Justice Law, as displayed in New Jersey Economic Development Authority's OBC map. https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6/page/Overburdened-Communities/

Table 83. Transferable Occupations and Their Employment and Wages in New Jersey[366] [367]

Occupation	Total Employment (NJ, 2023)	Median Hourly Wage (NJ, 2023)	Typical Entry-Level Education
Welders, Cutters, Solderers, and Brazers	3,690	$27.55	High school diploma or equivalent
Sawing Machine Setters, Operators, and Tenders, Wood	130	$21.83	High school diploma or equivalent
Packaging and Filling Machine Operators and Tenders	8,660	$18.91	High school diploma or equivalent
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	190	$21.24	High school diploma or equivalent
Print Binding and Finishing Workers	1,430	$20.60	High school diploma or equivalent
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	1,380	$21.07	High school diploma or equivalent
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	2,390	$23.10	High school diploma or equivalent
Helpers--Production Workers	3,040	$18.02	High school diploma or equivalent
Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	220	$20.81	High school diploma or equivalent
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	1,990	$17.33	High school diploma or equivalent
Molders, Shapers, and Casters, Except Metal and Plastic	940	$27.13	High school diploma or equivalent
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	6,650	$18.43	High school diploma or equivalent
Structural Metal Fabricators and Fitters	1,050	$26.17	High school diploma or equivalent
Plating Machine Setters, Operators, and Tenders, Metal and Plastic	470	$19.28	High school diploma or equivalent
Miscellaneous Assemblers and Fabricators*	21,310	$17.80	High school diploma or equivalent
Ophthalmic Laboratory Technicians	70	$15.81	High school diploma or equivalent
Coil Winders, Tapers, and Finishers	240	$17.55	High school diploma or equivalent
Upholsterers	310	$21.59	High school diploma or equivalent
Inspectors, Testers, Sorters, Samplers, and Weighers	12,740	$22.20	High school diploma or equivalent
Dental Laboratory Technicians	720	$23.73	High school diploma or equivalent

**Denotes Transferable occupations that are other priority occupations in this jobs study.*

366 Transferable occupations are taken from O*NET's Career Changers Matrix: https://www.onetcenter.org/dictionary/20.3/excel/career_changers_matrix.html

367 U.S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics. May 2023. Accessed August 2024. https://www.bls.gov/oes/current/oes_stru.htm & U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. https://www.bls.gov/ooh/

APPENDIX A: REPORT METHODOLOGY

Context for Modeling Projected Green Jobs In New Jersey

Economic modeling can help the State of New Jersey investigate and define future demand for workers in its green economy. BW Research conducted this modeling aligned with two potential pathway scenarios developed in preparation for New Jersey's forthcoming Energy Master Plan (EMP), developed by Energy + Environmental Economics (E3). Using these scenarios ensures that projections around energy systems, environmental impacts, economic costs and benefits, and workforce trends are as consistent as possible across different work streams, improving the strategic planning capabilities of New Jersey policymakers and stakeholders.

This modeling effort calculated the employment impacts associated with in-state capital and operational expenditures on clean electricity and fuel resources, building efficiency and electrification measures, alternative transportation adoption, and green infrastructure development. The modeling framework also includes negative impacts on the New Jersey economy through reduced employment in fossil electricity generators and fuel suppliers. This effort does not include economic impacts on households and businesses from cost recovery or energy savings.

Comparison to Original Modeling

This effort is different from previous modeling efforts for the Council on the Green Economy's (CGE) *Green Jobs for a Sustainable Future* roadmap, which studied the positive and negative economic impacts of policies and programs driving investments into solar, offshore wind, grid infrastructure and storage, energy efficiency, electric vehicles, and green infrastructure. Positive economic impacts studied in the roadmap include jobs generated by in-state capital and operational expenditures, electric and fuel use savings to consumers, and merit order price suppression. Negative economic impacts studied include lost revenues to in-state fossil electric power generators and fossil fuel suppliers and the cost recovery of programs through customer bills and resident taxes.

The research team decided to change the structure of the modeling from what was used in the CGE roadmap for two primary reasons:

1. Align with the outputs from the modeling E3 is undertaking for the New Jersey EMP.[1]
2. Create more focused occupational outputs to be used as the basis of the workforce development portion of the project.

The modeling undertaken for the CGE roadmap was useful in measuring a more comprehensive range of economic impacts associated with policies and programs supporting the green economy. For this updated research project, with modeled economic impacts focused on the direct activities associated with an EMP transition scenario, the resulting occupational employment outputs are a more focused estimate of specific green jobs in demand and other energy jobs at risk. These more targeted occupational outputs allow us to better analyze the education, training, recruitment, and other workforce development resources needed to fill the occupational demand specific to the role, industry, or technology.

For example, with this new framework, while we no longer capture the economic activity generated by energy savings to households, giving them more disposable income to spend on healthcare, food, and retail needs, we can estimate the number of offshore wind welders who will require Global Wind Organisation (GWO) safety training.

Model Structure Overview and Outputs

To analyze the varied impacts of the future green economy on New Jersey residents and the economy, the research team will develop two different types of model outputs:

- **Initial Employment Outputs (IEOs)** summarize the workforce impacts across energy sectors, sub-sectors, and five industries: Construction, Manufacturing, Professional Services, Other Supply Chain, and Induced.
- **Secondary Employment Outputs (SEOs)** use staffing pattern analyses to further break down impacts, examining the types and amount of occupational employment around the state.

To model the employment impacts, the research team leveraged transition scenario data developed by E3 for the Electricity, Fuels, Buildings, and Transportation sectors. Data from E3 includes forecasted values for capital expenditures, operations and maintenance costs, device stocks and sales, and energy demand. The research team coordinated with E3 and the client team to use the Current Policy and High Electrification scenarios, originally modeled in developing the NJ EMP, as input in this employment modeling effort. The research team derived inputs for the Green Infrastructure sector from current state policies and programs related to waste, water, wastewater, and stormwater & resiliency infrastructure and federal policies included in the Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL).

The research team then used these inputs to develop models using IMPLAN and the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) multipliers. Investments or activities in a particular sub-sector are used as inputs into the model to estimate the direct, indirect, and induced effects on business, household, government expenditures, and industry employment.

- **Direct:** employment associated with the initial economic activity of a given investment or activity (e.g., changes in wages, production, or jobs). Examples of direct impacts are solar or HVAC installers.
- **Indirect:** employment associated with the supply chain connected to the initial economic activity of the original investment or activity (e.g., purchases of goods and services or business tax impacts). An example of an indirect impact is increased employment at HVAC equipment manufacturers due to increased HVAC installations.
- **Induced:** employment based on the additional household spending resulting from the additional direct and indirect employment generated from the initial economic activity of the original investment or activity (e.g., wages paid, household purchases, or household tax impacts). These impacts can take the form of retail or hospital workers.

While direct, indirect, and induced employment effects are calculated in IEO model outputs, SEOs only use direct and indirect employment to focus the resulting

1 https://www.nj.gov/emp/

occupational outputs on energy-related jobs. Leveraging the current New Jersey green jobs employment, the modeling produced employment outputs from the most recently available USEER data year through 2035.

The forecasted occupational demand detailed here represents net occupational growth, or net new workers added to the economy, and does not account for occupational separations or workers transferring to different occupations in the workforce and workers exiting the workforce. Therefore, the occupational demand reported here should be interpreted as a measure of the expansion of the overall number of jobs and should not be interpreted as the number of new job openings.

This forecasted occupational demand is estimated from energy-specific national staffing patterns, developed by BW Research Partnership, applied to the IEO model outputs, while the 2022 occupational employment within New Jersey's energy economy is estimated from the energy-specific national staffing patterns applied to the New Jersey's energy employment from the U.S. Energy and Employment Report and Bureau of Labor Statistics.

The Energy Economy in the Model and Analysis

The modeled employment impacts assess employment changes within New Jersey's entire energy economy in which there are green sub-sectors, non-green sub-sectors, and sub-sectors with both green and non-green jobs. The job projections are assessed within the State's broader energy economy, rather than the green economy alone, as New Jersey's energy economy includes all types of energy technologies.

Given New Jersey's strong clean energy and climate-related policies and investments, the growth in the green sub-sectors represent a large portion of the projected growth of the total energy economy. Thus, while this analysis examines the employment impacts within the energy economy, the green economy remains the focus of the greatest workforce demands and opportunities.

New Jersey's broader energy economy includes clean energy sectors as well as fossil and nuclear energy generation and fuels, traditional electric transmission and distribution, and gas and diesel motor vehicles and fueling stations. Detail on the clean energy sectors and the green economy definition is included in Appendix B: Green Jobs Definition.

Primary Sectors and Sub-sectors

Five primary sectors are used to model the impacts of the transition scenarios: Electricity, Fuels, Buildings, Transportation, and Green Infrastructure. These sectors are further split into 32 sub-sectors, detailed in Table A on the next page.

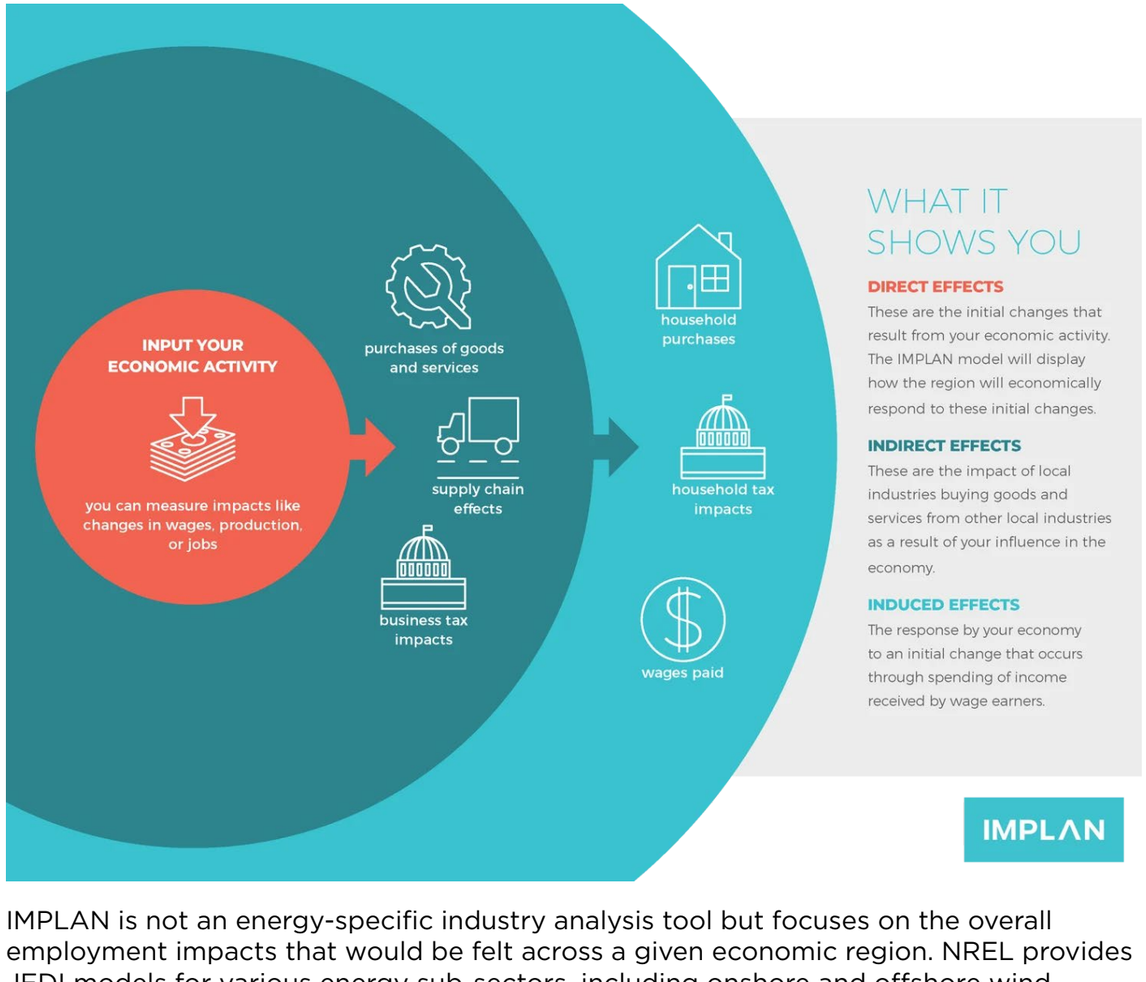
Primary sector	Sub-sector
Electricity	Solar, Including Utility and Distributed PV
	Offshore Wind
	Land-Based Wind
	Hydropower
	Hydrogen
	Biomass
	Distribution
	Transmission
	Storage
	Natural Gas Generation
	Other Fossil Generation
	Nuclear
Fuels	Hydrogen
	Bioenergy
	Natural Gas
	Natural Gas Distribution
	Petroleum Fuels
Buildings	Commercial HVAC
	Commercial Shell
	Commercial Other
	Residential HVAC
	Residential Shell
	Residential Other
Transportation	Vehicle Manufacturing
	Vehicle Maintenance
	Wholesale Trade Parts
	Conventional Fueling Stations
	Charging & Hydrogen Fuel Stations
Green Infrastructure	Waste
	Water
	Wastewater
	Stormwater & Resiliency Infrastructure

Table A. Employment Sectors and Sub-sectors

Input Output Modeling Overview

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 uses two different I/O models, IMPLAN and JEDI, 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.

Figure A. Direct, Indirect, and Induced Effects



IMPLAN is not an energy-specific industry analysis tool but focuses on the overall employment impacts that would be felt across a given economic region. NREL provides JEDI models for various energy sub-sectors, including onshore and offshore wind, biomass, and hydropower. 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. JEDI is used in the electricity and fuels sectors as a technical data source to split investments into industries and to generate initial employment outputs for both onshore and offshore wind electricity sub-sectors.

Employer Survey

BW Research conducted online employer surveys with green economy businesses located in New Jersey. The survey was programmed, tested, and distributed to prospective respondents by BW Research, and each respondent was assigned a unique ID to prevent duplication. Respondents were recruited through samples from industry associations, a sample of firms known to employ the relevant industry codes (NAICS) from DataAxle, and third-party email online panels. To qualify for the survey, respondents must be involved in green economy technologies[2] and have business locations in New Jersey.

2 Energy efficiency; renewable energy generation; grid infrastructure and energy storage; electric or other alternative transportation; clean or alternative fuels; water, waste, or wastewater treatment and management; stormwater or resiliency infrastructure.

The survey was fielded between August 1st and September 20th, 2024, resulting in 102 responses. The average length of the survey was 9 minutes.

Stakeholder Engagement

BW Research Partnership (BW) conducted 29 executive interviews with stakeholders involved in New Jersey's workforce and energy ecosystem to uncover existing challenges, needs, and opportunities in the state's green industries.[3] Interviewees represented education institutions, businesses, labor organizations, workforce development organizations, community services providers, and state government officials. The interviews occurred from August to October 2024, and each took approximately 30 minutes, following similarly structured discussion guides tailored for each interview. The interview discussion guide utilized by BW when conducting the interviews is in Appendix D: Executive Interview .

Of the 29 interviews, seven interviewees represented stakeholders in education, seven from the business community, six from organized labor, four operating in workforce development, three in state government, and two representing community services providers. The findings from these executive interviews are qualitative and serve to more deeply explore the opportunities and challenges in New Jersey's green economy and workforce development ecosystem.

Training Asset Inventory

BW Research Partnership's (BW Research) research team developed a comprehensive inventory of 398 publicly available training and credentialing programs in New Jersey that serve the 12 priority occupations. These trainings were identified by looking at programs offered at the state's community college system, career technical education school districts, labor unions, and other local entities. The inventory was developed from mid-July 2024 through mid-August 2024, with some updates made in October 2024, leveraging an energy efficiency training inventory developed in July 2023. The inventory is included in Appendix E: Full Training Inventory.

Wraparound Service Inventory

BW Research Partnership's (BW Research) research team developed a comprehensive inventory of 85 publicly available wraparound support services in New Jersey. These services were identified by conducting an initial literature review to better understand trends in these support service offerings across the state and the types of entities often involved in providing these services to New Jersey workers, including non-profits, government agencies, community-based organizations, and more. BW Research then began a thorough review of government social service directories, partnership data from workforce development boards, economic development reports, WIOA provider lists, and other relevant sources. The inventory was developed from July 2024 through September 2024. The inventory is included in Appendix F: Wraparound Service Inventory.

3 BW refers to the "green economy" in this memo, but interviews used the term "clean economy" and "clean energy economy" interchangeably with "green economy" in conversations.

APPENDIX B: GREEN JOBS DEFINITION

The green economy of New Jersey compromises both green and clean energy technologies in this report, consistent with the CGE's 2022 report's definition of "green employment," which sought to balance a credible and defined categorization of specific green industries with an ambitious look at the breadth of New Jersey's green economy.

Green infrastructure technologies in New Jersey include water, waste, and wastewater treatment and management, as well as stormwater and resiliency infrastructure. These technologies generally contribute to a cleaner, more sustainable environment. Clean energy technologies produce little to no greenhouse gas emissions and, within this report, these technologies include grid infrastructure and storage, renewable energy generation and fuels, energy efficiency and alternative vehicles. These technologies are captured by the annual United States Energy and Employment Report and are commonplace in various state clean energy definitions.

The following is a list of sub-technologies and sub-sectors that fall within each of the five major green sectors for New Jersey. Employment in the green infrastructure sector is based on publicly available data from the Bureau of Labor Statistics using North American Industry Classification System (NAICS) codes. Employment data for the remaining four sectors are based entirely on the United States Energy and Employment Report's (USEER) annual data collection effort.[4]

Green Infrastructure

Water, Waste, & Wastewater Treatment & Management (incl. Lead Paint)[5]

- Water
  - Water and Sewer Line and Related Structures Construction (NAICS 237110)
  - Water Supply and Irrigation Systems (NAICS 221310)
- Waste
  - Solid Waste Combustors and Incinerators (NAICS 562213)
  - Solid Waste Collection (NAICS 562111)
  - Hazardous Waste Collection (NAICS 562112)
  - Other Waste Collection (NAICS 562119)
  - Hazardous Waste Treatment and Disposal (NAICS 562211)
  - Solid Waste Landfill (NAICS 562212)
  - Other Nonhazardous Waste Treatment and Disposal (NAICS 562219)
  - Remediation Services (NAICS 562910)
  - Materials Recovery Facilities (NAICS 562920)
  - Septic Tank and Related Services (NAICS 562991)
  - All Other Miscellaneous Waste Management Services (NAICS 562998)
- Wastewater
  - Sewage Treatment Facilities (NAICS 221320)

4 https://www.energy.gov/us-energy-employment-jobs-report-useer

5 Job estimates for water, waste, and wastewater treatment and management are based on all related NAICS codes for these industries.

Stormwater & Resiliency Infrastructure[6]

- Structural Steel Contractors, nonresidential (NAICS 238122)
- Poured Foundation Contractors, nonresidential (NAICS 238112)
- Power and Communication Line and Related Structures Construction (NAICS 237130)
- Highway, Street, and Bridge Construction (NAICS 237310)

Grid Infrastructure & Storage

- Smart grid
- Microgrids
- Other grid modernization
- Pumped hydro-power storage
- Battery storage, including battery storage for solar generation
  - Lithium batteries
  - Lead-based batteries
  - Other solid-electrode batteries
  - Vanadium redox flow batteries
  - Other flow batteries
- Mechanical storage (flywheels, compressed air energy storage, etc.)
- Thermal storage, excluding fossil-related
- Biofuels, including ethanol and biodiesel
- Nuclear fuel

Renewable Energy Generation & Fuels

Renewable Energy Generation

- Solar photovoltaic
- Concentrated solar
- Wind
- Geothermal
- Bioenergy/Biomass
- Low-impact hydroelectric, including wave/kinetic
- Traditional hydroelectric
- Nuclear
- Combined heat and power
- Other clean energy generation

Clean Fuels

- Corn ethanol
- Other ethanol/non-woody biomass, including biodiesel
- Woody biomass/cellulosic biofuel
- Other biofuels
- Nuclear fuel
- Other clean fuels

6 Due to the lack of granular and specific data on jobs within stormwater and resiliency infrastructure, an overall estimation of jobs in closely related industries most likely to support stormwater and resiliency infrastructure buildouts and developments, such as heavy and civil engineering construction, is used for this sub-sector. It should be noted that employment estimates presented for this sub-sector include all jobs in these industries.

Energy Efficiency

- ENERGY STAR Certified Appliances, excluding HVAC
- ENERGY STAR Certified Heating Ventilation and Air Conditioning (HVAC), including boilers and furnaces with an AFUE rating of 90 or greater and air and central air conditioning units of 15 SEER or greater
- Traditional HVAC goods, control systems, and services
- ENERGY STAR Certified Electronics (TVs, Telephones, Audio/Video, etc.)
- ENERGY STAR Certified Windows and Doors
- ENERGY STAR Certified Roofing
- ENERGY STAR Certified Seal and Insulation
- ENERGY STAR Certified Commercial Food Service Equipment
- ENERGY STAR Certified Data Center Equipment
- ENERGY STAR Certified LED Lighting
- Other LED, CFL, and Efficient Lighting
- Solar thermal water heating and cooling
- Other renewable heating and cooling (geothermal, biomass, heat pumps, etc.)
- Advanced building materials/insulation
- Recycled building materials
- Reduced water consumption products and appliances
- Other energy efficiency

Alternative Transportation

- Plug-in Hybrid Vehicles
- Electric Vehicles
- Natural Gas Vehicles
- Hydrogen Vehicles
- Fuel Cell Vehicles
- Other Clean Vehicles

APPENDIX C: SURVEY TOPLINES

The Employer Survey

The employer survey was conducted from August 1 to September 20, 2024, garnering 102 responses (n = 102) [7] from New Jersey-based green economy firms. The following section outlines general firm characteristics, employment and occupation composition, hiring difficulties, and equity initiatives of responding firms, among other outcomes. Given limited survey responses for questions focused on occupations, BW considers these results of interest but still directional and qualitative in nature.

Responses from employers of CNC Tool Operators and Team Assemblers are included in the survey data since they were considered priority occupations when the survey was fielded and responses analyzed. These two occupations have since been removed as priority occupations elsewhere in the report.

Key Findings

1. **41% of surveyed green economy firms focus on Renewable Energy Generation-related activities, such as solar or wind energy generation. Approximately one in three firms focused on Energy Efficiency-related activities**, including Heating, Cooling, and Building Envelope (30%), Electric or other Alternative Transportation (29%), Water, Waste, or Wastewater Treatment and Management (29%), and Grid Infrastructure or Storage (27%) (Figure D).

2. **Nearly one in three (28%) of surveyed firms are a Minority or Women-Owned Business (MWBE) (Figure F)**. Among MWBE firms, two in three (69%) possess state or national certification as such, while 31% do not (Figure G).

3. **Over eight in ten (85%) of surveyed firms report "some" or "great" difficulty hiring qualified workers in any occupation**. Only 13% of firms reported "little to no" difficulty in hiring qualified workers (Figure N).

4. **Occupations with the highest expected growth by employers over the next year include HVAC Mechanics and Installers; General Maintenance and Repair Workers; Construction Managers; Carpenters, and Operating Engineers**. All surveyed firms that employ HVAC Mechanics and Installers anticipate hiring more of these workers in the next year, while two in three (67%) of firms that employ General Maintenance and Repair Workers anticipate hiring more of these workers (Figure K). *[Given the limited sample size, please use caution when interpreting this result.]*

5. **HVAC Mechanics and Installers and Construction Managers are the most challenging occupations to hire, with 63% and 80% of surveyed firms reporting "great" difficulty hiring for these occupations, respectively**. These two occupations also take surveyed firms the longest time to hire, with approximately one in three firms indicating it takes more than three months to hire for these occupations (Figure Q). Hiring Electricians and Welders, Cutters, Solderers, and Brazers also pose challenges to surveyed firms, with 50% and 60% of

7 Includes incomplete survey responses – incomplete survey response data utilized when available.

firms reporting “great” difficulty hiring qualified workers for these occupations, respectively (Figure O). *[Given the limited sample size, please use caution when interpreting this result.]*

6. **Applicants to surveyed firms often lack the prior work experience, training, and education required for a given position**. Approximately two in three (63%) of firms indicated applicants lack the prior work experience needed, while one in two (53%) indicated applicants lack the training or education needed. Surveyed firms face little difficulty with providing applicants with competitive wages, receiving applicants with adequate transportation means, and receiving applicants who can pass employment screening procedures. **However, approximately one in two (46%) firms indicated that there are not enough applicants for their open positions to begin with (Figure Q)**.

7. **Across most priority occupations, surveyed firms require at least some form of prior work experience for entry-level applicants, although that varies by firm**. Construction Manager roles require the highest level of prior work experience, with one in three (33%) of firms requiring more than three years in a comparable position. One in three (33%) firms did not require prior work experience for Construction Laborer roles (Figure S). *[Given the limited sample size, please use caution when interpreting this result.]*

8. **Very few of the priority occupations tested require a bachelor’s degree or higher**. Construction Laborers have the lowest educational requirements from surveyed firms of the priority occupations, and very few of the priority occupations tested require a bachelor’s degree or higher (Figure T). *Given the limited sample size, please use caution when interpreting this result.]*

9. **One in two (45%) surveyed firms recruit from within their organization to meet their workforce needs**, while four in ten (41%) partners with high schools or technical/vocational schools. One in three partners with four-year colleges (34%) and community colleges (30%). Only one in ten (9%) firms have an existing partnership with union apprenticeship or joint apprenticeship training centers (JATCs) (Figure U).

10. **60% of surveyed firms also partnered with high schools or technical/vocational schools to meet their training needs**, and one in four (26%) partnered with four-year colleges or conducted internal training (21%) (Figure V).

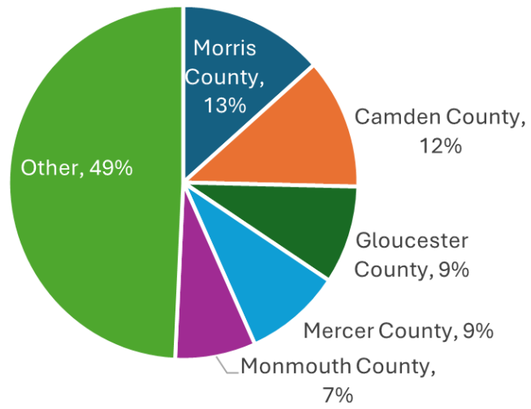
11. **Only one in four (26%) surveyed firms utilize incentive or rebate programs, driven by a lack of familiarity with the types of incentives or programs available (Figure W, Figure Y)**. Among firms that utilize incentives or programs, three in four (73%) use state incentives or rebates, utility incentives (73%), or Federal Government incentives (64%), such as Inflation Reduction Act rebates (Figure X).

12. **Just over one in two surveyed firms (51%) conduct criminal background screening on potential applicants, and only 40% conduct substance use screening (Figure Z, Figure AA). A sizable majority of firms have no special hiring initiatives to target female, minority, LGBTQ+, or Veteran populations**. Only 9% of firms have specific strategies, policies, or programs to increase female hires, while 12% of firms have strategies to increase minority hires (Figure BB).

Surveyed Firm Characteristics

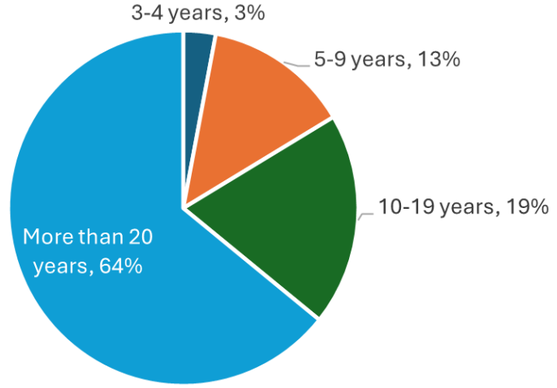
Green economy firms are generally spread across the state. One-third (34%) of firms surveyed are located in Morris, Camden, or Gloucester County (Figure B) collectively.

Figure B. County Distribution of Responding Firms



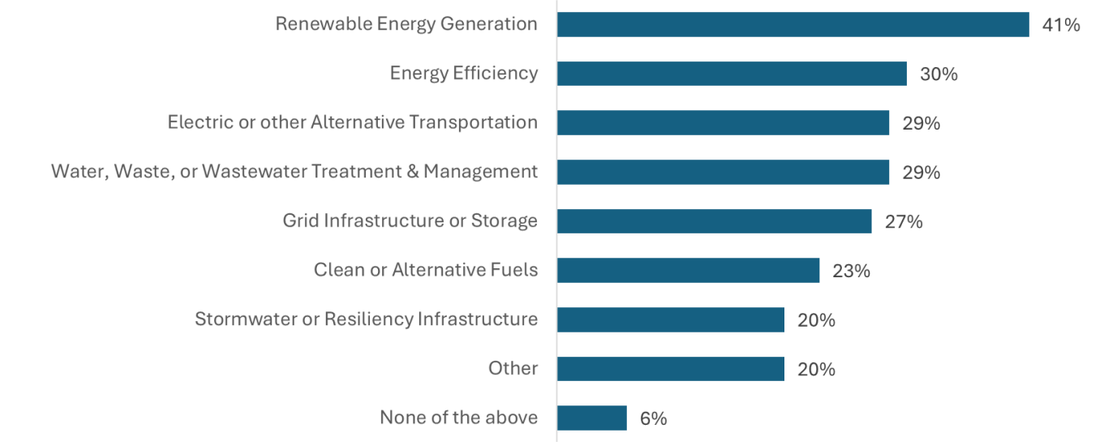
Surveyed firms also skew older, with nearly two-thirds (64%) of firms more than 20 years old and just one in six (16%) younger than ten years old (Figure C).

Figure C. Number of Years in Business



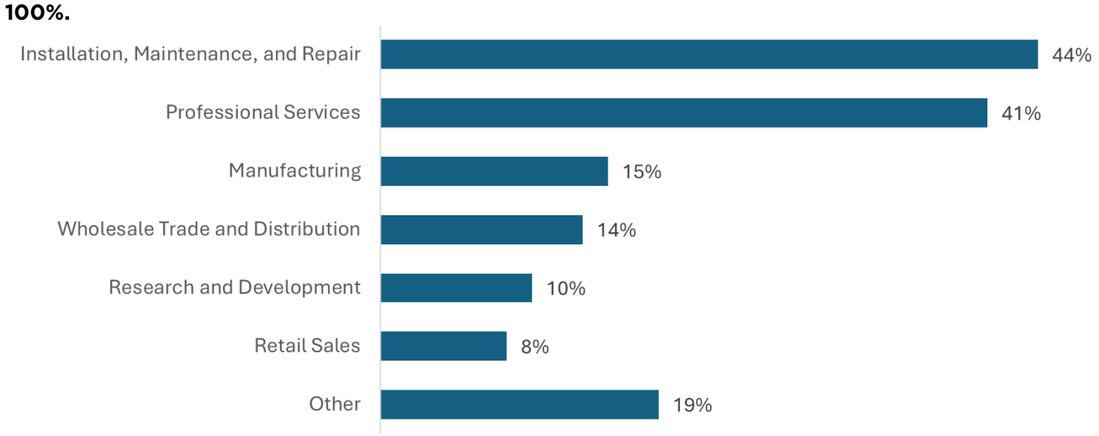
41% of surveyed green economy firms focus on Renewable Energy Generation-related activities, such as solar or wind energy generation. Firms focused on Energy Efficiency-related activities, including Heating, Cooling, and Building Envelope (30%), Electric or other Alternative Transportation (29%), Water, Waste, or Wastewater Treatment and Management (29%), and Grid Infrastructure or Storage (27%) represent approximately one in three firms, **indicating surveyed firms generally operate across multiple clean energy technologies (Figure D).**

Figure D. Firm's Clean Energy Technology Focus – Multiple responses permitted; Percentages may sum to more than 100%.



A majority of surveyed firms report being in the Installation, Maintenance, and Repair industry (44%) or the Professional Services industry (41%). Manufacturing and Wholesale Trade and Distribution firms represent 15% and 14%, respectively. One in ten (10%) of firms are involved in the Research and Development industry, while only 8% of firms are involved in the Retail Sales industry (Figure E).

Figure E. Firm's Industry Focus – Multiple responses permitted; Percentages may sum to more than 100%.



Nearly one in three (28%) of surveyed firms are a Minority or Women-Owned Business (MWBE) (Figure F). Among MWBE firms, two in three (69%) possess state or national certification as such, while 31% do not (Figure G).

Figure F. Minority or Women-Owned Business (MWBE) Status

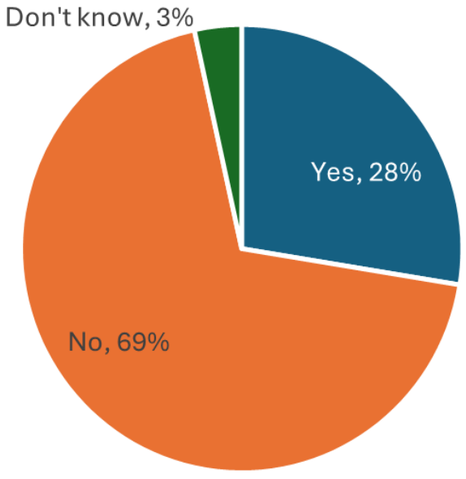
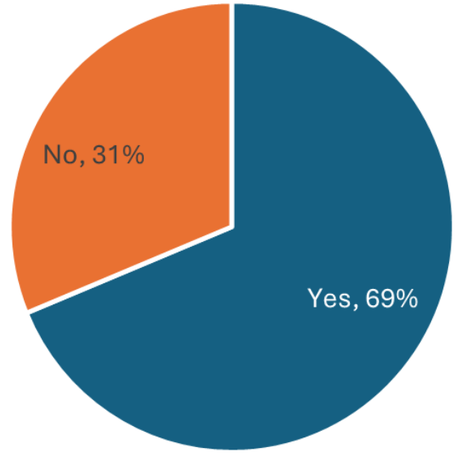


Figure G. MWBE Certification Status Among MWBE Firms



Employment & Occupation Composition at Surveyed Firms

A majority of surveyed firms (84%) employ less than 50 workers, while larger firms, or those with 50 or more employees, represent 16% of surveyed firms (Figure H). However, employees focused on green economy activities represent a smaller share of overall firm employment, with a majority of firms (57%) reporting less than 10 green economy workers at their firm (Figure I).

Figure H. Number of Employees

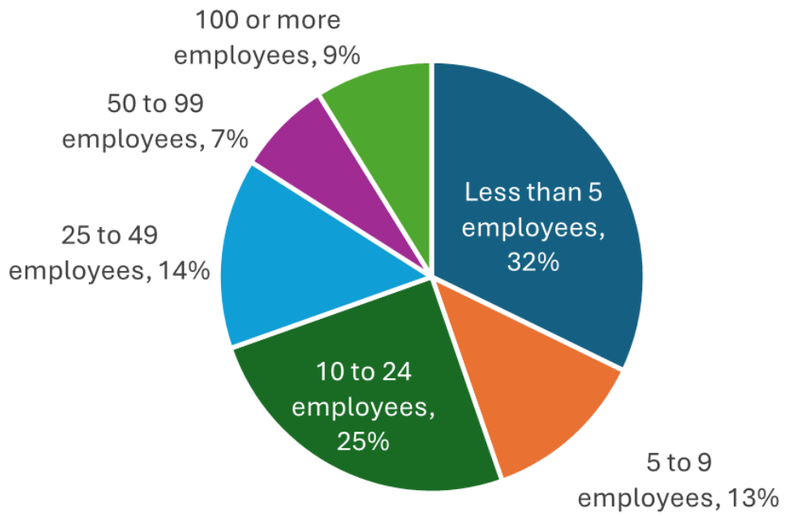
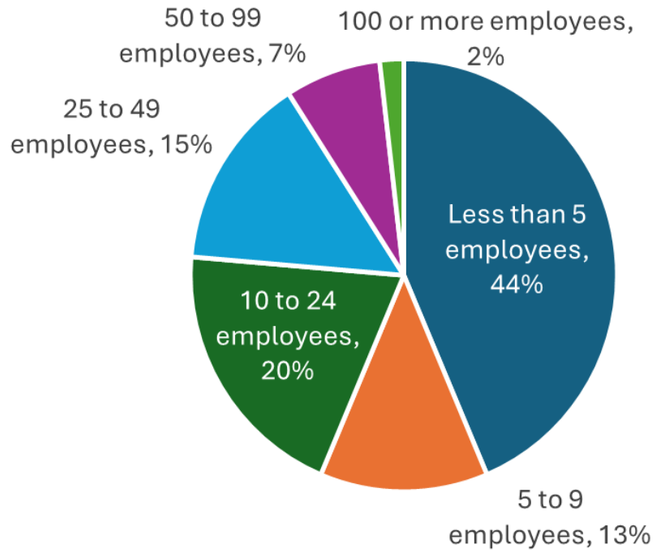
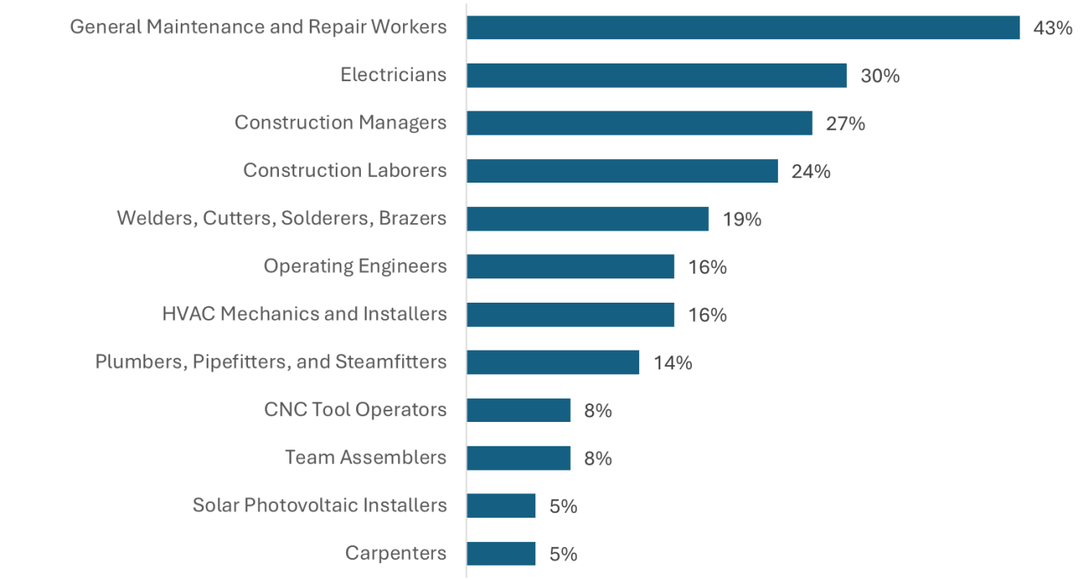


Figure I. Number of Green Economy Employees



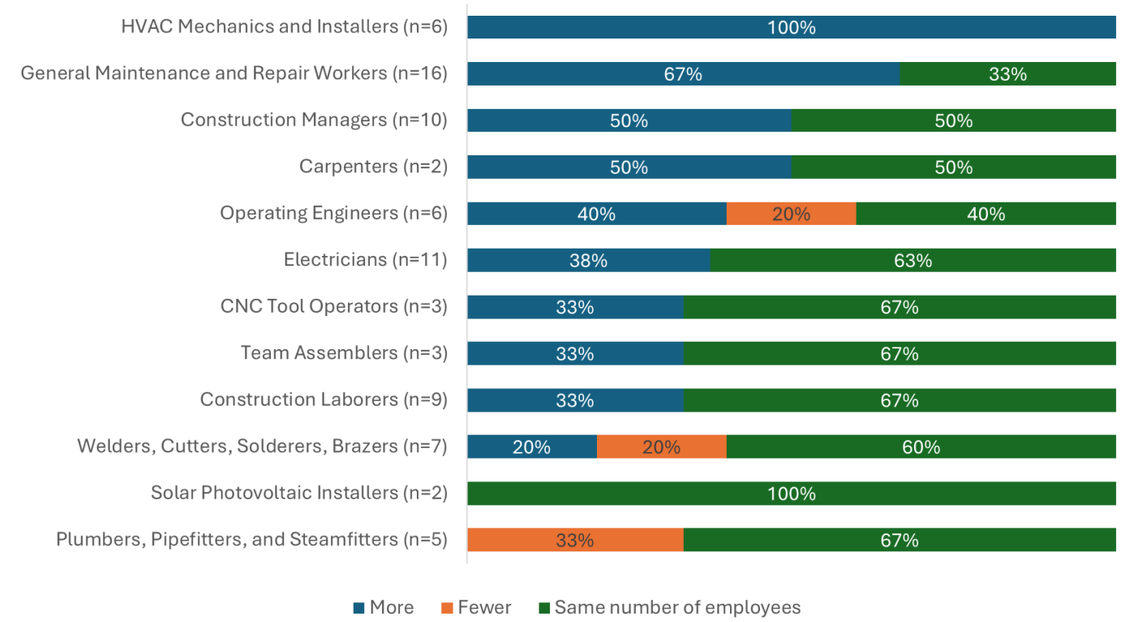
Surveyed firms more frequently reported employing General Maintenance and Repair Workers (43% of firms), Electricians (30%), Construction Managers (27%), and Construction Laborers (24%). The least common priority occupations employed at surveyed firms are Solar Installers (5%) and Carpenters (5%) (Figure J).

Figure J. Occupations Employed – Multiple responses permitted; Percentages may sum to more than 100%.



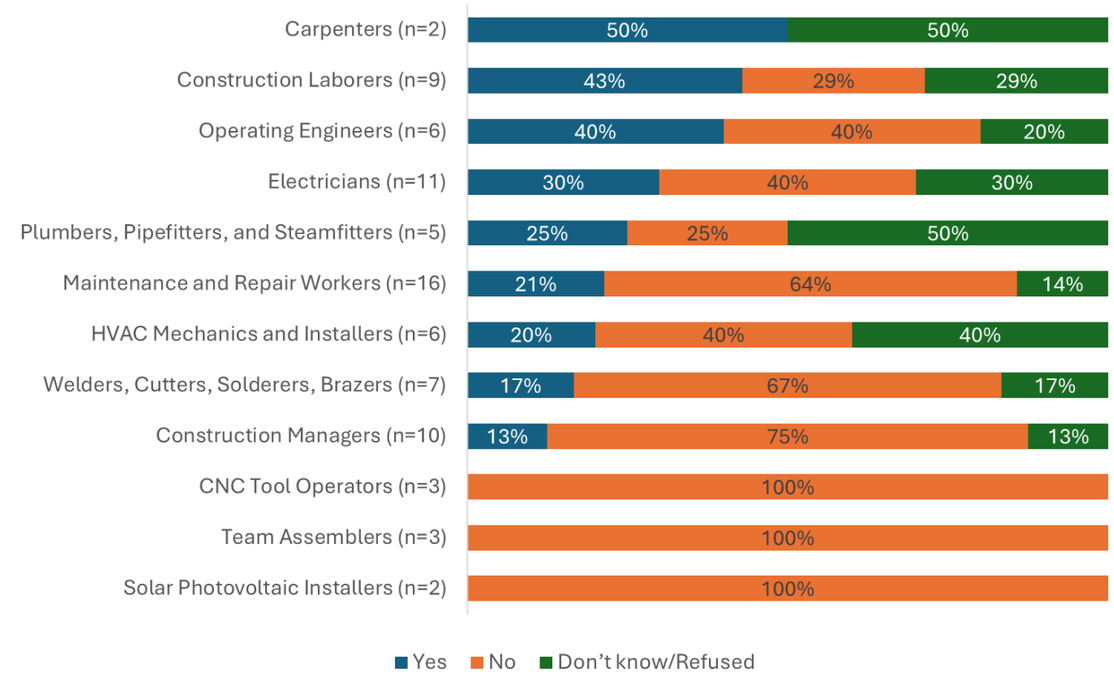
Occupations with the highest expected growth in the next year include HVAC Mechanics and Installers; General Maintenance and Repair Workers; Construction Managers; Carpenters, and Operating Engineers. All surveyed firms that employ HVAC Mechanics and Installers anticipate hiring more of these workers in the next year, while two in three (67%) of firms that employ General Maintenance and Repair Workers anticipate hiring more of these workers (Figure K). *[Please use caution in interpreting this result given limited sample size.]*

Figure K. One-Year Employee Growth Expectations by Occupation



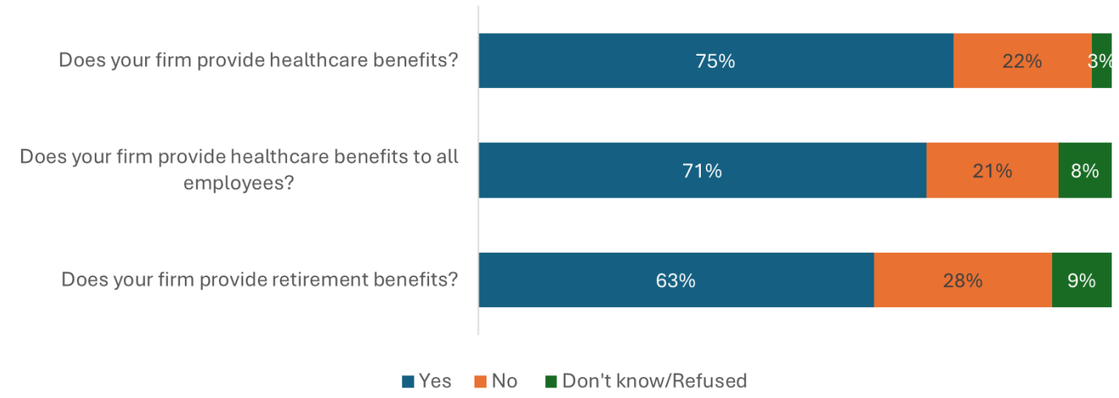
Carpenters, Construction Laborers, and Operating Engineers have the highest rate of Collective Bargaining Agreement (CBA), Project Labor Agreement (PLA), or Union coverage. However, CBA, PLA, or Union coverage rates are much lower among surveyed firms employing Construction Managers; Welders, Cutters, Solderers, Brazers; and HVAC Mechanics and Installers (Figure L). *[Please use caution in interpreting this result given limited sample size.]*

Figure L. Are a Majority of Workers Covered by a Collective Bargaining Agreement, Project Labor Agreement, or Labor Union?



Three in four (75%) of surveyed firms provide healthcare benefits to their employees. Among these firms, however, 71% provide healthcare benefits to *all* employees, with 21% opting to provide healthcare benefits to only *some* employees. **Additionally, a majority (63%) of surveyed firms provide retirement benefits to their employees (Figure M).**

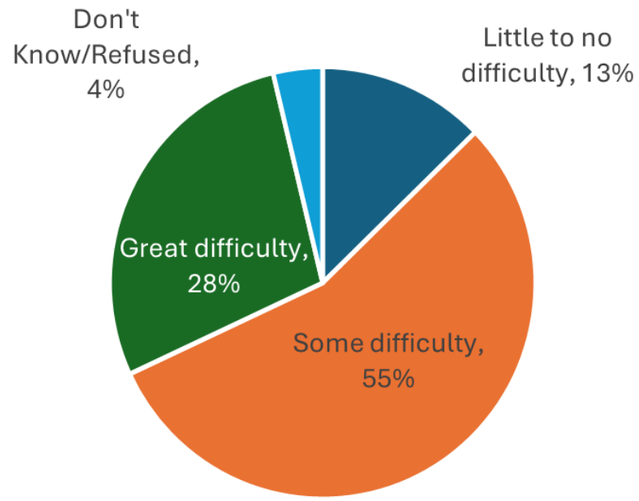
Figure M. Employee Healthcare and Retirement Benefits Offered



Hiring Profile

Over eight in ten (84%) of surveyed firms report "some" difficulty (55%) or "great" difficulty (28%) in hiring qualified workers in any occupation. Only 13% of firms reported "little to no" difficulty hiring qualified workers (Figure N).

Figure N. Firms' Level of Difficulty with Hiring Qualified Workers



HVAC Mechanics and Installers and Construction Managers are the most challenging occupations to hire, with 63% and 80% of surveyed firms reporting "great" difficulty hiring for these occupations, respectively (Figure O). These two occupations also take surveyed firms the longest time to hire, with approximately one in three firms indicating it takes more than three months to hire for these occupations (Figure P). Hiring Electricians and Welders, Cutters, Solderers, and Brazers also pose challenges to surveyed firms, with 50% and 60% of firms reporting "great" difficulty hiring qualified workers for these occupations, respectively. *[Please use caution in interpreting this result given limited sample size.]*

Figure O. Firms' Level of Difficulty with Hiring Qualified Workers by Occupation

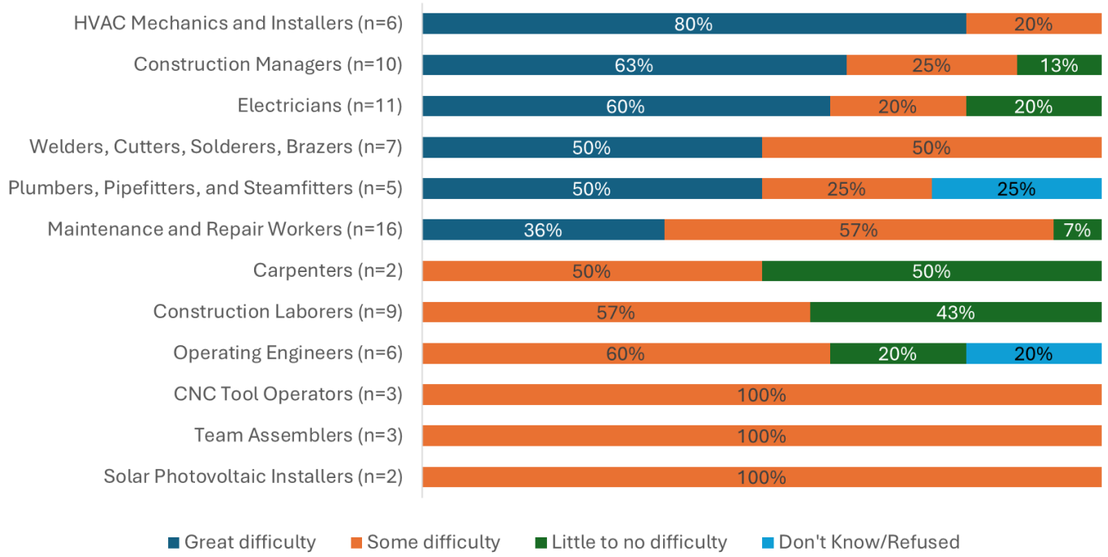
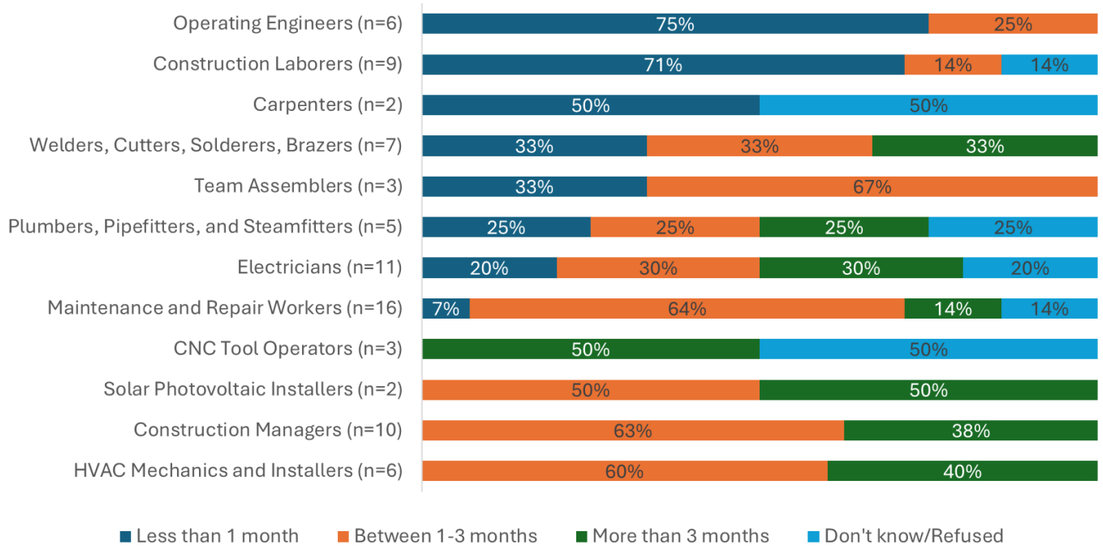
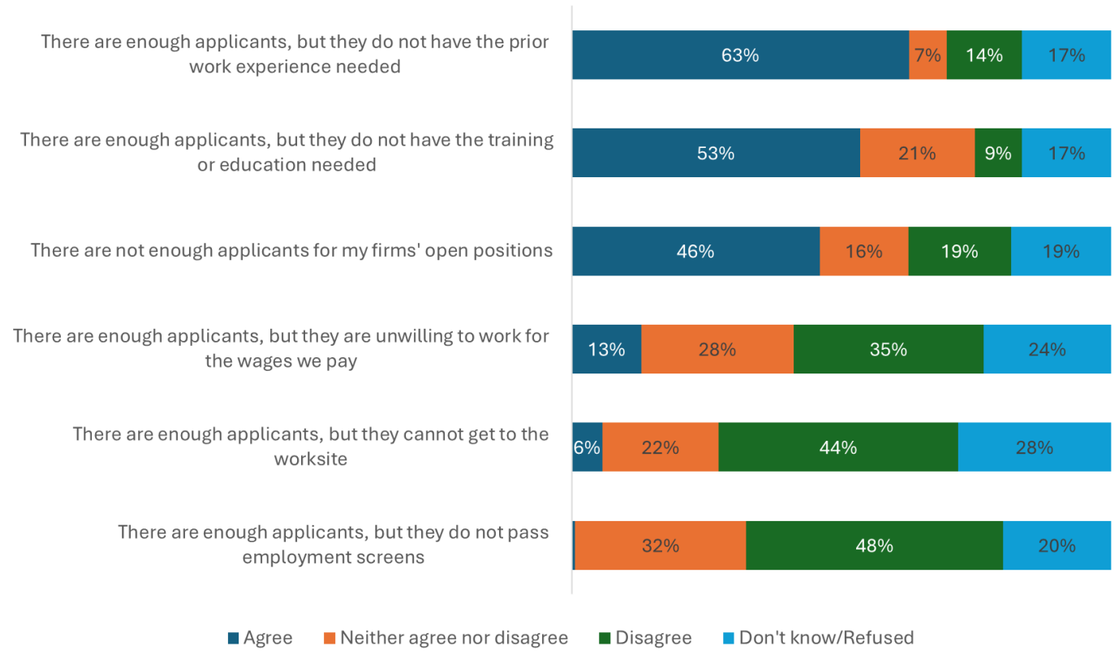


Figure P. Approximate Time to Find and Hire Employees by Occupation



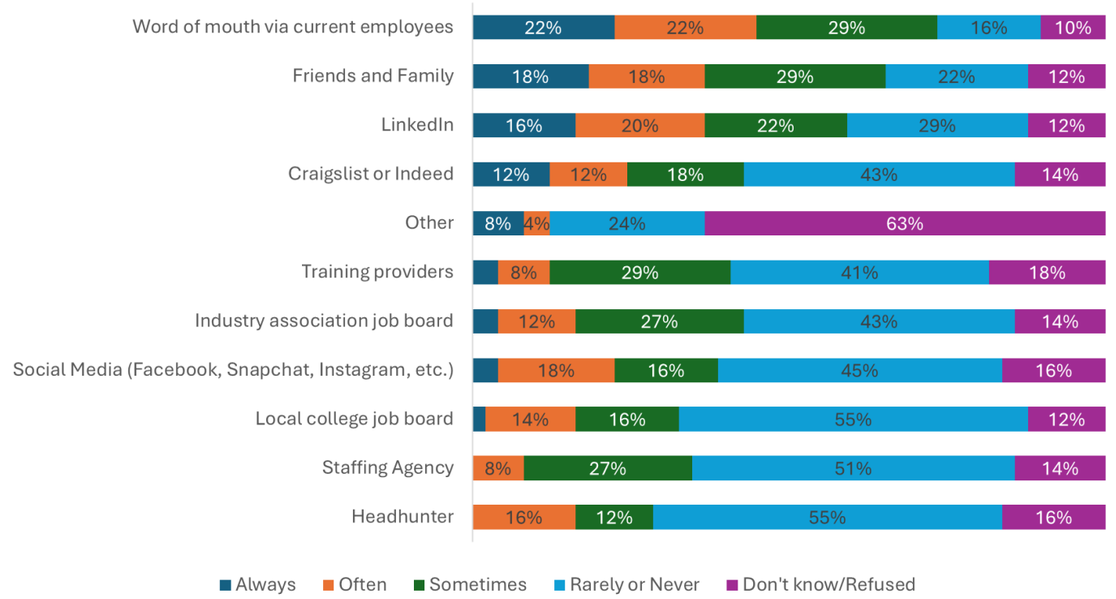
Applicants to surveyed firms often lack the prior work experience, training, and education required for a given position. Approximately two in three (63%) of firms indicated applicants lack the prior work experience needed, while one in two (53%) indicated applicants lack the training or education needed. Surveyed firms face little difficulty providing applicants with competitive wages, receiving adequate transportation means, and receiving applicants who can pass employment screening procedures. However, approximately one in two (46%) firms indicated insufficient applicants for their open positions (Figure Q).

Figure Q. Firms' Level of Agreement with Hiring-Related Issues



Referrals, including through word-of-mouth via current employees, friends and family, LinkedIn, and job boards (Craigslist, Indeed), are the most utilized recruitment and hiring resources among surveyed firms. 44% of firms indicated they "always" or "often" use referrals via current employees to find and hire potential workers, while 36% indicated the same for friends and family referrals (Figure R).

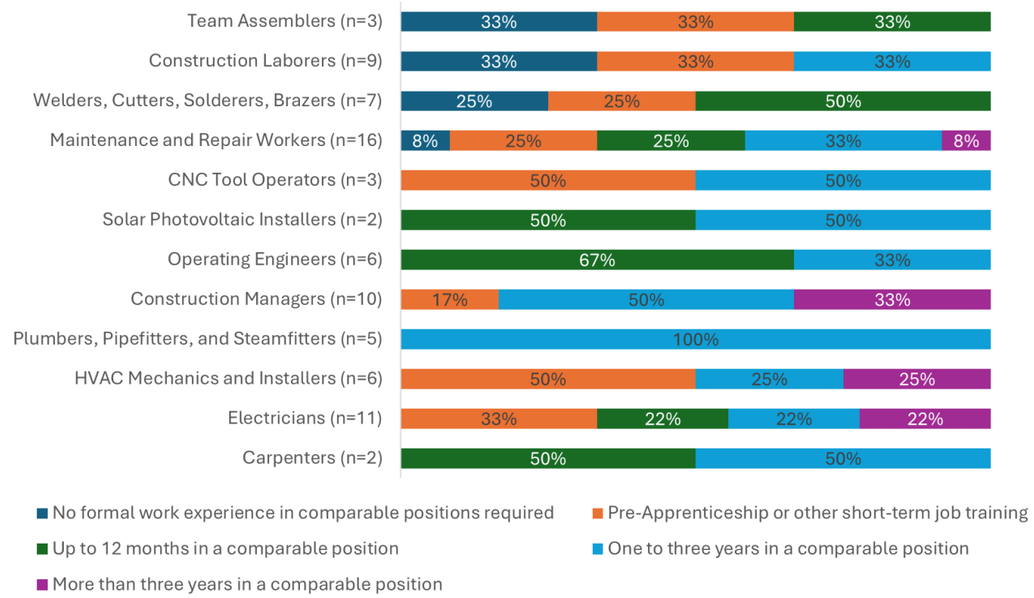
Figure R. Resources Used to Find and Hire Potential Workers



Skill, Education, & Workforce Pipeline Profile

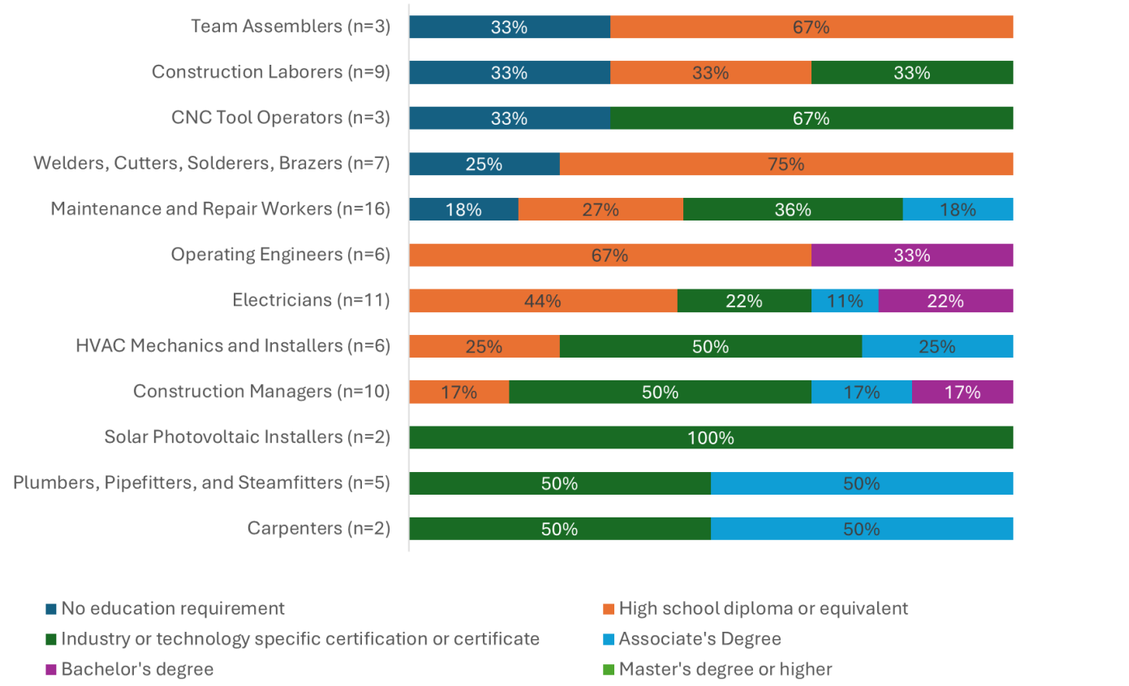
Across most priority occupations, surveyed firms require at least some form of prior work experience for entry-level applicants, although that varies by firm. Construction Manager roles required the highest level of prior work experience, with one in three (33%) firms requiring more than three years in a comparable position. One in three (33%) firms did not require prior work experience for Construction Laborer roles (Figure S). *[Please use caution in interpreting this result given limited sample size.]*

Figure S. Minimum Level of Prior Experience Required of Qualified Applicants by Occupation



Construction Laborers have the lowest educational requirements from surveyed firms of the priority occupations, and very few of the priority occupations tested require a bachelor's degree or higher (Figure T). *[Please use caution in interpreting this result given limited sample size.]*

Figure T. Highest Education Level Required of Qualified Applicants by Occupation

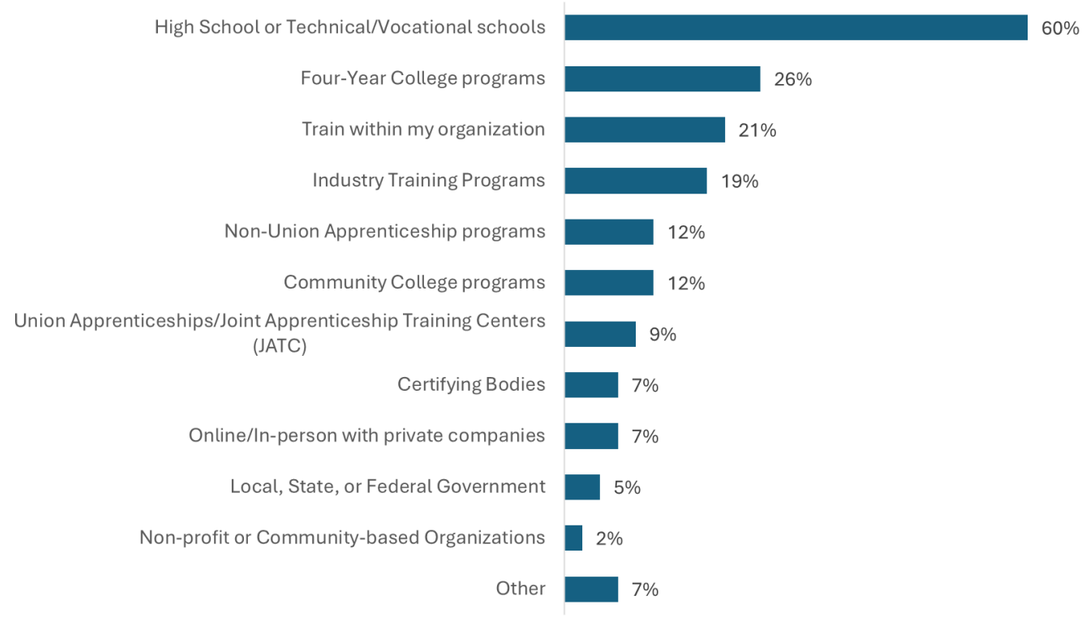


One in two (45%) surveyed firms recruit from within their organization to meet their workforce needs, while four in ten (41%) partner with high schools or technical/vocational schools. One in three partners with four-year colleges (34%) and community colleges (30%). Only one in ten (9%) firms have an existing partnership with union apprenticeship or joint apprenticeship training centers (JATCs) (Figure U).

Figure U. Firms' Partner Organizations for Recruiting and Hiring – Multiple responses permitted; Percentages may sum to more than 100%

60% of surveyed firms also partnered with high schools or technical/vocational schools to meet their training needs, and one in four (26%) partnered with four-year colleges or conducted internal training (21%) (Figure V).

Figure V. Firms' Partner Organizations for Training – Multiple responses permitted; Percentages may sum to more than 100%



Rebates & Internal Programs

Only one in four (26%) surveyed firms utilize incentive or rebate programs, driven by a lack of familiarity with the types of incentives or programs available (Figure W, Figure Y). Among firms that utilize incentives or programs, three in four (73%) use state incentives or rebates, utility incentives (73%), or Federal Government incentives (64%), such as Inflation Reduction Act rebates (Figure X).

Figure W. Does your Firm Utilize Incentive or Rebate Programs in its Green Economy Business?

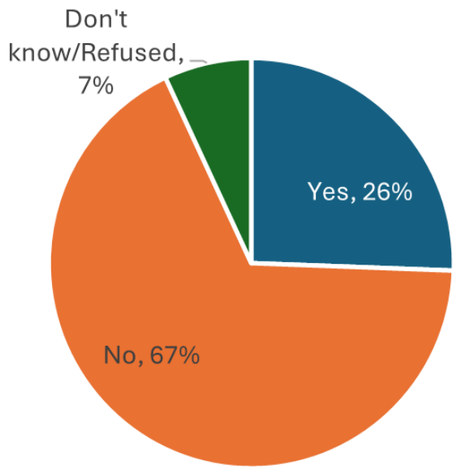


Figure X. Incentives or Rebate Programs Utilized

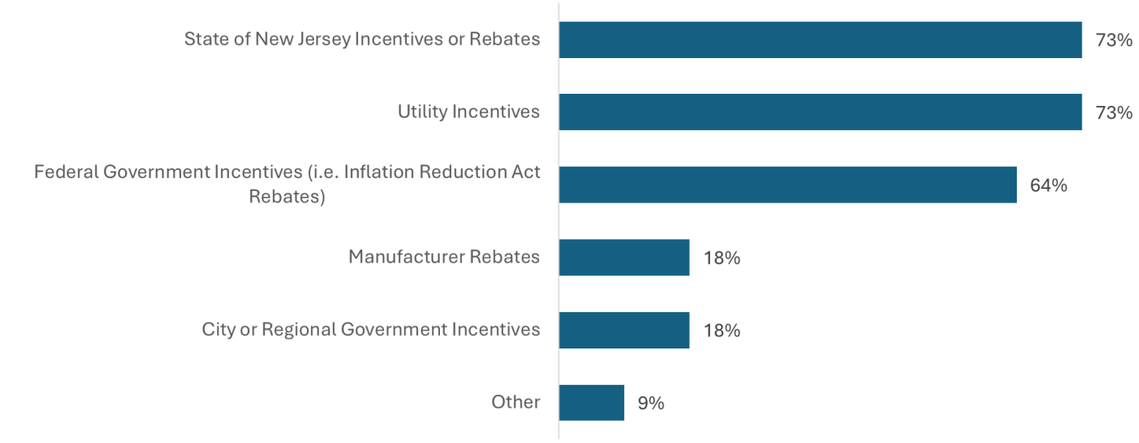
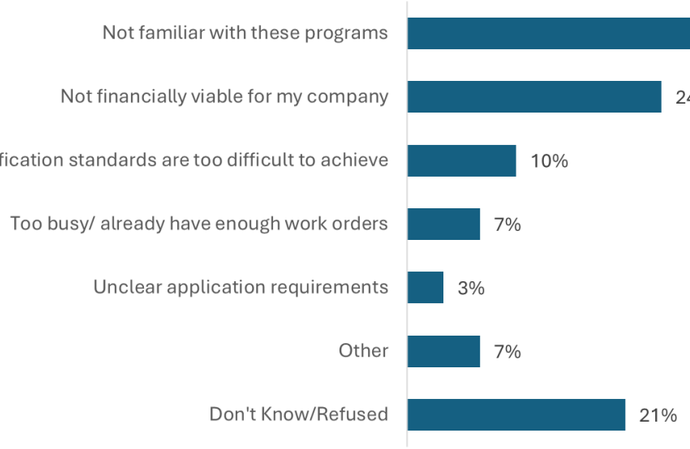


Figure Y. Primary Reasons Incentives or rebate programs are not utilized – Multiple responses are permitted; percentages may be more than 100%.



While just over one in two surveyed firms (51%) conduct criminal background screening on potential applicants, only 40% conduct substance use screening (Figure Z, Figure AA).

Figure Z. Does your Firm Conduct Criminal Background Checks for Potential Applicants?

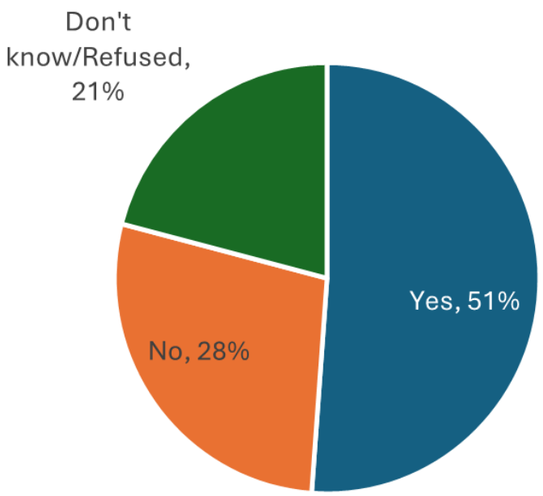
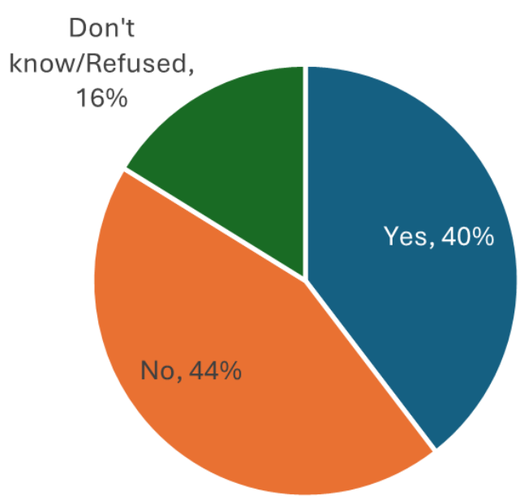
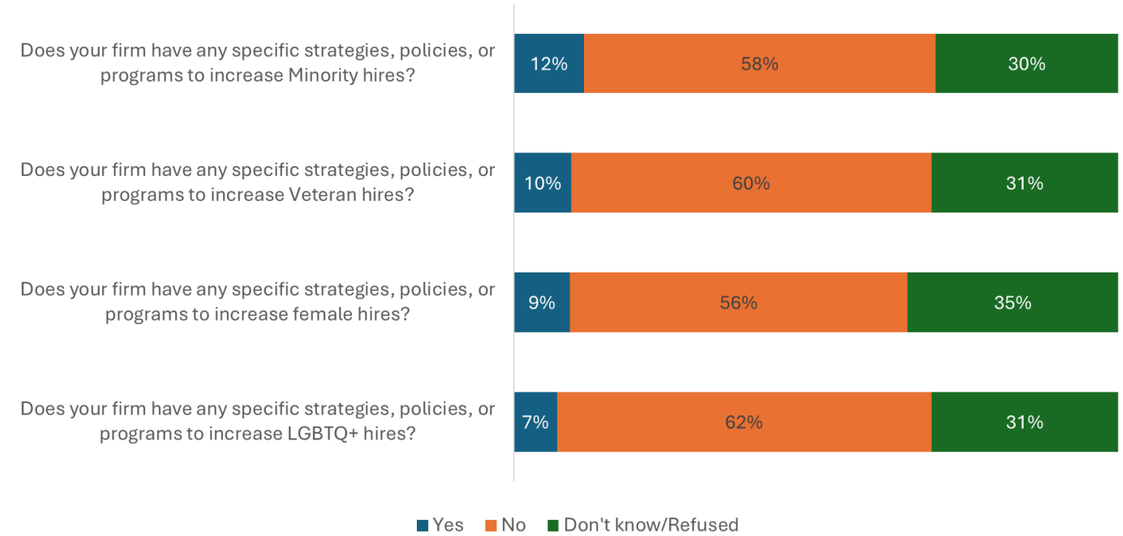


Figure AA. Does your Firm Conduct Substance Use or Drug Testing for Potential Applicants?



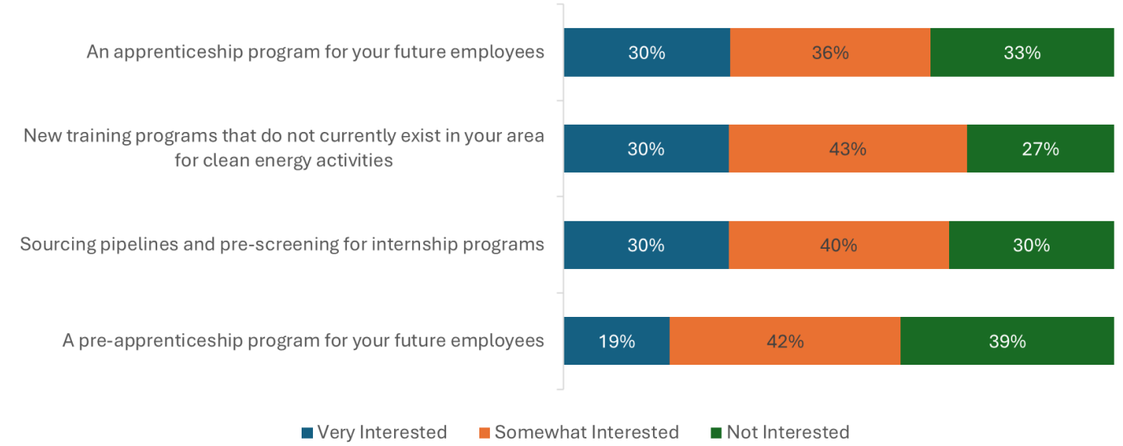
A majority of firms have no special hiring initiatives to target female, minority, LGBTQ+, or Veteran populations. Only 9% of firms have specific strategies, policies, or programs to increase female hires, while only 7% of firms have strategies to increase LGBTQ+ hires (Figure BB).

Figure BB. Firms' Special Hiring Initiatives



Overall, support for new programs was sizable but somewhat less enthusiastic, with no more than three in ten surveyed firms stating they were very interested in the tested workforce initiatives. Three in four (73%) surveyed firms were either very interested (30%) or somewhat interested (43%) in new clean energy training programs in their area, while two in three expressed interest in an apprenticeship program for future employees (66%) and sourcing pipelines and pre-screening for internship programs (Figure CC).

Figure CC. Firms' Expressed Interest in Programs, Services, and Resources to Support Workforce Needs



APPENDIX D: EXECUTIVE INTERVIEW DISCUSSION GUIDE

Education and Workforce

1. What are your organization's goals connected to workforce development, and building a strong New Jersey workforce of the future?
2. Do you offer any green economy training or other workforce development initiatives? *[prompt as needed: "green economy technologies include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in water or waste infrastructure"]*
    a. [If yes]
        i. How does the program operate?
        ii. Do you focus on a specific industry?
        iii. Do you provide any other workforce support services as part of these initiatives or work with partners/other agencies/programs?
        iv. Where do you get your instructors, trainers or teachers?
        v. Are you trying to reach disadvantaged populations with your training (e.g. people of color, women, veterans, young, rural, etc., etc.)?
        vi. What challenges are you seeing in successfully implementing workforce training programs?
    b. [If no]
        i. Are you interested in working on green economy 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 green economy related needs?
5. Are there any state resources, assets or programs that have been useful for your organization
6. Do you partner with any other organizations (e.g. training providers, labor unions, community groups, etc.) on any green economy initiatives [or more broadly]? Why or why not?
7. What is the best role for career and technical education programs in particular in supporting green economy workforce development in the state of New Jersey?
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 green economy 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 New Jersey or other states to reach qualified workers that we can adopt for green economy job recruitment?
13. How do we better reach and inform future potential workers about occupations connected to the green economy? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?
14. How can the state of New Jersey and workforce stakeholders help ensure training and curriculum developments meets employer needs in clean energy and climate-related industries?
15. 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?
16. Do you collect any data on the job placement activities of the participants who completed your program/s? Are you comfortable sharing this data with us?
17. 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?

Business Community / Industry

1. What are your company's/organization's goals for workforce development, especially in connection with the green economy? How are you measuring success? *[prompt as needed: "green economy technologies include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in water or waste infrastructure"]*
2. Do you have/are seeing a growing demand for specific occupations found in the green economy and if so, how are you responding? Are there any occupations in the green economy workforce 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 green economy workforce needs and help ensure training and curriculum developments meet employer needs in the green economy?
4. Is there a history of collaboration and engagement with and among New Jersey employers in developing the state's workforce? What lessons can be leveraged here?
5. What specific occupations are you most focused on, and why?
6. 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?

7. 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?
8. What programs or resources at the state or federal level have been or would be helpful in supporting your needs in green economy workforce development?
9. What have been effective ways in New Jersey or other states to reach qualified workers that we can adopt for green economy job recruitment?
10. How do we better reach and inform future potential workers about occupations connected to the green economy? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?
11. 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?
12. Are there other relevant/important stakeholders we should speak with?

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 the green economy? *[prompt as needed: "green economy technologies include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in water or waste infrastructure"]*
3. Do you provide any other 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 the green economy?
9. What data and information are most helpful in supporting unions interested in pursuing green economy opportunities?
10. Are there other relevant/important stakeholders we should speak with?

Government

1. How would you describe your agency's role in green economy workforce development? Do you see your role as similar or different from other agencies in New Jersey? *[prompt as needed: "green economy technologies include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in water or waste infrastructure"]*
2. Do you offer any green economy workforce programs or funding? Are there any programs in development?
    a. [If Yes]
        i. Are there any challenges you are experiencing in effectively implementing workforce programs?
    b. [If no]
        i. What would you need to see/learn to offer green economy-specific programs or funding?
3. What elements of the New Jersey workforce system should be prioritized and what elements should be improved/created to meet gaps and needs in a future New Jersey green economy workforce?
4. Do you feel that there are enough programs and resources in the state for green economy workforce development?
5. How can IRA/IIJA/CHIPS/BBB have been better aligned with workforce needs and what future federal and state policy and resources are needed to maximize workforce opportunities in those bills?
6. What have been effective ways in New Jersey to reach qualified workers that we can adopt for green economy job recruitment?
7. How do we better reach and inform future potential workers about occupations connected to the green economy? 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 green economy workforce needs and develop comprehensive career pathways?
9. Is there a history of collaboration and engagement with and among New Jersey employers in developing the state's workforce? What lessons can be leveraged here?
10. What is the role of organized labor in preparing New Jersey's green economy workforce?

Community Organizations

1. What primary services does your organization offer?
2. How would you describe your organization's role in workforce development? Do you see your role as similar or different from other organizations in New Jersey?
3. Are you providing or have you previously provided support services to help individuals looking to enter or return to the workforce in any green economy training / workforce program? *[prompt as needed: "green economy technologies include clean energy like solar, wind, energy efficiency, or electric vehicles, or other sectors in water or waste infrastructure"]*

    a. [If yes]

        i. What kind of services/resources?

        ii. Are you experiencing any challenges providing these services?

    b. [If no]

    ○ Would your organization be willing to establish partnerships with workforce development programs and training programs to support workers?

        i. What resources would your organization find most useful in thinking about how to support workers as they seek green 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 tends 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 New Jersey 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 the green economy? How do you ensure that underrepresented individuals and disadvantaged communities are not only hired but also retained at jobs?
9. Returning citizens, disabled residents, veterans, immigrants, individuals lacking post-secondary credentials, and others face unique barriers in entering or re-entering the workforce. What have been best practices, or at least effective strategies in reducing/eliminating those barriers *[optional: follow up on green economy specific challenges and opportunities]*
10. What does an ideal partnership between training/workforce development programs and your organization look like?
11. Are there other relevant/important stakeholders we should speak with?
12. Is there anything that we have not discussed that you think is important to our research?

APPENDIX E: FULL TRAINING INVENTORY

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Eferon Solar Solutions	Introduction to Electricity	Electricians	North Region
Bergen Community College	30-hr OSHA Construction Safety Training	Construction Managers	North Region
United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry	9 Training	Plumbers, pipefitters, and steamfitters	Central Region
UA of New Jersey AC/ Refrigeration Division	A/C Apprenticeship	HVAC Technicians and Mechanics	Central Region
County College of Morris	Advanced Manufacturing	Multiple occupations	North Region
AmeriArc Welding Academy	Advanced Pipe Welder Course	Welders, Cutters, Solderers, and Brazers	North Region
Edison Job Corp Center	Advanced Plumbing, Sewer and Drain Technician	Plumbers, pipefitters, and steamfitters	Central Region
Sheet Metal, Air, and Rail Transportation Local 25	Advanced Welding	Welders, Cutters, Solderers, and Brazers	North Region
C&C Lift Truck	Aerial Lift Certification	Construction Laborers	Central Region
Lincoln Technical Institute	Air Conditioning, Refrigeration, and Heating Systems Technology	HVAC Technicians and Mechanics	North Region
Lincoln Technical Institute	Air Conditioning, Refrigeration, and Heating Systems Technology	HVAC Technicians and Mechanics	North Region
Mechanical Contractors Association of New Jersey	American Red Cross - Standard First Aid, CPR & AED	Multiple occupations	North Region
UA Local 24	Apprenticeship	Plumbers, pipefitters, and steamfitters	North Region
UA Local 332	Apprenticeship	Plumbers, pipefitters, and steamfitters	South Region
UA Local 475	Apprenticeship	Plumbers, pipefitters, and steamfitters	Central Region
UA Local 9	Apprenticeship	Plumbers, pipefitters, and steamfitters	Central Region
Eastern Atlantic States Carpenters Technical Centers	Apprenticeship placement	Carpenters	Central Region
Eastern Atlantic States Carpenters Technical Centers	Apprenticeship placement	Carpenters	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Eastern Atlantic States Carpenters Technical Centers	Apprenticeship placement	Carpenters	South Region
Sheet Metal, Air, and Rail Transportation Local 27	Apprenticeship training	Multiple occupations	Central Region
Mechanical Contractors Association of New Jersey	Basic HVAC-R	HVAC Technicians and Mechanics	North Region
Bergen Community College	Basic to Intermediate Blueprint Reading	Construction Managers	North Region
Mechanical Contractors Association of New Jersey	Blueprint Reading and Estimating	Multiple occupations	North Region
Burlington County Institute of Technology	Blueprint Reading for Electric	Electricians	South Region
Monmouth County Vocational School District	Boiler Operator Low Pressure: BLACK SEAL - ONLINE COURSE	Plumbers, pipefitters, and steamfitters	Online
Electrical Training Academy Corp.	Bootcamp	Electricians	North Region
Essex Community College	Building Code Technology	Construction Managers	North Region
Essex County Vocational - Technical School	Building Construction Technology	Construction Laborers	North Region
Mercer County Community College	Building Construction Technology	Construction Managers	Central Region
Ocean County Vocational Technical School District	Building Construction Technology	Construction Laborers	Central Region
Edison Job Corp Center	Building Construction Technology, pre-apprenticeship	Construction Laborers	Central Region
Passaic County Technical Institute	Building Maintenance	General Maintenance and Repair Workers	North Region
Institute for Contemporary Careers	Building Maintenance Supervisor	General Maintenance and Repair Workers	North Region
Warren County Technical School	Building Technology	Construction Laborers	North Region
Pipefitters 274	Building Trades	Plumbers, pipefitters, and steamfitters	North Region
New Community Career & Technical Institute	Building Trades Specialist Program	Multiple occupations	North Region
Eastern Atlantic States Carpenters Technical College	Carpenter	Carpenters	Central Region
Eastern Atlantic States Carpenters Technical College	Carpenter	Carpenters	South Region
Absegami High School	Carpentry	Carpenters	South Region
Atlantic County Institute of Technology	Carpentry	Carpenters	South Region
Camden County College	Carpentry	Carpenters	South Region
Essex County Schools of Technology	Carpentry	Carpenters	North Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Greater Egg Harbor Regional High School District	Carpentry	Carpenters	South Region
Greater Egg Harbor Regional High School District	Carpentry	Carpenters	South Region
Monmouth County Vocational School District	Carpentry	Carpenters	Central Region
Morris County Vocational School District	Carpentry	Carpenters	North Region
Passaic County Technical Institute	Carpentry	Carpenters	North Region
Pennsauken High School	Carpentry	Carpenters	South Region
Somerset County Vocational & Technical High School	Carpentry	Carpenters	Central Region
Sussex County Technical School	Carpentry	Carpenters	North Region
Cape May County Technical School	Carpentry & Property Management	Carpenters	South Region
Cape May County Technical School	Carpentry and Property Management	Carpenters	South Region
Mercer County Technical Schools	Carpentry Apprenticeship	Carpenters	Central Region
Ideal Institute of Technology	Carpentry Basics	Carpenters	South Region
Mercer County Technical Schools	Carpentry Certificate	Carpenters	Central Region
Gloucester County Institute of Technology	Carpentry I-IV	Carpenters	South Region
Edison Job Corp Center	Carpentry pre-apprenticeship	Carpenters	Central Region
Essex County Vocational - Technical School	Carpentry/ Carpenter	Carpenters	North Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Carpentry/Construction Trades	Carpenters	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Carpentry/Construction Trades	Carpenters	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Carpentry/Construction Trades	Carpenters	Central Region
Monmouth County Vocational School District	CDL B w/ Passenger Endorsement	Operating Engineers	Central Region
Middlesex College	Civil/Construction Engineering Technology	Construction Laborers	Central Region
Middlesex College	Civil/Construction Engineering Technology A.A.S.	Construction Managers	Central Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Hudson County Community College	Construction Administration	Construction Managers	North Region
Bergen Community College	Construction Administration and Licensing/UCC	Construction Managers	North Region
Construction Craft Laborers and Apprenticeship Fund	Construction Apprenticeship	Construction Laborers	Central Region
Installations 3 Construction Training Center	Construction Core Pre-Apprenticeship	Construction Laborers	North Region
Bergen Community College	Construction Documents, Contract Law, Insurance and Ethics	Construction Managers	North Region
Stevens Institute of Technology	Construction Engineering & Management	Construction Managers	North Region
Fairleigh Dickinson University	Construction Engineering Technology B.S.	Construction Managers	North Region
Bergen Community College	Construction Estimating Basics	Construction Managers	North Region
Eastern Atlantic States Carpenters Technical Centers	Construction Fall Protection	Carpenters	South Region
Rowan University	Construction Leadership	Construction Managers	South Region
Hudson County Community College	Construction Management	Construction Managers	North Region
New Jersey Institute of Technology	Construction Management	Construction Managers	North Region
Rowan College at Burlington	Construction Management	Construction Managers	South Region
Rowan College at Burlington County	Construction Management	Construction Managers	South Region
Rowan University	Construction Management	Construction Managers	South Region
Rowan University	Construction Management Certificate of Graduate Study	Construction Managers	South Region
Fairleigh Dickinson University	Construction Management Technology	Construction Managers	North Region
Middlesex College	Construction Project Management	Construction Managers	Central Region
Rowan University	Construction Project Management	Construction Managers	South Region
Americation Career and Training School	Construction Project Manager	Construction Managers	Online
Bergen Community College	Construction Project Organization and Management	Construction Managers	North Region
Bergen Community College	Construction Project Scheduling I	Construction Managers	North Region
Bergen Community College	Construction Site Management	Construction Managers	North Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Rowan College of South Jersey Gloucester	Construction Supervision	Construction Managers	South Region
Burlington County Institute of Technology	Construction Technology	Construction Laborers	South Region
Delsea CTE	Construction Technology	Construction Laborers	South Region
Hudson County Community College	Construction Technology	Construction Managers	North Region
Salem County Career and Technical High School	Construction Technology	Construction Laborers	South Region
Ideal Institute of Technology	Construction Trades	Construction Laborers	South Region
Union County Career Technical Institute	Construction Trades	Construction Laborers	North Region
Cumberland County Vocational School	Construction Trades Program	Construction Laborers	South Region
Barringer High School	CTE Academy	Carpenters	North Region
Ocean County Vocational Technical School District	Custom Woodworking & Design	Carpenters	Central Region
Hudson County Schools of Technology - HTHS	D|Fab Wood Technology	Carpenters	Central Region
Installations 3 Construction Training Center	Department of Labor Registered Apprenticeship (RA) Programs	Multiple occupations	North Region
Monmouth County Vocational School District	Diesel Mechanics	Operating Engineers	Central Region
Eastern Atlantic States Carpenters Technical College	EASCTC Apprenticeship	Carpenters	Central Region
Eastern Atlantic States Carpenters Technical Centers	Eastern District Piledriver & infrastructure training	Operating Engineers	South Region
Eastern Atlantic States Carpenters Technical Centers	Eastern District Piledriver & infrastructure training	Operating Engineers	South Region
Camden County College	Electrical-Electronic Engineering	Electricians	South Region
Hunterdon County Vocational School District - Adult and Continuing Education	Electrical	Electricians	Central Region
Fortis Institute	Electrical and Electronic Systems Technician	Electricians	Central Region
Lincoln Technical Institute	Electrical And Electronic Systems Technology	Electricians	North Region
Lincoln Technical Institute	Electrical And Electronic Systems Technology	Electricians	North Region
Warren County Technical School	Electrical Applications	Electricians	North Region
Camden County College	Electrical Apprentice - Levels I - IV	Electricians	South Region
Cape May County Technical High School	Electrical Apprenticeship	Electricians	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Cape May County Technical School	Electrical Apprenticeship	Electricians	South Region
Mercer County Technical Schools	Electrical Apprenticeship	Electricians	Central Region
Morris County School of Technology, Adult Education	Electrical Apprenticeship	Electricians	North Region
Ideal Institute of Technology	Electrical Assistant	Electricians	South Region
National Career Institute	ELECTRICAL ASSISTANT & HVAC	Electricians	North Region
National Career Institute	Electrical Assistant & HVAC	Electricians	North Region
Mercer County Technical Schools	Electrical Certificate	Electricians	Central Region
Essex Community College	Electrical Code Technology	Electricians	North Region
Essex County College	Electrical Code Technology - Certificate of Achievement (3051)	Electricians	North Region
Somerset County Vocational & Technical High School	Electrical Construction	Electricians	Central Region
Gloucester County Institute of Technology	Electrical Construction Specialization	Electricians	South Region
Fairleigh Dickinson College-Metropolitan Campus	Electrical Engineering	Electricians	North Region
Princeton University	Electrical Engineering	Electricians	Central Region
Princeton University	Electrical Engineering	Electricians	Central Region
Princeton University	Electrical Engineering	Electricians	Central Region
Rowan College South Jersey: Gloucester	Electrical Engineering	Electricians	South Region
Stevens Institute of Technology	Electrical Engineering	Electricians	North Region
Stevens Institute of Technology	Electrical Engineering	Electricians	North Region
Stevens Institute of Technology	Electrical Engineering	Electricians	North Region
The College of New Jersey	Electrical Engineering	Electricians	Central Region
Essex County College	Electrical Engineering Technology - AAS (2313)	Electricians	North Region
Rowan College South Jersey	Electrical Engineering Technology (2+2)	Electricians	South Region
Cape May County Technical School	Electrical Housing Wiring	Electricians	South Region
Inspection 21	Electrical Inspection I-21-101-E	Electricians	North Region
Brookdale Community College	Electrical Inspector, HHS	Electricians	Online
Brookdale Community College	Electrical Inspector, ICS	Electricians	Online

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Camden County College	Electrical Residential	Electricians	South Region
Fortis Institute	Electrical Systems Technician	Electricians	North Region
Fortis Institute	Electrical Systems Technician	Electricians	North Region
Fortis Institute	Electrical Systems Technician	Electricians	Central Region
Bergen Community College	Electrical Technician	Electricians	Online
Raritan Valley Community College	Electrical Technician	Electricians	Online
Salem Community College	Electrical Technician	Electricians	South Region
Bergen Community College	Electrical Technician (Tools Included)	Electricians	Online
Barringer High School	Electrical Technology	Electricians	North Region
Delsea CTE	Electrical Technology	Electricians	South Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Electrical Technology	Electricians	Central Region
Salem County Career and Technical High School	Electrical Technology	Electricians	South Region
Salem County Vocational Technical School District	Electrical Technology	Electricians	South Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Electrical Technology Adult Certificate Program	Electricians	Central Region
Passaic County Technical Institute	Electrical Technology HVAC/Refrigeration	Electricians	North Region
Morris County Vocational School District	Electrical trades	Electricians	North Region
Ocean County Vocational Technical School District	Electrical Trades	Electricians	Central Region
Ocean County Vocational Technical School District	Electrical Trades	Electricians	Central Region
Pennsauken High School	Electrical Trades	Electricians	South Region
American Institute	Electrical Trades Technology	Electricians	North Region
American Institute	Electrical Trades Technology	Electricians	Central Region
American Institute	Electrical Trades Technology	Electricians	Central Region
American Institute	Electrical Trades Technology	Electricians	South Region
Essex County Vocational - Technical School	Electrical, Electronic, and Communications Engineering Technology/ Technician	Electricians	North Region
Edison Job Corp Center	Electrical, pre-apprenticeship	Electricians	Central Region
Lincoln Technical Institute	Electrical/Electronics	Electricians	North Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Bergen County Technical School	Electrician	Electricians	North Region
Essex County Vocational - Technical School	Electrician	Electricians	North Region
Pennco Tech-Blackwood	Electrician	Electricians	South Region
Sussex County Technical School	Electrician	Electricians	North Region
Fireworks Electric LLC	Electrician - TIME - BASED	Electricians	Central Region
MCommunity Development Corp.	Electrician - TIME-BASED	Electricians	South Region
Eastwick College-Nutley	Electrician Apprenticeship	Electricians	North Region
Eastwick Education - HoHoKus School of Trade	Electrician Apprenticeship	Electricians	North Region
IBEW 102	Electrician Apprenticeship	Electricians	North Region
IBEW 164	Electrician Apprenticeship	Electricians	North Region
IBEW 400	Electrician Apprenticeship	Electricians	Central Region
Lincoln Technical Institute	Electrician Training Program	Electricians	North Region
Lincoln Technical Institute	Electrician Training Program	Electricians	North Region
Lincoln Technical Institute	Electrician Training Program	Electricians	South Region
Hudson Training Center	Electricity	Electricians	North Region
Monmouth County Vocational School District	Electricity	Electricians	Central Region
Monmouth County Vocational School District	Electricity Apprenticeship	Electricians	Central Region
Absegami High School	Engineering Technology	Operating Engineers	South Region
Sussex County Technical School	EPA Section 608 Refrigeration	HVAC Technicians and Mechanics	North Region
Sussex County Technical School	Exploratory Construction	Multiple occupations	North Region
Eastern Atlantic States Carpenters Technical Centers	First Aid/CPR/AED (CE)	Multiple occupations	South Region
Mechanical Contractors Association of New Jersey	Foreman Training	Multiple occupations	North Region
Cape May County Technical School	Forklift Certification	Operating Engineers	South Region
EZ Wheels Driving School	Forklift Certification - OSHA Safety Training for Forklift Operators	Construction Laborers	North Region
C&C Lift Truck	Forklift Training	Construction Laborers	Central Region
Brookdale Community College	Foundation of Plumbing	Plumbers, pipefitters, and steamfitters	Online
Bergen Community College	Foundations of Plumbing	Plumbers, pipefitters, and steamfitters	Online

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Raritan Valley Community College	Foundations of Plumbing	Plumbers, pipefitters, and steamfitters	Online
Bergen Community College	Foundations of Plumbing (Tools Included)	Plumbers, pipefitters, and steamfitters	Online
AmeriArc Welding Academy	Gas Metal Arc Welding (GMAW or MIG)/Flux Cored Arc Welding (FCAW)	Welders, Cutters, Solderers, and Brazers	North Region
AmeriArc Welding Academy	Gas Tungsten Arc Welding (GTAW - Pipe)	Welders, Cutters, Solderers, and Brazers	North Region
National Career Institute	General Construction	Multiple occupations	North Region
Institute for Contemporary Careers	General Construction Manager	Construction Managers	North Region
Elite Welder Training & Testing	GMAW/FCAW (Mig) STRUCTURAL/PLATE PROGRAM	Welders, Cutters, Solderers, and Brazers	South Region
Elite Welder Training & Testing	GTAW (TIG) PIPE WELDING QUALIFICATION PROGRAM	Welders, Cutters, Solderers, and Brazers	South Region
Hudson Training Center	Heating	HVAC Technicians and Mechanics	North Region
Essex County Vocational - Technical School	Heating Air Conditioning, Ventilation and Refrigeration Maintenance Technology/ Technicians	HVAC Technicians and Mechanics	North Region
Bergen County Technical School	Heating Air conditioning, Ventilation, and Refrigeration Maintenance Technology/Technician	HVAC Technicians and Mechanics	North Region
Mercer County Technical Schools	Heating, Ventilation, Air Conditioning & Refrigeration Technology (HVAC-R)	HVAC Technicians and Mechanics	Central Region
Hunterdon County Vocational School District - Adult and Continuing Education	Heavy Equipment Operator	Operating Engineers	Central Region
Lincoln Technical Institute	Heavy Equipment Operator	Operating Engineers	Central Region
Medical Construction Industrial Training Center, LLC	Heavy Equipment Operator	Operating Engineers	South Region
Ocean County Vocational Technical School District	Heavy Equipment Operator	Operating Engineers	Central Region
Ocean County Vocational Technical Schools	Heavy Equipment Operator	Operating Engineers	Central Region
Lincoln Technical Institute	Heavy Equipment Service Technology	Operating Engineers	Central Region
Burlington County Institute of Technology	HVAC	HVAC Technicians and Mechanics	South Region
Fortis Institute	HVAC	HVAC Technicians and Mechanics	North Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Fortis Institute	HVAC	HVAC Technicians and Mechanics	Central Region
Lincoln Technical Institute	HVAC	HVAC Technicians and Mechanics	North Region
Lincoln Technical Institute	HVAC	HVAC Technicians and Mechanics	North Region
Lincoln Technical Institute	HVAC	HVAC Technicians and Mechanics	South Region
Monmouth County Vocational School District	HVAC	HVAC Technicians and Mechanics	Central Region
Morris County Vocational School District	HVAC	HVAC Technicians and Mechanics	North Region
Pennsauken High School	HVAC	HVAC Technicians and Mechanics	South Region
Raritan Valley Community College	HVAC	HVAC Technicians and Mechanics	Central Region
Raritan Valley Community College	HVAC	HVAC Technicians and Mechanics	Central Region
Salem County Career and Technical High School	HVAC	HVAC Technicians and Mechanics	South Region
Sussex County Technical School	HVAC	HVAC Technicians and Mechanics	North Region
Ocean County Vocational Technical School District	HVAC & R	HVAC Technicians and Mechanics	Central Region
Pennco Tech-Blackwood	HVAC & R	HVAC Technicians and Mechanics	South Region
Camden County College	HVAC Apprentice - Levels 1-4	HVAC Technicians and Mechanics	South Region
Mercer County Technical Schools	HVAC Apprenticeship	HVAC Technicians and Mechanics	Central Region
Monmouth County Vocational School District	HVAC Apprenticeship	HVAC Technicians and Mechanics	Central Region
National Career Institute	HVAC I & II	HVAC Technicians and Mechanics	North Region
Ideal Institute of Technology	HVAC Technician	HVAC Technicians and Mechanics	South Region
Edison Job Corp Center	HVAC technology	HVAC Technicians and Mechanics	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	HVAC technology	HVAC Technicians and Mechanics	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	HVAC technology	HVAC Technicians and Mechanics	Central Region
Pipefitters 274	HVAC-R	HVAC Technicians and Mechanics	Central Region
Cape May County Technical High School	HVAC-R Apprenticeship	HVAC Technicians and Mechanics	South Region
Cape May County Technical School	HVAC-R Apprenticeship	HVAC Technicians and Mechanics	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Inspection 21	HVAC—Air Conditioning & Heat Pumps Inspection I21-101-HVAC-AC	HVAC Technicians and Mechanics	North Region
Inspection 21	HVAC—Heating Inspection I-21-101-HVAC-H1	HVAC Technicians and Mechanics	North Region
Inspection 21	HVAC—Heating Inspection II I-21-101-HVAC-H2	HVAC Technicians and Mechanics	North Region
Morris County School of Technology, Adult Education	HVAC/R	HVAC Technicians and Mechanics	North Region
Cape May County Technical High School	HVAC/R & Sustainable Energy	HVAC Technicians and Mechanics	South Region
Bergen Community College	HVAC/R Certified Technician	HVAC Technicians and Mechanics	Online
Bergen Community College	HVAC/R Simulations for Field Technicians	HVAC Technicians and Mechanics	Online
Bergen Community College	HVAC/R Technician	HVAC Technicians and Mechanics	Online
Brookdale Community College	HVAC/R Technician	HVAC Technicians and Mechanics	Online
Raritan Valley Community College	HVAC/R Technician (Voucher Included)	HVAC Technicians and Mechanics	Online
Camden County College	HVACR	HVAC Technicians and Mechanics	South Region
Eastwick College-Nutley	HVACR	HVAC Technicians and Mechanics	North Region
Fortis Institute	HVACR	HVAC Technicians and Mechanics	North Region
Fortis Institute	HVACR	HVAC Technicians and Mechanics	Central Region
New Jersey PHCC Apprenticeship Academy	HVACR	HVAC Technicians and Mechanics	Online
Universal Technical Institute	HVACR	HVAC Technicians and Mechanics	North Region
Mercer County Technical Schools	HVACR Certificate	HVAC Technicians and Mechanics	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	HVACR Certificate Program	HVAC Technicians and Mechanics	Central Region
Bergen Community College	HVACR Controls/ Building Automation Systems	HVAC Technicians and Mechanics	Online
Camden County College	Hydro Technology (Plumbing)	Plumbers, pipefitters, and steamfitters	South Region
Bergen Community College	Industrial Maintenance Mechanic	Operating Engineers	North Region
Rowan College of South Jersey-Cumberland Campus	Industrial Maintenance Technician	General Maintenance and Repair Workers	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
IBEW 269	Inside Wireman Apprenticeship	Electricians	Central Region
IBEW 456	Inside Wireperson Apprenticeship	Electricians	Central Region
Monmouth County Vocational School District	Introduction to Instrumentation and Control Fundamentals	Multiple occupations	Central Region
IBEW 351	Journeyman Wireman	Electricians	South Region
Burlington County Institute of Technology	Journeyworker's Electrician Exam Prep	Electricians	South Region
Bergen Community College	Machine Tool Operator	Operating Engineers	North Region
Bergen Community College	Maintenance Technician	General Maintenance and Repair Workers	Online
Warren County Community College	Maintenance Technician	General Maintenance and Repair Workers	Online
Rider University	Management and Leadership Certificate	Construction Managers	Central Region
Eastern Atlantic States Carpenters Technical Centers	MEWPs – Mobile Elevating Work Platforms (formerly Aerial Lift)	Multiple occupations	South Region
Associated Construction Contractors of New Jersey	Microsoft Excel for Construction Scheduling	Construction Managers	Online
Raritan Valley Community College	NABCEP Certification – PV Associate (Exam Cost Included)	Solar installers	Online
Raritan Valley Community College	NABCEP Certification – PV Design Specialist	Solar installers	Online
Raritan Valley Community College	NABCEP Certification – PV Installation Professional	Solar installers	Online
Bergen Community College	NABCEP Certification-PV Associate	Solar installers	Online
Bergen Community College	NABCEP Certification-PV Design Specialist	Solar installers	Online
Bergen Community College	NABCEP Certification-PV Installation Master	Solar installers	Online
Laborers' International Union of North America (LIUNA)	NJ Construction Craft Laborers Apprenticeship Program	Construction Laborers	Central Region
Ocean County Vocational Technical School District	OCVTS APPRENTICESHIP PROGRAM	Multiple occupations	Central Region
Eastern Atlantic States Carpenters Technical Centers	Open Welding – (Welding Certification/ Recertification)	Welders, Cutters, Solderers, and Brazers	South Region
IUOE 825	Operating Apprenticeship	Operating Engineers	Central Region
Essex County Schools of Technology	OSHA 10 Certification	Multiple occupations	North Region
African American Chamber of Commerce	OSHA 10 Construction	Construction Laborers	Central Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
African American Chamber of Commerce	OSHA 10 General Industry	Multiple occupations	Central Region
Sheet Metal, Air, and Rail Transportation Local 25	OSHA 10 or OSHA 30	Multiple occupations	North Region
Insulators Local 89	OSHA 30	Multiple occupations	Central Region
Sheet Metal, Air, and Rail Transportation Local 27	OSHA 30	Multiple occupations	Online
African American Chamber of Commerce	OSHA 30 General Industries	Multiple occupations	Central Region
Eastern Atlantic States Carpenters Technical Centers	OSHA 30 Hour for Construction (90007B)	Multiple occupations	South Region
Mechanical Contractors Association of New Jersey	OSHA 30-hour Construction	Multiple occupations	Online
Union College	Photovoltaic Studies	Solar installers	North Region
AmeriArc Welding Academy	Pipeline Welding (Downhill) API 1104 Standard	Welders, Cutters, Solderers, and Brazers	North Region
Eastwick College-Nutley	Plumber Apprenticeship	Plumbers, pipefitters, and steamfitters	North Region
Eastwick Education - HoHoKus School of Trade	Plumber Apprenticeship	Plumbers, pipefitters, and steamfitters	North Region
Atlantic County Institute of Technology	Plumbing	Plumbers, pipefitters, and steamfitters	South Region
Burlington County Institute of Technology	Plumbing	Plumbers, pipefitters, and steamfitters	South Region
Hudson Training Center	Plumbing	Plumbers, pipefitters, and steamfitters	North Region
Hunterdon County Vocational School District - Adult and Continuing Education	Plumbing	Plumbers, pipefitters, and steamfitters	Central Region
New Jersey PHCC Apprenticeship Academy	Plumbing	Plumbers, pipefitters, and steamfitters	Online
Ocean County Vocational Technical School District	Plumbing	Plumbers, pipefitters, and steamfitters	Central Region
Passaic County Technical Institute	Plumbing	Plumbers, pipefitters, and steamfitters	North Region
New Jersey PHCC e.Learning Plumbing & HVACR Apprenticeship Academy	Plumbing - Heating - Cooling - Contractors Association	Plumbers, pipefitters, and steamfitters	Online
Monmouth County Vocational School District	Plumbing & Pipefitting	Plumbers, pipefitters, and steamfitters	Central Region
Morris County Vocational School District	Plumbing & Pipefitting	Plumbers, pipefitters, and steamfitters	North Region
Camden County College	Plumbing Apprentice - Level I Through IV	Plumbers, pipefitters, and steamfitters	South Region
Essex County Schools of Technology	Plumbing Apprenticeship	Plumbers, pipefitters, and steamfitters	North Region
Mercer County Technical Schools	Plumbing Apprenticeship	Plumbers, pipefitters, and steamfitters	Central Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Monmouth County Vocational School District	Plumbing Apprenticeship	Plumbers, pipefitters, and steamfitters	Central Region
Morris County School of Technology, Adult Education	Plumbing Apprenticeship	Plumbers, pipefitters, and steamfitters	North Region
Ideal Institute of Technology	Plumbing Basics	Plumbers, pipefitters, and steamfitters	South Region
Mercer County Technical Schools	Plumbing Certificate	Plumbers, pipefitters, and steamfitters	Central Region
Essex Community College	Plumbing Code Technology	Plumbers, pipefitters, and steamfitters	North Region
Camden County College	Plumbing Inspector ICS	Plumbers, pipefitters, and steamfitters	South Region
Mechanical Contractors Association of New Jersey	Plumbing Systems and Project Management	Plumbers, pipefitters, and steamfitters	North Region
Delsea CTE	Plumbing Technology	Plumbers, pipefitters, and steamfitters	South Region
Essex County Vocational - Technical School	Plumbing Technology	Plumbers, pipefitters, and steamfitters	North Region
Somerset County Vocational & Technical High School	Plumbing Technology	Plumbers, pipefitters, and steamfitters	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Plumbing Technology Certificate Program	Plumbers, pipefitters, and steamfitters	Central Region
Bergen County Technical School	Plumbing Technology/ Plumber	Plumbers, pipefitters, and steamfitters	North Region
Eastern Atlantic States Carpenters Technical Centers	Powered Industrial Truck Operator – Rough Terrain (PITO-RTV)	Operating Engineers	South Region
County College of Morris	Project Management	Construction Managers	North Region
Hudson Training Center	Refrigeration & HVAC	HVAC Technicians and Mechanics	North Region
Eferon Solar Solutions	Renewable Energy Technician Professional	Solar installers	North Region
Gloucester County Institute of Technology	Residential Electric	Electricians	South Region
Bergen Community College	Residential Electrician	Electricians	Online
Brookdale Community College	Residential Electrician	Electricians	Online
Brookdale, Center for Career Development	Residential Electrician	Electricians	Online
Raritan Valley Community College	Residential Electrician	Electricians	Online
Gloucester County Institute of Technology	Residential HVACR	HVAC Technicians and Mechanics	South Region
Gloucester County Institute of Technology	Residential Plumbing	Plumbers, pipefitters, and steamfitters	South Region
Eastern Atlantic States Carpenters Technical Centers	Scaffolding Erector Qualification	Multiple occupations	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Pennsauken High School	School-to-Careers	Multiple occupations	South Region
Pennsauken High School	School-to-Work	Multiple occupations	South Region
AmeriArc Welding Academy	Shielded Metal Arc Welding (SMAW - Pipe)	Welders, Cutters, Solderers, and Brazers	North Region
AmeriArc Welding Academy	Shielded Metal Arc Welding (SMAW - Plate)	Welders, Cutters, Solderers, and Brazers	North Region
Elite Welder Training & Testing	SMAW (Stick) PIPE WELDING QUALIFICATION PROGRAM	Welders, Cutters, Solderers, and Brazers	South Region
Elite Welder Training & Testing	SMAW (Stick) STRUCTURAL/PLATE PROGRAM	Welders, Cutters, Solderers, and Brazers	South Region
Interfaith Neighbors Launch Center	SOAR CDL	Solar installers	Central Region
Bergen Community College	Solar Design Training	Solar installers	Online
Com-Tec Institute	Solar Energy Technician	Solar installers	North Region
Eferon Solar Solutions	Solar Energy Technician	Solar installers	North Region
Bergen Community College	Solar Energy Training	Solar installers	Online
Bergen Community College	Solar Panel Installer Training	Solar installers	Online
Raritan Valley Community College	Solar Panel Installer Training	Solar installers	Online
Hudson Training Center	Solar Panels	Solar installers	North Region
Middlesex College	Solar Photovoltaic	Solar installers	Central Region
T Byrd Computer School	Solar Professional and Sales Certification	Solar installers	South Region
Bergen Community College	Solar Sales Training	Solar installers	Online
Gloucester County Institute of Technology	Subarc Welding	Welders, Cutters, Solderers, and Brazers	South Region
Brookdale Community College	Subcode Official	Construction Laborers	Online
Brookdale Community College	Technical Assistant	Construction Laborers	Online
Atlantic County Workforce Development Board	The Get into Energy Math and Boot Camp	Multiple occupations	South Region
Atlantic County Workforce Development Board	The High School Energy Career Academy	Multiple occupations	South Region
Atlantic County Workforce Development Board	The Women in Sustainable Employment (WISE) Pathway	Multiple occupations	South Region
Monmouth County Vocational School District	Tractor Trailer – CDL Class A	Operating Engineers	Central Region
Jingoli Power	Train to hire	Multiple occupations	Central Region
Eastern Atlantic States Carpenters Technical Centers	Underwater Welding	Welders, Cutters, Solderers, and Brazers	South Region
Essex Community College	Uniform Construction Code	Construction Managers	North Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Essex Community College	Uniform Construction Code Technology	Construction Managers	North Region
Sheet Metal, Air, and Rail Transportation Local 25	Ventilation Verification/ Indoor Air Quality for Technicians Class	HVAC Technicians and Mechanics	Online
Pennsauken High School	Welder	Welders, Cutters, Solderers, and Brazers	South Region
Raritan Valley Community College	Welder Technician	Welders, Cutters, Solderers, and Brazers	Online
Atlantic County Institute of Technology	Welding	Welders, Cutters, Solderers, and Brazers	South Region
Cape May County Technical School	Welding	Welders, Cutters, Solderers, and Brazers	South Region
County College of Morris	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Eastwick College-Nutley	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Eastwick Education - HoHoKus School of Trade	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Essex County Schools of Technology	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Monmouth County Vocational School District	Welding	Welders, Cutters, Solderers, and Brazers	Central Region
Ocean County Vocational Technical School District	Welding	Welders, Cutters, Solderers, and Brazers	Central Region
Passaic County Community College	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Passaic County Technical Institute	Welding	Welders, Cutters, Solderers, and Brazers	North Region
Raritan Valley Community College	Welding	Welders, Cutters, Solderers, and Brazers	Central Region
Rowan College of South Jersey-Cumberland Campus	Welding	Welders, Cutters, Solderers, and Brazers	Online
Rowan College of South Jersey-Cumberland Campus	Welding	Welders, Cutters, Solderers, and Brazers	South Region
Warren County Technical School	Welding & Fabricating	Welders, Cutters, Solderers, and Brazers	North Region
Mr. G's Workshop	Welding 101	Welders, Cutters, Solderers, and Brazers	North Region
Mr. G's Workshop	Welding 201	Welders, Cutters, Solderers, and Brazers	North Region
Mercer County Technical Schools	Welding Apprenticeship	Welders, Cutters, Solderers, and Brazers	Central Region
Monmouth County Vocational School District	Welding Apprenticeship	Welders, Cutters, Solderers, and Brazers	Central Region
Mercer County Technical Schools	Welding Certificate	Welders, Cutters, Solderers, and Brazers	Central Region
Cumberland County Vocational School	Welding Engineering Program	Welders, Cutters, Solderers, and Brazers	South Region
Gloucester County Institute of Technology	Welding I-II	Welders, Cutters, Solderers, and Brazers	South Region

Institution Name/Program Host	Program Name	Primary Occupational Focus	Region
Eastern Atlantic States Carpenters Technical Centers	Welding Orientation	Welders, Cutters, Solderers, and Brazers	South Region
Morris County Vocational School District	Welding Technologies	Welders, Cutters, Solderers, and Brazers	North Region
Bergen Community College	Welding Technology	Welders, Cutters, Solderers, and Brazers	Online
Burlington County Institute of Technology	Welding Technology	Welders, Cutters, Solderers, and Brazers	South Region
Camden County College	Welding Technology	Welders, Cutters, Solderers, and Brazers	South Region
Cape May County Technical High School	Welding Technology	Welders, Cutters, Solderers, and Brazers	South Region
Lincoln Technical Institute	Welding Technology	Welders, Cutters, Solderers, and Brazers	North Region
Lincoln Technical Institute	Welding Technology	Welders, Cutters, Solderers, and Brazers	Central Region
Lincoln Technical Institute	Welding Technology	Welders, Cutters, Solderers, and Brazers	North Region
Lincoln Technical Institute	Welding Technology	Welders, Cutters, Solderers, and Brazers	Central Region
Mercer County Technical Schools	Welding Technology	Welders, Cutters, Solderers, and Brazers	Central Region
Middlesex County Vocational and Technical Schools (Middlesex County Magnet schools)	Welding Technology	Welders, Cutters, Solderers, and Brazers	Central Region
Salem County Career and Technical High School	Welding Technology	Welders, Cutters, Solderers, and Brazers	South Region
Sussex County Community College	Welding Technology	Welders, Cutters, Solderers, and Brazers	North Region
Sussex County Technical School	Welding Technology	Welders, Cutters, Solderers, and Brazers	North Region
Union County Career Technical Institute	Welding Technology	Welders, Cutters, Solderers, and Brazers	North Region
Essex County Vocational - Technical School	Welding Technology/ Welding	Welders, Cutters, Solderers, and Brazers	North Region
Universal Technical Institute	Welding Training	Welders, Cutters, Solderers, and Brazers	North Region
Bergen Community College	Welding Training Level 1	Welders, Cutters, Solderers, and Brazers	North Region

APPENDIX F: WRAPAROUND SERVICE INVENTORY

Organization Name	Name of Program(s)	County
Isles, Inc.	Isles Youth Institute; Center for Energy and Environmental Training; Trenton Climate Corps	Mercer County
Hopeworks	Customized Training Program, Direct Hire	Camden County
Center for Family Services	PowerCorps Camden, ReWork, ReStart, Camden Works	Camden County
GOTrenton! (program of Isles, Inc.)		Mercer County
NJ Division of Vocational Rehabilitation Services (DVRS)	Pre-Placement / Placement Services, Time-Limited Job Coaching (TLJC), Supported Employment (SE), Long-Term Follow-Along (LTFA)	Mercer County
Live Well-Vivir Bien News Brunswick		Middlesex County
We Help People, LLC		Burlington County
Smith-Carmichael Academy of Learning, LLC		Burlington County
Child and Family Solutions		Gloucester County
Connect Family Center Inc.		Burlington County
Family Transition Support Services (FTSS)		Atlantic County
Interactive Kids		Camden County
NJ Division of Displaced Homemaker Services	ReStart offered at certain locations, Job Skills Development	Mercer County
NJ DOL Mature Workers Services	Workforce 55+	Mercer County
NJ DOL Veteran Services	Career Development Services	Mercer County
NJ DOL Pathways to Recovery	Pathways to Recovery	Mercer County
Legal Services of New Jersey		Middlesex County
New Jersey Community Development		Passaic County
Rising Tide Capital	The Community Business Academy, Business Acceleration Services, Credit to Capital	Hudson County
State of NJ Dept. of Human Services Division of Family Development		N/A
Urban League of Essex County	Urban Seniors Job Program	Essex County
Women Aware		Middlesex County
Isaiah House		Essex County
NJ Association of Community Providers	Direct Support Professionals Career Development Program (DSPCDP)	Mercer County
NJ Dept of Children and Families "Family Success Centers"		Mercer County
Cumac Echo Inc		Passaic County
Homefront Inc	HireExpectations	Mercer County

Organization Name	Name of Program(s)	County
Bergen Volunteers	CHEER, CHORE, Mentoring, Bergen READS, All Wrapped Up, Get Connected, Redefining Retirement, VITA	Bergen County
Anchor House		Mercer County
Friends Connect Foundation		Ocean County
Charity Kings		Monmouth County
The Amazing Help		Passaic County
New Jersey Parents' Caucus	NJPC Parents Empowerment Academy	Union County
Sierra House	Transitional Program	Essex County
Best Work Industries for the Blind		Camden County
The Arc Mercer Inc.	Prevocational Training, Supported Employment, Project HIRE	Mercer County
Women Rising	Community Partnership in Hotel Employment, Strong Foundations, Transportation, Logistics, and Distribution (TLD), Women's Pre-Apprentice, Microsoft Office Training	Hudson County
Community Credit Counseling Corp.		Monmouth County
Garden State Employment	Local Governance Policy Training Materials, Work Based Learning Services	Gloucester County
New Jersey Travel Independence Program @ Rutgers		Middlesex County
Reentry Coalition of New Jersey	Residential Community Reintegration Programs (RCRPs)	Camden County
State of NJ Department of Corrections	Successful Transition and Reentry Series (STARS)	Mercer County
Transition Professional Re-Entry Services		Bergen County
New Jersey Human Services		Mercer County
NJ Transit - Reduced Fare Program		Essex County
Volunteers of America Delaware Valley	Safe Return	Camden County
IronBound Community Corporation	Essex County College @ Ironbound	Essex County
New Jersey Environmental Justice Alliance		Essex County
Greater Bergen Community Action, Inc.	Education and Training: the State licensed vocational training center offers national credentials in green technology, customer and food service, citizenship prep, English as a Second Language classes	Bergen County
Sustainable Jersey		Mercer County
Kinetic Communities Consulting	Workforce, M/WBE, small business mobilization	N/A
Association for Energy Affordability	provides trainings/employment for Weatherization, utility, and NYSERDA	N/A
Camden Community Partnership	Camden Works	Camden County

Organization Name	Name of Program(s)	County
Emerald Cities Collaborative	E-Contractor Academy, HRAMBI, Green Path Careers (GPC), Workforce Education and Training (WET), Architecture Construction Engineering Students (ACES), Just Transition PowerForce	N/A
La Casa de Don Pedro		Essex County
National Society of Black Engineers	NSBE provides multiple education and leadership program that one must apply to attend or be a part of	Essex County
New Jersey Clean Cities Coalition		Middlesex County
Newark Science and Sustainability, Inc.		Essex County
New Jersey Institute for Social Justice		Essex County
NJ Reentry Corporation	Governors Reentry Training and Employment Center	Hudson County
The Cloud Institute	Center for Sustainability and Climate Education	N/A
The Solar Foundation		N/A
Bergen County Board of Social Services		Bergen County
Rutgers-New Brunswick Center for Advanced Infrastructure and Transportation	New Jersey Local Technical Assistance Program	Middlesex County
Mercer County Board of Social Services	Workfirst New Jersey	Mercer County
Avenues in Motion		Morris County
Summit Community Programs		Union County
Monmouth County Programs		Monmouth County
The Children's Home Society of New Jersey		Mercer County
New Jersey Cares for Kids (NJCK)		Monmouth County
Workfirst New Jersey	Workfirst New Jersey	Mercer County
MobilityWorks		Burlington County; Middlesex County; Monmouth County; Gloucester County
New Jersey State Independent Living Council		Mercer County
New Jersey Council on Developmental Disabilities	Employment First	Mercer County
New Jersey Institute for Disabilities	Snack Shack	Middlesex County
CarePlus New Jersey		Bergen County
New Jersey Citizen Action		Essex County
New Jersey Advocates for Aging Well		Atlantic County
The Guidance Center		Cumberland County
Jewish Family and Children Service of Southern New Jersey		Camden County
UU Faith Action		Union County

Organization Name	Name of Program(s)	County
United Women in Faith		Monmouth County
Hispanic Chamber of Commerce of New Jersey	Entrepreneurship Training Programs	Bergen County
The Neighborhood Center		Camden County
Community Child Care Solutions		Middlesex County

APPENDIX G: POLICY AND PROGRAM INVENTORY

Sector	Policies or Programs	Workforce Related?	Description
General economy	New Jersey Economic Recovery Act of 2020, signed into law in January 2021	Y	This Act was designed to stimulate job growth and economic development by offering tax incentives and financial support to businesses that choose to invest within the state. It aims to rebuild and strengthen local economies by encouraging private capital investments and fostering long-term employment opportunities.
Resiliency Infrastructure	New Jersey Urban Enterprises Zones Act; P.L.2021, c.197. : restores and revises Urban Enterprise Zone program; appropriates $42,500,000. (A5580)	Y	This Act revitalizes the Urban Enterprise Zone (UEZ) program that was discontinued in 2011 along with creation of the Zone Assistance Fund (ZAF). The UEZ has $42.5 million, while the ZAF has an initial $42.5 million and will be capped at $82.5 million. These two funds provide businesses with the money for job creation and business development.
Other	P.L.2018, c.78. : Revises law concerning reciprocity for outofstate professional and occupational licenses. A1531	Y	This Law introduces changes to the process of obtaining professional and occupational licenses for individuals coming from out of state. The revisions aim to simplify application procedures, recognize equivalent credentials, and remove unnecessary barriers, thereby enhancing access for qualified professionals.
Other; Resiliency Infrastructure	P.L.2019, c.342 Eliminates term limits for members of State Board of Examiners of Master Plumbers and State Board of Examiners of Heating, Ventilating, Air Conditioning and Refrigeration Contractors. A5277	Y	This Bill addresses board appointments and term length for the State Board of Examiners of Master Plumbers in the Department of Law and Public Safety, Division of Consumer Affairs in the Department of Law and Public Safety, the State Board of Examiners of Heating, Ventilating, Air Conditioning, and Refrigeration Contractors. Both boards will no longer have a term limit.
Clean Energy; Renewables; Offshore Wind; Solar	2018 Clean Energy Act	Y	This Act mandates the NJ Department of Workforce and Labor to create programs for offshore wind career trainings and updated manufacturing skills.
Offshore Wind; Clean Energy	Offshore Wind Economic Development Act (OWEDA)	Y	This Act mandates trainings and funding for offshore wind construction and manufacturing.
Clean Energy; Other	Global Warming Response Act (GWRA)	Y	The GWRA outlines strategies for enhancing job growth and economic opportunities in clean energy sectors by 2050. It emphasizes the role of the Regional Greenhouse Gas Initiative (RGGI) in driving these developments, supporting workforce expansion in green energy technologies, and contributing to broader climate action goals.
Environmental Justice; Clean Energy	Clean Transportation: Economic Access & Equity Funding (2021)	Y	$100 million in funding through the Regional Greenhouse Gas Initiative and Volkswagen Mitigation Trust Funds was announced for multiple green initiatives including electrifying buses and implementing green job training programs.
Offshore Wind; Clean Energy	The New Jersey Wind Port	Y	The New Jersey Wind Port, located in Lower Alloways Creek, is the nation's first offshore wind port designed specifically for wind energy development. The facility includes Parcel A, which features a 1,080-foot heavy lift wharf and 30 acres designated for equipment staging. With over 520,000 labor hours already completed, it is projected to be fully operational by fall 2024. Upon completion, the port is expected to generate 1,500 new jobs and contribute $500 million to the local economy annually, while also prioritizing opportunities for minority- and women-owned businesses.
Offshore Wind; Clean Energy	BPU and South Jersey Port Corporation Memorandum of Understanding (MOU)	Y	The MOU between the South Jersey Port Corporation (SJPC) and the Board of Public Utilities (BPU) aims to construct a monopile manufacturing facility at the Port of Paulsboro, advancing New Jersey's offshore wind capabilities. The project is supported by a $1.8 million grant from BPU, funded through the Societal Benefits Charge, and is a collaboration with Ørsted and EEW Group. This initiative is expected to drive local workforce development, boost regional economic growth, and reduce offshore wind costs through localized production.
Clean Energy; Offshore Wind; EJ	Amends "Electric Discount and Energy Competition Act" to add definition of "open access offshore wind transmission facility" and revises law concerning "qualified offshore wind projects."	Y	This amendment requires that employers of a project outline the salary, location, and job type for a full-time position.

Sector	Policies or Programs	Workforce Related?	Description
Clean Energy; Resiliency Infrastructure; Other	Clarifies intent of P.L.2007, c.340 regarding NJ's required participation in Regional Greenhouse Gas Initiative. A1212	Y	This piece of legislation states that the local government must create job opportunities that directly support meeting air pollution standards.
Clean Energy; Energy Efficiency; Renewables	Establishes and modifies clean energy and energy efficiency programs; modifies State's solar renewable energy portfolio standards. A3723	Y	This Bill requires that the Department of Labor creates and funds offshore wind training programs; offshore wind parts manufacturing should be included in these programs.
Other	Establishes zero emission certificate program for nuclear power plants. S2313	Y	This Bill requires that with nuclear sites being deemed helpful in zero-carbon emission goals, new nuclear jobs will be created and funded due to their high demand.
Water and Wastewater	Water Supply and Wastewater Operator's Licensing Act, NJSA 58:11-64 et seq	Y	This Act establishes definitions and regulations for what it means for one to be a "licensed operator," "licensee, and "Commissioner."
Water and Wastewater	Water Quality Planning Act, NJSA 58:11A-1 et seq.	Y	This document outlines the process of how the removal of wastewater facilities can lead to job losses - transition plans must be in place for these jobs to be compensated or reallocated.
Lead	Statewide Lead Strategy	Y	This strategy plan defines training in maintenance and remediation skills for the repair, and transition away from, lead pipes.
Solid Waste Management	P.L.2019, c.263.: Makes various changes to laws governing remediation of contaminated sites	Y	This piece states the changes in who is qualified to work on contaminated sites and the definitions of employment terms.
Other; Public Health	Air Pollution Control Act N.J.S.A. 26:2C-1 through -57	Y	This Act establishes clean air internship and graduate scholarship program at any qualifying institution in the region.
Stormwater & Seawater; Water & Wastewater	NJ Water Pollution Control Act (N.J.S.A. 58:10A et seq.)	Y	This Act states that trainings and skills must be updated/expanded to include new regulations for emerging technologies/industries, such as sludge management.
Resiliency Infrastructure	Public Law 113-2: containing Division A: Disaster Relief Appropriations Act, 2013 and Division B: Sandy Recovery Improvement Act of 2013	Y	Per the Robert T. Stafford Disaster Relief and Emergency Assistance Act, benefits and rules for employment are outlined in this section of the legislation. During the environmental and infrastructure recovery, the federal government has the responsibility to pay back local/state governments for continuing public services.
Climate Change	P.L.2019, c.442.: Establishes NJ Climate Change Resource Center at Rutgers University	Y	This Law was established by statute in January 2020 to create and support the use of impartial and actionable science to advance efforts to adapt to, and mitigate a changing climate, including through training, education, and skills development for the green transition.

Sector	Policies or Programs	Workforce Related?	Description
Water & Wastewater	Safe Drinking Water Act, NJ.AC. 7: 10-1.1 et seq.	Y	The Act states that if an expansion of non-public resources occurs, an employer must meet certain requirements. These can include a description of the job and all certifications and responsibilities for completing that work.
Water & Wastewater	Licensing of Water Supply and Wastewater Treatment System Operators, N.J.A.C. 7: 10A-1.1 et seq.	Y	These New Jersey Administrative Code regulations establish the requirements for the qualifications of water supply system operators and outline protocols for preventive maintenance and operational procedures.
Clean Energy; Labor	Executive Order 12 (02/27/2018): Established a Governor's Jobs and Economic Opportunity Council.	Y	Executive Order 12, signed by Governor Phil Murphy on February 27, 2018, established the Governor's Jobs and Economic Opportunity Council in New Jersey. This advisory body was tasked with providing recommendations to stimulate job growth and workforce development across the state. The Council's objectives included advising on strategies to attract, expand, and retain employment opportunities, developing priorities for infrastructure funding, and recommending actions to enhance services for job seekers. It comprised key state officials, including the Lieutenant Governor, Commissioners of various departments, and the CEO of the New Jersey Economic Development Authority, among others. The Council was also required to coordinate with other state departments to ensure effective implementation of its recommendations.
Other; Labor	Executive Order 41 (10/05/2018): Governor Murphy Signs Executive Order Creating the Future of Work Task Force (the "Task Force") that will evaluate how technological advancements that will shape the future of New Jersey's economy and workforce.	Y	A State Executive Order that creates "the Future of Work Task Force" to improve the technologies available in education and job training. The policies created will use data to analyze the best approaches to improving education, including with respect to diversity, equity, and inclusion outcomes.
Offshore Wind	Executive Order No. 8 (01/31/2018): Promotes Offshore Wind Energy	Y	A State Executive Order concerning the implementation of Offshore Wind Economic Development Act (OWEDA) and to improve its effectiveness. Multiple divisions, including New Jersey Department of Environmental Protection and Board of Public Utilities, are charged with working on an Offshore Wind Strategic Plan.

Sector	Policies or Programs	Workforce Related?	Description
Offshore Wind	Executive Order No. 79 (08/16/2019): Governor Murphy Signs Executive Order Establishing Council on Offshore Wind	Y	A State Executive Order establishing the Council for Wind Innovation and New Development Institute to have a central entity in charge of education, training, and policy. The council will conduct a skillful analysis of gaps in education in given regions and outline the many areas of improvement.
Other; Labor	Contract Work Hours and Safety Standards Act	Y	The Contract Work Hours and Safety Standards Act covers the requirements for training employees in avoiding unsafe working conditions.
Other; Housing; Manufacturing	Section 3 of the Housing and Urban Development Act of 1968	Y	The Housing and Urban Development Act provides opportunities for training and employment planning, construction, rehabilitation, and operation of housing.
Offshore Wind	Offshore Wind Strategic Plan	Y	The NJ Offshore Wind Strategic Plan involves workforce development. The plan includes use of existing state institutions to train workers with offshore wind-specific skills. The plan also prioritizes creating Global Wind Organization (GWO) safety certification programs and facilities, introducing wind turbine technician training, and expanding welding certification programs.
Offshore Wind	Offshore Wind Tax Credit Program	Y	The NJ Offshore Wind Tax Credit Program, which was updated on November 15th, 2021, offers a tax credit to businesses that make a capital investment of $50 million and employ at least 150 new, full-time employees at a qualified wind energy facility.
Offshore Wind	New Jersey Offshore Wind Safety Training Challenge Grant Program	Y	The New Jersey Offshore Wind Safety Training Challenge is a grant program that invites statewide institutions, such as community colleges, private institutions, unions, etc., to submit proposals for grants to create an offshore wind training program and facility.
Offshore Wind	NJ Wind Turbine Technician Training Grant Challenge	Y	The NJ Wind Turbine Tech Training Challenge is a competitive grant program that awards up to $1 million to a New Jersey community college to establish an offshore wind turbine technician training program that will further the workforce for clean energy projects.
Offshore Wind	Wind Institute (Wind Council Report)	Y	The Wind Council's Final report suggested the creation of the Wind Institute, to deliver training programs and educational resources, and promote research and innovation in the state's offshore wind industry.

Sector	Policies or Programs	Workforce Related?	Description
Clean Energy	QO21040720: In The Matter Of The Clean Energy Programs And Budget For Fiscal Year 2022 (6/24/21)	Y	The Fiscal Year 2022 Clean Energy Programs and Budget allocated $4.5 million towards workforce development initiatives. These initiatives include tailored training programs focused on enhancing skills in energy efficiency, renewable energy technologies, and clean energy project management.
Energy Efficiency	QO19010040: Regarding The Establishment Of Energy Efficiency And Peak Demand Reduction Programs (6/10/20)	Y	The BPU focuses heavily on workforce development in establishing energy efficiency and peak demand reduction programs. They have partnered with several state agencies, including the New Jersey Department of Labor and Workforce Development, to create workforce development opportunities with vocational institutions, community colleges, community-based organizations, and nonprofits.
Energy Efficiency	GO18101112 and EO18101113: PSE&G Approval Of Its Clean Energy Future – Energy Efficiency (CEF-EE) Program On A Regulated Basis (9/23/20)	Y	The petition is meant for Public Service and Electric Gas Company so that they can establish an Energy Efficiency (CEF-EE) program. The program was then approved on a regulated basis, and the board determined that the programs would help to build up the clean energy workforce. No specific programs are outlined in this document, however, the document states that programs for clean energy workforce development must take place.
Energy Efficiency	GO20090618: SJG Approval Of New Energy Efficiency Programs And Associated Cost Recovery (4/7/21)	Y	The New Jersey Board of Public Utilities granted approval to South Jersey Gas (SJG), a subsidiary of SJI, to expand its energy efficiency initiatives with a $133 million investment spanning three years. This enhanced program is designed to promote energy conservation, reduce carbon emissions, and support New Jersey's broader clean energy objectives. Through rebates, energy audits, and upgrade incentives, SJG anticipates significant cost savings for customers, alongside reductions in CO2 emissions and the creation of thousands of clean energy jobs.
Energy Efficiency	GO20090619: EGC Approval Of New Energy Efficiency Programs And Established Of A Conservation Incentive Program (4/7/21)	Y	Elizabethtown Gas Company received approval from the New Jersey Board of Public Utilities to implement new energy efficiency programs, alongside the creation of a conservation incentive program. These initiatives are intended to promote energy savings, enhance efficiency in residential and commercial sectors, and bolster the clean energy workforce in New Jersey.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency	EO20090620: JCP&L - Energy Efficiency And Conservation Plan Including Energy Efficiency And Peak Demand Reductions Programs (4/27/21)	Y	The petition is in regard to the energy efficiency and peak demand programs. These programs were approved and New Jersey's Board of Public Utilities determined that the programs would help to build up the clean energy workforce.
Energy Efficiency	EO20090621: ACE Approval Of An Energy Efficiency Program, And Other Related Relief For Plan Years One Through Three (4/27/21)	Y	The petition for Atlantic City Electric Company (ACE) was approved. Part of the approval states that the new energy efficiency programs will bolster the workforce and must be maintained by ACE. Ongoing stakeholder working groups for workforce development and equity will be involved in this process.
Energy Efficiency	GO20090622: New Jersey Natural Gas (NJNG) Approval Of Energy Efficiency Programs And The Associated Cost Recovery Mechanism (3/3/21)	Y	The Energy Efficiency programs that were approved cover building up the clean energy workforce in order to meet these needs.
Energy Efficiency	EO20090623: Rockland Electric Company - Approval Of Its Energy Efficiency And Peak Demand Reduction Programs (6/9/21)	Y	This document is the approval of Rockland Electric's energy efficiency and peak demand energy plan. They plan to include program development, marketing, and job initiatives in order to bolster their workforce development. These development programs include training in multi-family homes and pre-existing homes.
Offshore Wind	QO21050825: Offshore Wind Solicitation 2 – Ocean Wind II, LLC (6/30/21)	Y	The Offshore Wind II project mentions its efforts to expand workforce training. They have committed $8 million to fund the Pro-NJ Grantor Trust 2 for workforce training and $2 million to fund the NJ WIND Institute.
Offshore Wind	QO21050824: Offshore Wind Solicitation 2 – Atlantic Shores Offshore Wind Project 1, LLC (6/30/21)	Y	The New Jersey Board of Public Utilities has approved the 1,509.6 MW Atlantic Shores Offshore Wind Project under the state's Second Offshore Wind Solicitation. This project is part of New Jersey's broader strategy to achieve 7,500 MW of offshore wind capacity by 2035. It is projected to generate more than 40,000 job-years and contribute approximately $1.9 billion to the state economy through investments in manufacturing and infrastructure. Atlantic Shores has pledged over $15 million for workforce development, partnering with institutions like the NJ WIND Institute, Rutgers, Rowan, and Stockton Universities to prepare a skilled workforce for clean energy roles.

Sector	Policies or Programs	Workforce Related?	Description
Resiliency Infrastructure; Stormwater	Stormwater Infrastructure Toolkit	Y	The Stormwater Infrastructure Toolkit is designed to provide long-term sustainable flood resiliency. This is achieved by designing infrastructure that considers climate change. The toolkit also provides stormwater infrastructure operations and maintenance, asset management, and stormwater maintenance job training.
Clean Energy; Resiliency Infrastructure	2019 and 2025 New Jersey Energy Master Plan	Y	The New Jersey 2019 Energy Master Plan (EMP) "sets forth a strategic vision for the production, distribution, consumption, and conservation of energy in the State of New Jersey". In specific sections it discusses the creation of jobs and expanding the workforce for renewable energy. The modeling conducted for the 2025 EMP builds on the 2019 plan, incorporating progress and newer climate goals, including the goal to reach 100% clean energy by 2035. It assesses the current policy scenario and three "mitigation" scenarios, highlighting how each "mitigation" scenario can help New Jersey achieve its climate goals.
Climate Change	Climate Change Resilience Strategy (including the Coastal Resilience Plan)	Y	The Climate Change Resilience Strategy talks about the need to promote workforce development and training through climate resilience initiatives.
Other	Micro Lender Support Grant Program	Y	The Micro Lender Support Grant allows eligible applicants to apply for up to $200,000 in grants per entity. One of the eligible uses for the grant is to hire additional staff to better serve, or market to, New Jersey businesses.
Other	Wineries and Vineyards	Y	To be eligible for the program funding by the New Jersey Economic Development Authority, wine and vineyard businesses must commit to the creation of one new full-time job for every $65,000 of NJEDA allocation within 2 years.
Other	Executive Order No. 317, signed February 2023	Y	Advances the Global Warming Response Act's goals by targeting emission reductions in the natural gas sector. The order promotes cleaner energy production and supports innovative programs to help natural gas utilities develop new revenue pathways, creating high-quality job opportunities aligned with the state's climate objectives.

Sector	Policies or Programs	Workforce Related?	Description
Electrification	Executive Order No. 316, signed February 2023	Y	Sets a goal to electrify space heating and cooling systems of 400,000 homes and 20,000 commercial properties and make 10% of all low-to-moderate (LMI) properties electrification ready by 2030. Includes requirement to for the State to release a strategic roadmap for building decarbonization with recommendations for policy, legislative, regulatory, workforce development, and funding strategies to achieve building electrification goals.
Clean Energy	Executive Order No. 307, signed September 2022	Y	This Executive Order grows New Jersey's goal for offshore wind energy production to 11,000 megawatts (MW) by 2040. Alongside this new Order, Governor Murphy released a *Green Jobs for a Sustainable Future* report outlining possible ways to grow the clean energy workforce in order to help meet the new offshore wind goal.
Clean Energy	Executive Order No. 274, signed November 2021	Y	This Executive Order establishes an interim greenhouse gas reduction target of 50% below 2006 levels by 2030, strengthening New Jersey's path to achieve an 80% reduction in greenhouse gas emissions by 2050.
Clean Energy	Garden State Commercial Property Assessed Clean Energy (C-PACE) Program	Y	The Garden State Commercial Property Assessed Clean Energy (C-PACE) Program will provide funding to commercial properties in participating municipalities of the state for them to upgrade the infrastructure of their buildings to become greener and more energy efficient. The program will be administered by the NJ Economic Development Authority creating more local jobs, lowering carbon emissions, and upgrading commercial properties to be more energy efficient.
Solar	Solar Act of 2021	Y	The Solar Act of 2021 established the Successor Solar Incentive (SuSI) Program. SuSI is designed to increase the supply of electricity, while also bringing down the cost of solar generation in the state. The program will help to grow the state's solar industry, with a goal of incentivizing up to 3,750 MW of solar generation by 2026.
Clean Energy	Executive Order No. 221, signed in February 2021	Y	Establishes the Governor's Office of Climate Action and the Green Economy to focus on the interlocking policies of addressing climate change, ensuring New Jersey's clean energy future, and transitioning to a green economy while prioritizing equity and environmental justice.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency	Customer Tailored Energy Efficiency Program (CTEEP)	Y	The CTEEP is designed to take a streamlined approach to the implementation of energy efficiency upgrades in industrial and commercial buildings. Participants in this program must pay the current prevailing wages to the workers for any construction projects undertaken through this initiative.
Clean Energy	New Jersey Clean Energy Loans (CELs)	Y	The CELs program is a co-lending initiative through which the New Jersey Economic Development Authority supports the financing of clean energy small businesses/projects. The New Jersey Economic Development Authority finances up to 50% of a total loan at 3% below the private lender's rate, along with additional interest rate reduction incentives for businesses owned by minority groups and/or for projects located in an Overburdened Community. The program provides funding from the U.S. Treasury's State Small Business Credit Initiative (SSBCI) to help jump-start clean energy small businesses, helping to expand the clean energy workforce. The program also provides 10% loan forgiveness if the financed project results in at least one job created per $100,000 loan amount.
Energy Efficiency	Energy Manager Training Program for State Employees	Y	The NJBPU launched the Energy Manager Training Program in September 2022. The program is designed to improve the training and skills of energy managers. Each state agency is required to have an energy manager. This program allows the agencies to give their managers the tools they need to manage their agency's energy costs and usage successfully.
Energy Efficiency	Large Energy Users Program (LEUP)	Y	The LEUP, provided under the New Jersey Clean Energy Program, is designed to encourage large non-hospital industrial and commercial utility customers to invest in upgrading their buildings with energy-conserving measures. This incentive program also increases the workforce pipeline while requiring workers to be paid the prevailing wage (or higher) for any construction projects undertaken.
Solar	Administratively Determined Incentive (ADI) Program	Y	The ADI Program, offered under SuSI, sets incentives for net-metered residential and non-residential solar projects of 5 MW or less and community solar projects. This incentive program promotes job creation and workforce development by expanding solar power in the state.

Sector	Policies or Programs	Workforce Related?	Description
Solar	Competitive Solar Incentive (CSI) Program	Y	The CSI Program, offered under SuSI, is an annual competitive procurement that provides incentives for grid-supply solar generation projects and non-residential net-metered solar projects greater than 5 MW. This incentive program promotes job creation and workforce development through the expansion of solar power in the state.
Renewable Energy, Clean Energy	Executive Order No. 92	Y	Executive Order No. 92 (2019), issued by Governor Phil Murphy, increases New Jersey's offshore wind energy goal from 3,500 megawatts by 2030 to 7,500 megawatts by 2035 to accelerate the state's transition to clean energy. The order highlights the offshore wind industry's role in driving economic development, workforce growth, and renewable energy production, building on prior initiatives to establish a robust offshore wind supply chain and infrastructure.
Labor, Energy Efficiency, Renewable Energy	NJ DEP BRIDGE grant program	Y	The BRIDGE grant is a $5 million initiative launched by the New Jersey Council on the Green Economy to expand the state's green workforce. Announced in March 2023, the program funds organizations that develop inclusive training and job placement programs in clean energy sectors such as solar, offshore wind, and building decarbonization.
Renewable Energy, Labor	NJEDA Offshore Wind Workforce and Skills Development Program	Y	The New Jersey Economic Development Authority launched the Offshore Wind Workforce and Skills Development Grant Challenge to bolster the state's offshore wind industry by developing a skilled and diverse workforce. This $3.725 million competitive grant program supports organizations in creating or expanding training programs that prepare New Jersey residents, particularly those from overburdened communities, for careers in offshore wind.
Labor, Environmental Justice	NJEDA Green Workforce Training Grant Challenge	Y	The NJEDA Green Workforce Training Grant Challenge is a $7 million initiative launched in 2024 to support inclusive job training programs that prepare New Jersey residents, especially those from overburdened communities, for careers in the green economy. It funds community-based organizations, educational institutions, and workforce entities to develop skills in areas like solar energy, energy efficiency, green infrastructure, and clean transportation, with grants ranging from $250,000 to $1.5 million.

Sector	Policies or Programs	Workforce Related?	Description
Renewable Energy	Offshore Wind Solicitation 1 and Solicitation 3	Y	New Jersey's First Offshore Wind Solicitation awarded 1,100 MW to Ørsted's Ocean Wind 1 project in 2019, but the project was canceled in 2023 due to supply chain and cost challenges, resulting in a $125 million settlement with the state. The Third Solicitation, announced in 2024, awarded 3,742 MW to two projects, Leading Light Wind and Attentive Energy Two, which are expected to power 1.8 million homes and significantly boost clean energy jobs and infrastructure.
Labor, Renewable Energy	Wind Institute Fellowship Program	Y	The New Jersey Wind Institute Fellowship Program, administered by the New Jersey Economic Development Authority, is a state-funded initiative that supports undergraduate and graduate students conducting independent research on offshore wind energy. The program aims to advance offshore wind innovation and workforce development in New Jersey.
Energy Efficiency; Clean Energy; Labor	Training for Residential Energy Contractors (TREC)	Y	The TREC program, part of the Inflation Reduction Act, provides grants to support workforce development in energy efficiency and electrification. In New Jersey, the program, managed by the New Jersey Board of Public Utilities, offers training for contractors to enhance their skills in energy efficiency and clean energy technologies.
Other	P.L.2019 c.101: S605	N	Provides that natural gas supplier license issued by BPU may be renewed without expiring if certain conditions are met.
Water & Wastewater	The Water Quality Accountability Act, P.L. 2017, c. 133 (WQAA)	N	The WQAA, enacted in 2017 and amended in 2021, requires New Jersey public water systems with over 500 service connections to implement robust asset management, routine maintenance, and cybersecurity protocols. The New Jersey Department of Environmental Protection recently proposed a rule to codify and enhance these requirements, including stronger oversight and public health protections. The WQAA aims to improve the safety, reliability, and resiliency of water infrastructure across the state.
Other	P.L.2019, c.100: S604	N	Provides that electric power supplier license issued by New Jersey's Board of Public Utilities may be renewed without expiring if certain conditions are met

Sector	Policies or Programs	Workforce Related?	Description
Alternative Vehicles	AN ACT concerning the use of plug-in electric vehicles,1	N	The law calls for support regarding the increased use of plug-in electric vehicles by providing incentives for the purchase or lease of such vehicles and for related charging equipment. It also aims to increase consumer awareness of the availability of incentives through a Statewide public education program.
Alternative Vehicles	Clean Car Program / NJ Low Emission Vehicle Program (2004)	N	The Clean Car Program adopts California's Low Emission Vehicle (LEV) standards to cut motor vehicle emissions of both criteria pollutants and greenhouse gases. This initiative, known as the NJ Low Emission Vehicle Program, also incorporates the Advanced Clean Cars II (ACCII) Program, which sets annual zero-emission vehicle sales requirements for manufacturers. That same year, the state introduced a sales tax exemption for battery-electric and fuel cell vehicles to further support the transition to cleaner transportation.
Alternative Vehicles; Clean Energy	Municipal Land Use Law, amending and supplementing P.L.1975, c.291.	N	Chapter 106 is a legislative amendment that enhances municipal land use planning and development practices in New Jersey. It updates and builds upon the existing Municipal Land Use Law (P.L.1975, c.291) to promote more efficient development, better land use, and the protection of natural resources, farmland, and historic sites. The amendment also prioritizes environmentally sustainable and community-centered planning.
Other	Title 40A. Municipalities and Counties, amending P.L.1992, c.79 (C.40A:12A-3)	N	Title 40a is a legislative amendment that enhances municipal land use planning and development practices in New Jersey. It updates and builds upon the existing Municipal Land Use Law (P.L.1975, c.291) to promote more efficient development, better land use, and the protection of natural resources, farmland, and historic sites. The amendment also prioritizes environmentally sustainable and community-centered planning.
Alternative Vehicles; Clean Energy	P.L.2020, c.80: EV New Residential Construction	N	This Act requires developers to offer electric vehicle charging stations as option in certain new home construction.
Grid Infrastructure & Storage	NJ Fuel Cell Task Force	N	The NJ Fuel Cell Task Force was established to increase use of fuel cells in State.
Alternative Vehicles; Clean Energy	Encourages local units to plan for electric vehicle charging infrastructure. S606	N	This Bill encourages local units to plan for electric vehicle charging infrastructure.

Sector	Policies or Programs	Workforce Related?	Description
Clean Energy; Other	Establishes "New Jersey Solar Panel Recycling Commission." S601	N	The New Jersey Solar Panel Recycling Commission investigates options for recycling and other end-of-life management methods for photovoltaic and other solar energy generation structures, and develops recommendations for legislative, administrative, or private sector action.
Clean Energy; EJ; Other	Establishes new timeframes for implementation of, and revises, certain requirements in "Global Warming Response Act."	N	This amendment to New Jersey's Global Warming Response Act enhances the state's climate action strategy by setting updated targets for reducing greenhouse gas emissions. It emphasizes reaching 1990 emission levels by 2020 and achieving an 80% reduction from 2006 levels by 2050. Additionally, the amendment includes measures to address short-lived climate pollutants, aiming for more effective environmental protection.
Resiliency Infrastructure; Other	Sewerage Authorities Law, N.J.S.A. 40:14A-1 et seq.	N	This law establishes a framework for counties and municipalities to create sewerage authorities. These authorities are empowered to manage wastewater services, aiming to protect public health and the environment by reducing water pollution.
Resiliency Infrastructure; Other	Water Supply Management Act, N.J.S.A. 58:1A-1 et seq.	N	This Act authorizes the New Jersey Department of Environmental Protection to develop and implement a comprehensive plan for water supply management, including permitting, conservation requirements, and drought response strategies. The Act aims to maintain sustainable water use, protect water quality, and ensure that water supplies are adequate for current and future needs of the public, agriculture, and industry.
Water & Wastewater; Stormwater & Seawater	New Jersey Water Bank (NJWB) Program	N	This program offers low-interest financing to support the development of projects that protect water quality and public health, such as wastewater treatment systems, stormwater and nonpoint source pollution controls, and drinking water infrastructure. Borrowers from disadvantaged communities may qualify for grants or principal forgiveness, with additional principal forgiveness available for projects deemed high priority. The program also funds initiatives like land acquisition for open space preservation, environmental cleanup efforts (including brownfield remediation), and well decommissioning.

Sector	Policies or Programs	Workforce Related?	Description
Water & Wastewater; Stormwater & Seawater	Water Pollution Control Act NJSA 58:10A-1 et seq	N	The Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) serves as New Jersey's main law for managing and protecting water quality. It empowers the NJ Department of Environmental Protection to control the release of pollutants into state waters through a permit-based system, in coordination with the federal Clean Water Act. The law's primary goal is to prevent and reduce water pollution to protect both public health and the environment.
Water & Wastewater; Stormwater & Seawater; Resiliency Infrastructure	Spill Compensation and Control Act, N.J.S.A 58: 10-23.11 et seq.	N	This Act addresses the release of hazardous substances into the environment, holding responsible parties strictly liable for the costs associated with cleaning up and removing spilled hazardous materials, regardless of fault. It also created the New Jersey Spill Fund to support cleanup efforts and provide reimbursements, while granting the New Jersey Department of Environmental Protection authority to enforce cleanup actions and seek recovery of costs from those responsible for the spills.
Water and Wastewater	The Realty Improvement Sewerage and Facilities Act (1954), N.J.S.A. 58:11-23 et seq.	N	The Realty Improvement Sewerage and Facilities Act (1954), regulates the installation and maintenance of sewerage systems and related facilities in real estate developments. It establishes requirements for developers to provide adequate sewage disposal systems, ensuring public health and environmental protection. The Act also grants the New Jersey Department of Environmental Protection authority to oversee and approve sewerage system plans, and it holds developers responsible for proper construction and operation of these systems.
Lead	An Act concerning lead paint inspections prior to home purchases and tenant turnover, establishing an educational program on lead hazards, supplementing P.L.2003, c.311 (C.52:27D-437.1 et al.), and amending various parts of the statutory law.	N	This Act requires lead paint inspection prior to home purchases and tenant turnover and establishes educational program on lead hazards.

Sector	Policies or Programs	Workforce Related?	Description
Stormwater & Seawater; Water & Wastewater	Regulations Governing the Certification of Laboratories and Environmental Measurements, NJ.AC. 7:18-1.1 et seq.	N	These regulations set the standards used by the New Jersey Department of Environmental Protection to accredit laboratories responsible for conducting environmental testing. These rules ensure that labs meet specific quality and reliability requirements when performing analyses related to other state and federal environmental laws, including the Safe Drinking Water Act, the Water Pollution Control Act, and the Spill Compensation and Control Act.
Environmental Justice	Executive Order No. 23 (04/20/2018): Addresses Environmental Justice Issues in New Jersey's Urban Communities	N	Executive Order No. 23 directs the New Jersey Department of Environmental Protection to create guidelines that help state agencies incorporate environmental justice into their policies and operations. The order is based on the principle that all residents—regardless of race, income, or background—have the right to live in a clean and healthy environment. It also recognizes that communities of color and low-income areas have historically faced greater environmental burdens and calls for state agencies to ensure their actions do not worsen these disparities but instead promote fair and equitable treatment in environmental decision-making.
Environmental Justice	Executive Order No. 63 (04/2/2019): Establishing new regulatory principles to foster economic growth and government efficiency. Rescinds and replaces Governor Christie's Executive Orders No. 1 (2010) and No. 2 (2010)	N	Executive Order No. 63 outlines updated regulatory principles designed to promote economic growth and improve government efficiency. The order calls for clear, data-driven rulemaking, streamlined permitting processes, and better public engagement, especially with underserved communities—while ensuring that state regulations protect public health, the environment, and support innovation, even when federal standards fall short.
Other	NJ Ignite Program (ERA-update)	N	NJ Ignite provides grants to New Jersey Economic Development Authority-approved collaborative workspaces for the benefit of early-stage innovation economy businesses that locate in New Jersey. Qualified Industries for tenant companies include renewable energy, and the New Jersey Economic Development Authority will provide bonus support to workspaces that are in an Opportunity Zone, and certified woman- or minority-owned businesses.

Sector	Policies or Programs	Workforce Related?	Description
Other; Manufacturing	Urban Enterprise Zone (UEZ) Manufacturers Energy Sales Tax Exemption	N	Urban Enterprise Zone (UEZ)-certified manufacturers that employ at least 250 full-time workers, at least 50% of whom are involved in the manufacturing process, may be eligible for an exemption from the sales and use tax for electricity and natural gas utilities, both the commodity and its transmission, consumed at the UEZ-certified location.
Other Renewable Generation	The Rutgers Agrivoltaics Program (RAP)	N	The RAP is a multidisciplinary group of Rutgers faculty and staff committed to designing and conducting applied agrivoltaics research and outreach.
Electric Vehicles; Charging Infrastructure; Energy Efficiency; Grid Infrastructure & Storage; Water & Wastewater	Clean Tech R&D Voucher Program	N	The Round 2 Clean Tech R&D Voucher Program is intended to support early-stage clean tech/clean energy companies in NJ to access core facilities, equipment and makerspaces at any participating NJ University Facility or Government labs for clean energy/clean technological research and development. Eligible applicants can apply for multiple Vouchers up to a cap of $25,000 within any twelve (12)-month period.
Energy Efficiency	Clean Energy Future – Energy Efficiency (CEF-EE) Program	N	The New Jersey Board of Public Utilities approved Public Service Electric and Gas Company's (PSE&G) Clean Energy Future – Energy Efficiency (CEF-EE) program, marking a major advancement in the state's clean energy strategy. As New Jersey's largest energy efficiency investment to date, the program commits $1 billion over three years to reduce energy use across residential, commercial, and industrial sectors. It is expected to generate $1 billion in net customer savings, create approximately 4,300 jobs, and prevent 8 million metric tons of carbon dioxide emissions through 2050, supporting both economic growth and environmental goals.
Stormwater & Seawater	Emerging Contaminants: Harmful Algal Bloom (HAB)	N	An initiative aimed at reducing and preventing harmful algal blooms (HABs) across New Jersey through science-based strategies for prevention, mitigation, research, and response. The effort leverages both state and federal resources, including Clean Water State Revolving Fund dollars, to support infrastructure upgrades and provide principal forgiveness for projects that curb nutrient-rich runoff, a primary cause of HABs.

Sector	Policies or Programs	Workforce Related?	Description
Other; Climate Adaptation/ Mitigation	New Jersey Urban & Community Forestry Program (NJUCF)	N	This program works to encourage, promote, and support the local stewardship and effective management of trees and forest ecosystems in New Jersey's communities through technical assistance and financial assistance.
Climate Change	Interagency Council on Climate Resilience	N	The Interagency Council on Climate Resilience leads the development of both immediate and long-range plans aimed at strengthening New Jersey's ability to adapt to and withstand the effects of climate change. The Council plays a central role in advancing the Statewide Climate Change Resilience Strategy, which serves as the key policy guide for state agencies in addressing climate-related challenges across New Jersey's communities, economy, infrastructure, and natural environment.
Environmental Justice	Environmental Justice Enforcement Initiative	N	Executive Order No. 23 addresses the disproportionate environmental and health burdens faced by New Jersey's low-income and communities of color. It highlights the need for equitable treatment in environmental decision-making and directs the DEP to develop guidelines for state agencies to incorporate environmental justice into their policies.
Resiliency Infrastructure	Community Collaborative Initiative (CCI)	N	The CCI is an innovative partnership between the NJ Department of Environmental Protection, local governments, and community leaders aimed at transforming environmentally impacted communities into hubs of economic growth and sustainable development. CCI focuses on collaborating with local communities to promote shared objectives of improving environmental quality, fostering economic development, and revitalizing neighborhoods.
Other	Net Operating Loss (NOL) Program (ERA-update)	N	The expanded NOL Program enables tech and life sciences companies to sell their New Jersey net operating losses and/or research and development (R&D) tax credits for cash. Buyers can purchase tax credits at a discount and apply them to reduce taxable income.

Sector	Policies or Programs	Workforce Related?	Description
Other	Founders and Funders	N	NJ Founders & Funders is organized by the NJ Economic Development Authority to facilitate warm introductions between innovative emerging New Jersey companies and sophisticated angel & institutional investors. Our mission is to help grow the innovation ecosystem. Hosted twice per year, venture capital investors are invited to meet with a pre-determined group of companies for 10-minute, one-on-one sessions to discuss strategy, business models and funding opportunities.
Other	CDFI Loan to Lender Program	N	The program provides Community Development Financial Institutions (CDFIs) with funding for them to act as a means of administering term loans or credit to qualified micro enterprises.
Other	Small Business Fund	N	Creditworthy small businesses in New Jersey may be eligible for assistance under the Small Business Fund. Minority-owned or women-owned businesses may qualify under criteria that support their unique circumstances.
Clean Energy	Executive Order No. 315	N	Executive Order No. 315 expedites New Jersey's shift to clean energy by requiring that all electricity sold in the state come from clean sources by January 1, 2035—15 years ahead of the previously established 2050 target. This accelerated timeline supports the state's broader climate objectives, including cutting greenhouse gas emissions by 50% from 2006 levels by 2030 and 80% by 2050. The order also underscores the need for equitable access to clean energy and prioritizes the growth of a skilled green workforce.
Solar	Successor Solar Incentive (SuSI) Program	N	The Successor Solar Incentive (SuSI) Program is New Jersey's long-term, permanent initiative to support the development of new solar energy generation. It offers incentives to eligible solar facilities that are connected to the state's electric public utility or local government distribution and transmission systems. The program is designed to promote the efficient and orderly growth of solar energy across New Jersey.

Sector	Policies or Programs	Workforce Related?	Description
Clean Energy	Clean Tech Seed Grant Program	N	The Clean Tech Seed Grant Program, developed in coordination with the NJ Board of Public Utilities and NJ Economic Development Authority is aimed at helping new jersey based early-stage clean tech/clean energy companies accelerate development and innovation of clean technologies to transform new discoveries from research stage into commercially viable technologies, leading to industry and investor interest.
Energy Efficiency	NJ Cool Program	N	The NJ Cool program is a $15 million pilot initiative by the NJ Economic Development Authority aimed at helping commercial, industrial, and institutional property owners located in Newark, Edison, and Atlantic City or New Jersey designated Overburdened and Adjacent Communiy census blocks to reduce greenhouse gas emissions through building retrofits. Grants ranging from $50,000 to $1 million will be provided to cover eligible construction costs for upgrading heating and cooling systems, improving energy efficiency, or installing on-site renewable energy solutions. Funded by the Regional Greenhouse Gas Initiative (RGGI) proceeds, this program seeks to promote environmentally-friendly building practices across New Jersey.
Electric Vehicles	Multi-Unit Dwelling Vehicle Charging Program	N	This program offers incentives to encourage owners and operators of multiunit dwellings (MUDs) to provide EV chargers for residents and guests. The incentives support the purchase and installation of eligible Level-Two EV charging equipment.
Electric Vehicles	Electric Vehicle Tourism program	N	This program provides up to six Level-Two chargers and two DC Fast Chargers for public/tourist locations ranging from boardwalks, parks, and other unique attractions, as well as overnight lodging establishments.

Sector	Policies or Programs	Workforce Related?	Description
Solar	Dual-Use Solar Pilot Program	N	The Dual-Use Solar Pilot Program, created under the Dual-Use Solar Energy Act of 2021, encourages the development of agrivoltaics, the simultaneous use of farmland for agricultural production and solar energy generation. Administered by the New Jersey Board of Public Utilities, the program supports the installation of up to 200 megawatts of solar energy over a three-year period and offers additional financial incentives through the Successor Solar Incentive (SuSI) Program. Rutgers University's Agrivoltaics Program, along with other state agencies, provides technical support, while participating landowners are responsible for the cost of research equipment, with data collection covered by the state during the pilot's initial three years.
Solar	Community Solar	N	Community Solar enables utility customers to participate in a solar energy project that is not located on their property. It is a way to support solar energy and save on your power bill without installing your own solar panels by joining a local solar farm.
Clean Transport	Trenton Mobility and Opportunity: Vehicles Equity System (MOVES) Project	N	Trenton MOVES is a pilot project funded by a $5 million grant from the New Jersey Department of Transportation, aimed at launching an on-demand, autonomous, electric shuttle system in Trenton. The system will include 100 accessible shuttles and 50 kiosks, serving over 90% of Trenton residents within a five-minute walk. Designed to address major transportation gaps—such as limited vehicle ownership, infrequent bus service, and access issues for seniors and students—the initiative was shaped by public input and is supported by Princeton University and the Corporation for Automated Road Transportation Safety (CARTS).
Electric Vehicles	New Jersey Zero-Emission Incentive Program (NJ ZIP)	N	The New Jersey Zero-Emission Incentive Program (NJ ZIP) is a voucher pilot program for medium and heavy-duty Zero Emission Vehicles (ZEVs).

Sector	Policies or Programs	Workforce Related?	Description
Electric Vehicles	Clean Fleet EV Incentive Program	N	The Clean Fleet Electric Vehicle Incentive Program offers financial support to local, state, and nonprofit entities transitioning their fleets to electric vehicles (EVs). In Fiscal Year 2024, the NJBPU allocated $12 million to this program, providing grants for the purchase of light-duty and Class 2B-6 battery electric vehicles, as well as Level 2 and Direct Current Fast Charging (DCFC) stations. Additional incentives are available for overburdened municipalities, with bonus incentives of up to 50% for eligible vehicles and charging equipment.
Electric Vehicles	Charge Up New Jersey Incentive	N	Charge Up New Jersey promotes clean vehicle adoption in the state by offering incentives of up to $4,000 for the purchase or lease of new, eligible zero-emission vehicles, including battery electric and plug-in hybrid electric.
Electric Vehicles	Bill A5124 AcaAa (2r): Amends certain requirements for installation of electric vehicle supply equipment and Make-Ready parking spaces.	N	This Bill states that new or reconstructed multifamily housing (MFH) developments with five or more units must make 15% of off-street parking EV-ready. At least 5% of parking must have EV chargers installed before occupancy, with an additional 5% added within three years and another 5% within six years. Developers may install chargers more quickly, but at least 5% of all EV chargers must be accessible to people with disabilities.
Electric Vehicles	Assembly Bill 4011, 2024: Zero Emission Vehicle (ZEV) Fee	N	This Bill requires EV owners to pay an annual fee of $250 in addition to standard registration fees. ZEV fees increase by $10 every year until 2028. The fees will contribute to the Transportation Trust Fund Account – Subaccount for Capital Reserves to support transportation projects.
Electric Vehicles	New Jersey Assembly Bill 4794	N	This Bill requires request for proposal to establish demonstration projects to develop electric vehicle charging depots serviced by distributed energy resource charging centers for certain electric vehicle use.

Sector	Policies or Programs	Workforce Related?	Description
Electric Vehicles	Electric Vehicle (EV) Charger Make-Ready Requirements for New Developments	N	New non-residential developments in New Jersey must meet specific EV make-ready parking requirements based on the number of off-street parking spaces, ranging from one space for lots with 50 or fewer spots to 4% for lots with over 150 spaces. Retailers with 25 or fewer spaces are exempt, and EV chargers may be installed instead of make-ready spaces. A statewide model ordinance sets installation and safety standards, allows EV spaces to count double toward parking minimums (up to 10%), and limits how much municipalities can exceed the state's make-ready requirements.
Clean Transport	Natural Gas Vehicle (NGV) Weight Exemption; New Jersey Statutes: 39:3-84.1	N	An NGV may exceed the state's gross vehicle weight limits by a weight equal to the difference between the weight of the vehicle with the natural gas tank and fueling system and the weight of a comparable vehicle with a diesel tank and fueling system. The NGV maximum gross weight may not exceed 82,000 pounds.
Electric Vehicles	Electric School Bus Program	N	NJDEP must implement an Electric School Bus program to determine the reliability and cost effectiveness of replacing diesel-powered school buses with electric school buses. Over a three-year period, the New Jersey Department of Environmental Protection must select 18 school districts and school bus contractors that operate in the northern, central, and southern regions of New Jersey to participate.
Electric Vehicles	eMobility Grant Program	N	The New Jersey Department of Environmental Protection administers the eMobility Grant Program, which provides funding to increase electric mobility solutions including carshare, rideshare, ride-hailing, fixed-route transit, microtransit, and e-mobility services for residents in underserved areas. Eligible projects include EVs and EV chargers. Priority will be given to projects in overburdened communities.

Sector	Policies or Programs	Workforce Related?	Description
Clean Transport	Clean Truck Replacement Program	N	The Port Authority of New York & New Jersey's (PANYNJ) Truck Replacement Program (Program) provides funding for the replacement of eligible Class 8 trucks with model year (MY) 2015 or newer diesel vehicles. Eligible replacement trucks must meet U.S. Environmental Protection Agency heavy-duty vehicle standards. Funding is available for up to 50% of the replacement truck purchase price, up to $25,000, whichever is less. Vehicles eligible for retirement include Class 8 port drayage trucks with MY 1999 through 2009 engines. Funding is limited to two replacement trucks per applicant.
Energy Efficiency	Appliance Rebates	N	These rebates are for qualifying residential, ENERGY STAR®-certified appliances such as washers and, dryers, refrigerators, dehumidifiers, room air conditioners, and more.
Waste Management	Appliance Recycling Program	N	Through this program, local electric companies may pick up and recycle old, working refrigerator or freezer for a rebate. Residents can receive an additional rebate when you recycle your working room air conditioner or dehumidifier at the same time. There is no cost to participate in this program and all appliances are responsibly recycled.
Energy Efficiency	Benchmarking Program	N	Mandatory for commercial buildings larger than 25,000 square feet and free and voluntary for all others, this program uses the Environmental Protection Agency's Portfolio Manager tool to benchmark and compare a building's energy and water performance against buildings of comparable use to help you better understand and track your building's performance over time.
Renewable Energy	Combined Heat and Power and Fuel Cell Program	N	This program provides generous financial incentives for Combined Heat and Power (CHP) and Fuel Cell (FC) installations.
Renewable Energy	Combined Heat and Power - Feasibility Study	N	This program is designed to increase and expand distributed energy resources by providing incentives towards the cost of developing Feasibility Studies for combined heat and power systems and fuel cells.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency; Environmental Justice	Comfort Partners Program	N	This program helps income-eligible residential customers reduce their utility bills by implementing cost-effective measures, focusing on air sealing and insulation, that save energy and money while improving their existing home's safety and comfort at no cost.
Energy Efficiency	Commercial Equipment Upgrade: Custom Projects	N	This program helps businesses develop energy-saving projects for existing facilities by providing incentives for installing new, customized energy-saving equipment. Custom projects are typically multi-measure or optimization solutions for which customers earn performance-based incentives using $/kWh and/or $/therm.
Energy Efficiency	Commercial Equipment Upgrade: Direct Install	N	This program provides financial incentives for up to 80% of the installed costs to replace existing inefficient equipment with high-efficiency alternatives in smaller facilities with annual average demand of up to 300 kW or up to 40,000 therms of annual consumption.
Energy Efficiency	Commercial Equipment Upgrade: Prescriptive	N	This program provides incentives for installing single or multiple pieces of equipment in commercial and industrial facilities. Incentive levels are predetermined and apply to equipment for heating and cooling, refrigeration, HVAC controls, lighting and lighting controls, food service, and more.
Energy Efficiency	Commercial Existing Buildings: Energy Management	N	This program provides holistic solutions and incentives to optimize the performance of existing building systems. It can include HVAC tune-up and building tune-up, retro-commissioning, and strategic energy management solutions.
Energy Efficiency	Commercial Existing Buildings: Engineered Solutions	N	This program supports tailored, comprehensive energy-efficiency solutions and incentives for larger commercial customers.
Energy Efficiency	Commercial Existing Buildings: Large Energy Users	N	This program promotes self-investment in energy efficiency for eligible projects in the state's largest commercial and industrial facilities.
Alternative Transportation	Electric Vehicles - Charging Program	N	This program provides incentives for customers to facilitate easy and cost-efficient installation of EV chargers.
Alternative Transportation	Electric Vehicles - EV Smart	N	This program provides incentives for Atlantic City Electric customers to facilitate easy and cost-efficient installation of EV chargers.

Sector	Policies or Programs	Workforce Related?	Description
Alternative Transportation	Electric Vehicles - Local & State Governments: Clean Fleet EV Incentive Program	N	This program supports local and state governments transitioning fleets to EVs by providing grants for the purchase of battery electric vehicles, public Level-Two chargers, and fleet Level-Two EV charging station(s).
Alternative Transportation	Electric Vehicles - Residential: Charge Up New Jersey	N	This program provides incentives for light-duty electric vehicles and at-home electric charging infrastructure of up to $4,000 for the purchase or lease of new, eligible zero-emission vehicles, including battery electric and plug-in hybrid electric.
Energy Efficiency	Energy Efficient Products	N	This program provides instant rebates on residential energy-efficiency products, such as smart thermostats, LEDs, smart strips, conservation kits, and more through utility online marketplaces.
Energy Efficiency	Energy Savings Improvement Program	N	This program provides government entities with funds to pay for energy-related improvements to facilities using the value of energy savings that result from the improvements.
Energy Efficiency	Free Local Government Energy Audit	N	This program provides local government, state, and select non-profit agencies with services to examine facilities and see how they can improve energy use.
Renewable Energy; Clean Energy	Higher Education Decarbonization Program	N	This program was designed to encourage colleges, universities, and educational institutions to support New Jersey's clean energy future by taking actionable steps toward decarbonization.
Energy Efficiency	Multi-Family	N	There are various programs available for multi-family property owners to lower per-unit energy costs through energy assessments, single measure, and whole-building energy efficiency rebates and incentives.
Environmental Justice; Clean Energy	Municipal: Community Energy Plan Grants	N	These grants provide support to municipalities to develop climate action plans at the local level based on planning strategies that are most applicable in their respective communities.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency	New Construction Program	N	The New Construction Program is a streamlined approach to building a clean energy future, offering a single-entry point to various pathways to qualify for incentives with greater flexibility for gut renovation and new construction projects. As your building project achieves higher energy efficiency, you can qualify for larger incentives and optional bonuses, making energy efficiency a more cost-effective part of your project.
Energy Efficiency	Residential Equipment Upgrade: HVAC and Water Heating	N	Provides rebates and access to 0% financing for residential HVAC and water heating equipment such as furnaces, boilers, air conditioners, heat pumps, water heaters, and smart thermostats.
Energy Efficiency; Resiliency Infrastructure	Residential: Income-qualified Weatherization	N	Provides moderate-income residential customers with a comprehensive audit with qualifying energy-savings measures (focusing on air sealing and insulation and the potential for HVAC and water heating equipment), as well as any necessary health and safety measures.
Energy Efficiency	Residential: Whole Home Energy Assessment	N	Provides a no-cost home energy assessment, installation of energy-saving products, and recommendations to help save energy, and information on other available programs, rebates, and incentives.
Energy Efficiency	Residential: Whole Home Energy Solutions®	N	Supplies comprehensive whole house solutions that consider the building shell (insulation and seal up) and HVAC and water heating equipment; also provides access to rebates and 0% financing.
Clean Energy; Environmental Justice	Executive Order No. 7	N	Governor Murphy issued this order to reverse the prior administration's exit from RGGI, align state policy with climate science, and reassert New Jersey's leadership in regional climate action, especially through carbon reduction, clean energy investment, and environmental justice.
Clean Energy; Climate Change	Executive Order No. 28	N	Executive Order No. 28, issued by New Jersey Governor Phil Murphy in 2018, directs the creation of a new Energy Master Plan to transition the State to 100% clean energy by 2050. It establishes an interagency committee to develop the plan, prioritizing offshore wind, solar energy, energy storage, and clean transportation initiatives over the next decade.

Sector	Policies or Programs	Workforce Related?	Description
Resiliency Infrastructure; Climate Adaptation	Executive Order No. 89	N	Executive Order No. 89, issued by New Jersey Governor Phil Murphy in 2019, establishes a statewide climate resilience strategy to address the growing risks of climate change, including sea level rise, extreme weather, and public health threats. It creates a Chief Resilience Officer, a Climate and Flood Resilience Program, and an Interagency Council to coordinate science-based planning, infrastructure adaptation, and coastal protection efforts across state agencies.
Climate Change	Executive Order No. 100	N	Executive Order No. 100, signed in 2020, mandates the New Jersey Department of Environmental Protection to implement 'Protecting Against Climate Threats' (PACT) regulations. These regulations aim to embed climate considerations into permitting and oversight processes, focusing on reducing greenhouse gas emissions, enhancing pollution monitoring, and meeting the goals outlined in the State's 2019 Energy Master Plan and Global Warming Response Act.
Alternative Transportation	NJ Zero Emission Vehicles Financing program	N	The New Jersey Zero Emission Vehicle (NJ ZEV) Financing Program is a $25 million loan initiative by NJEDA that provides low-interest loans of $50,000 to $500,000 to help commercial and industrial businesses purchase zero-emission medium- and heavy-duty vehicles. It complements the NJ ZIP voucher program by covering additional costs, with $15 million reserved for applicants in overburdened communities and a requirement that vehicles operate at least 75% of their mileage within New Jersey.
Clean Energy; Resiliency Infrastructure	NJ Green Bank	N	The New Jersey Green Bank (NJGB), established by the New Jersey Economic Development Authority (NJEDA) in 2024, is a state-backed financial institution designed to accelerate the deployment of clean energy and climate-resilient infrastructure across the state. Its primary mission is to leverage public funds to attract private capital, thereby facilitating an equitable transition to 100% clean energy and advancing environmental justice initiatives.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency; Environmental Justice	State utility programs through Triennium 1 and Triennium 2	N	Triennium 1 (2021–2024) marked New Jersey's first statewide utility-run energy efficiency programs, investing $1.8 billion to reduce energy use, cut greenhouse gas emissions by 1.4 million metric tons annually, and lower utility bills for residents and businesses. Triennium 2 (2025–2027) builds on that progress with over $3.75 billion in funding, expanding energy-saving programs, introducing building decarbonization and demand response efforts, and prioritizing access for low-income and overburdened communities.
Clean Energy; Energy Efficiency; Renewables	State Energy Program (U.S. DOE)	N	The State Energy Program (SEP), administered by the U.S. Department of Energy (DOE), is a cost-shared initiative that offers financial and technical support to states for the design, development, and implementation of energy efficiency and renewable energy programs. New Jersey uses SEP funding to complement its broader Clean Energy Program (NJCEP) and support the state's transition toward 100% clean energy by 2035.
Energy Efficiency; Environmental Justice	Home Efficiency Rebates (HER)	N	The Home Efficiency Rebates (HER) program in New Jersey is a federal initiative created under the Inflation Reduction Act (IRA) and managed by the New Jersey Board of Public Utilities. Its purpose is to promote energy efficiency and electrification in low- and moderate-income households, helping residents lower their energy bills while supporting the state's clean energy objectives.
Energy Efficiency; Environmental Justice	Home Electrification and Appliance Rebates (HEAR)	N	The New Jersey Home Electrification and Appliance Rebates (HEAR) program, funded through the federal Inflation Reduction Act, provides rebates to assist low- to moderate-income households with home electrification and the purchase of energy-efficient appliances.
Energy Efficiency, Environmental Justice; Resiliency Infrastructure	Weatherization Assistance Program (U.S. DOE)	N	The Weatherization Assistance Program (WAP) in New Jersey, funded by the U.S. Department of Energy (DOE) and administered by the New Jersey Department of Community Affairs (DCA), offers free home energy upgrades to low-income households. The program aims to reduce energy consumption and lower utility bills by improving home insulation, sealing air leaks, and enhancing heating system efficiency. Eligible participants include low-income residents, particularly those who are elderly, disabled, or have high energy burdens.

Sector	Policies or Programs	Workforce Related?	Description
Energy Efficiency, Environmental Justice	Low-Income Home Energy Assistance Program	N	The Low-Income Home Energy Assistance Program (LIHEAP) in New Jersey is a federally funded initiative managed by the New Jersey Department of Community Affairs (DCA). It provides financial assistance to eligible low-income households to help cover heating and cooling costs, ensuring access to essential energy services.
Clean Energy, Environmental Justice	Solar for All	N	The Solar for All program in New Jersey is a federal initiative launched through the U.S. Environmental Protection Agency's Greenhouse Gas Reduction Fund, stemming from the Inflation Reduction Act. Administered by the New Jersey Board of Public Utilities, this program aims to expand access to solar energy for low-income and disadvantaged communities across the state.