



New Jersey's Energy-Efficiency Workforce Needs, Infrastructure, and Equity Assessment

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Abstract

Governor Phil Murphy's **Executive Order 315** in 2023 set a goal of ensuring 100% of energy sold in New Jersey comes from clean sources by 2035, and implementing strategic recommendations in the New Jersey Council on the Green Economy's report **Green Jobs for a Sustainable Future**, such as targeted job creation, educational ecosystem alignment, and piloted workforce initiatives. Understanding the energy-efficiency sector – its current landscape, challenges, and areas for growth – is critical given these efforts, especially ensuring commitments to diversity, equity, and inclusion in workforce development infrastructure. There are two **objectives** for this study: to better understand and document community needs and areas for growth in training, recruiting, hiring, and retaining students, trainees, and workers from diverse backgrounds in the state; and to produce strategies for improving workforce development infrastructure for state agencies to consider. This report presents 12 strategies for key stakeholders to implement based on eight findings supported by evidence from the labor market and job posting analyses, a survey, and interviews.¹ By strengthening workforce development infrastructure, these strategies will support a diverse, skilled, and equitable workforce in ways that help New Jersey achieve its clean-energy goals. For detailed information on strategies and supporting evidence, see the **executive summary** and main report. This study was conducted by the Heldrich Center for Workforce Development at Rutgers, The State University of New Jersey in partnership with the Built Environment and Green Building Group at the Center for Urban Policy Research (formerly known as the Rutgers Center for Green Building) at Rutgers University.

¹ This study is based on 350 valid survey responses from students, trainees, workers, and business owners, and 36 interviews with 10 employers, 15 training providers, 6 nonprofits and community-based organizations, and 5 associations and union-affiliated organizations. Students and trainees are defined as those completing training programs in the field. Workers are those currently employed in an energy-efficiency job, and business owners are employers within the energy-efficiency sector.



Executive Summary

The energy-efficiency sector² is an increasingly important component of the clean-energy transition in New Jersey, yet there are clear challenges with workforce development infrastructure, particularly around diversity, equity, and inclusion. Driving these efforts in the state is the Energy Master Plan, which set aggressive goals to achieve 100% clean energy by 2050, as well as recent recommendations from the New Jersey Council on the Green Economy, including targeted job creation, piloted workforce development initiatives, and key partnerships. Data collected from various sources³ show that, though energy-efficiency jobs are relatively high paying in New Jersey, they are largely concentrated in construction – often using traditional heating, ventilation, and air conditioning technologies – and consistently lack diversity in terms of race and gender. It is well documented that Hispanic workers, for example, are well represented in the sector but concentrated in low-wage positions, with higher-paying positions lacking racial and ethnic diversity (Shoemaker, Ayala, & York, 2020).

Given these trends, the **objectives** of this study are to: better understand and document workforce needs and areas for growth in training, recruiting, hiring, and retaining students, trainees, and workers in the state, with an emphasis on those from disadvantaged groups and underserved communities;⁴ and produce strategies for improving workforce development infrastructure for state agencies to consider for implementation. To achieve these objectives, researchers:

² The energy-efficiency sector has five industries: construction, manufacturing, professional and business services, wholesale trade, and other services. There are myriad occupations within each industry. See *United States Energy & Employment Report 2023* for more information: <https://www.energy.gov/sites/default/files/2023-06/2023%20USEER%20REPORT-v2.pdf>.

³ Researchers collected and analyzed labor market and job posting data from Lightcast, as well as the New Jersey Department of Labor and Workforce Development and the New Jersey Council on the Green Economy. See the **workforce trends** section for more detailed information.

⁴ This report uses both disadvantaged groups and historically underserved communities, though they often overlap. While **disadvantaged groups** specifically refers to individual characteristics, such as race, gender, or disability, **underserved communities** captures how these individual characteristics interact and the extent to which they are geographically related. See the **glossary of terms** in Appendix F for more detailed information.

- ▶ Analyzed New Jersey labor market and job posting data;
- ▶ Distributed and analyzed **350** valid survey responses from students, trainees, workers, and business owners; and
- ▶ Conducted **36** interviews with key New Jersey stakeholders in the energy-efficiency sector, including employers, training providers, nonprofits, community-based organizations (CBOs), associations, and unions.

This **executive summary** presents each strategy for improving workforce development infrastructure and supporting findings. Though there were persistent recruitment issues and limited engagement from union representation that affected the generalizability of findings outlined in this report (see Appendix A for the technical methodology), this report presents key insights into the current landscape of the energy-efficiency, education-to-workforce pipeline and opportunities for equitable expansion.

Strategies for Improving Workforce Development Infrastructure

Supported by key trends and takeaways from survey responses and interviews, the following strategies aim to strengthen workforce development infrastructure and help build a diverse, skilled, and equitable workforce in ways that can help New Jersey achieve its clean-energy goals. Underpinning these strategies is **energy equity**: the fair distribution of benefits from transitioning to clean energy – especially employment opportunities – to disadvantaged groups and underserved communities. While each strategy is supported by several, often overlapping findings, this **executive summary** provides thorough but not always exhaustive lists of findings (see Table 1 for strategies mapped with examples of supporting evidence). It is important to note that these findings are not ranked in any order of significance, but rather strategies are broadly grouped by training delivery, stakeholder engagement, and performance or measurement, with the **executive summary** highlighting critical evidence for each strategy. Additional findings and supporting evidence, including specific action items associated with each strategy, are detailed in the main report.

Table 1: Strategies and Examples of Supporting Evidence

Strategy	Examples of Supporting Evidence
<p>Strategy #1: State agencies should create and implement an integrated career pathways tool to bridge the gap between education and training to employment.</p>	<ul style="list-style-type: none"> ▶ Lack of public awareness of sector and energy-efficiency technologies that drive demand; absent clearly defined pathways and career trajectories ▶ Limited information about quality training providers and appropriate areas of study
<p>Strategy #2: State agencies should engage relevant stakeholders to strengthen awareness of energy-efficiency careers among youth.</p>	<ul style="list-style-type: none"> ▶ Lack of public awareness of sector limits participation among youth ▶ Misconceptions about working in the trades discourages youth from participating
<p>Strategy #3: State agencies should develop public-private partnerships (PPPs) to address workforce gaps and help facilitate feedback loops between employers and training providers to ensure curricula can better meet sector needs.</p>	<ul style="list-style-type: none"> ▶ Reliance on on-the-job training to fill skills gaps ▶ Misalignment between some education and training programs and sector needs ▶ Limited success with job posting platforms (e.g., LinkedIn)

Table 1: Strategies and Examples of Supporting Evidence (continued)

Strategy	Examples of Supporting Evidence
<p>Strategy #4: State agencies should partner with the New Jersey Department of Labor and Workforce Development (NJDL) to expand registered apprenticeship opportunities in the energy-efficiency sector and offer incentive mechanisms that encourage employers to increase participation among women, individuals of color, individuals with disabilities, and individuals who were formerly incarcerated.</p>	<ul style="list-style-type: none"> ▶ Women, Black, and/or Asian workers underrepresented ▶ Transportation, cost, and location limit participation among disadvantaged groups and/or underserved communities ▶ Women, individuals of color, and/or individuals with disabilities reported negative workplace experiences in the survey
<p>Strategy #5: State agencies should establish or expand existing financial assistance to participants of education and training programs.</p>	<ul style="list-style-type: none"> ▶ Prohibitive costs of transportation and tuition prevent low-income students and trainees from participating in opportunities
<p>Strategy #6: State agencies should require state-funded education and training programs to include externships and/or an experiential learning component.</p>	<ul style="list-style-type: none"> ▶ Struggle to provide students and trainees with skills required to be successful in the sector ▶ Partly attribute skills gap to poor integration of energy-efficiency-related topics
<p>Strategy #7: State agencies should provide stipends, bonuses, and/or rewards to field practitioners willing to instruct classes for education and training programs.</p>	<ul style="list-style-type: none"> ▶ Few qualified candidates available to fill instructor positions ▶ Partly attribute skills gap to lack of knowledge of instructors who have recent field experience ▶ Training providers get creative with sourcing grant funds to hire qualified candidates
<p>Strategy #8: State agencies should leverage stakeholder partnerships to provide and/or connect students and trainees with wraparound services, such as transportation, counseling, and child care, to reduce participation barriers.</p>	<ul style="list-style-type: none"> ▶ Few students and trainees can take time away from work to participate ▶ Lacking robust public transportation, prohibitive costs of fuel, and long travel times make it harder to participate
<p>Strategy #9: State agencies should facilitate community partnerships that help connect graduates of education and training programs with high-quality, good-paying jobs.</p>	<ul style="list-style-type: none"> ▶ Distinct but varied requirements for entry-level jobs complicate job search process ▶ Employers less intentional about hiring diverse candidates given supply-and-demand issues ▶ Overrepresentation of Hispanic/Latino workers attributed to exploitative hiring practices of low-cost immigrant labor
<p>Strategy #10: Who does recruitment and outreach matters. State agencies should build trust with communities and stakeholders by meeting them where they are.</p>	<ul style="list-style-type: none"> ▶ Community partnerships frequently cited as important for developing relationships and networks ▶ Workforce Development Boards partner with CBOs embedded in communities to increase uptake

Table 1: Strategies and Examples of Supporting Evidence (continued)

Strategy	Examples of Supporting Evidence
Strategy #11: State agencies should implement geographic-based hiring targets to ensure equitable access to employment opportunities across regions.	<ul style="list-style-type: none"> ▶ Participation barriers limit opportunities for individuals from disadvantaged groups and/or underserved communities ▶ Employment practices limit state’s ability to advance equity, whereby additional measures can help
Strategy #12: State agencies should require stakeholders to better collect and track equity measures.	<ul style="list-style-type: none"> ▶ Current hiring practices less intentional due to supply-and-demand issues ▶ Women, individuals of color, and/or individuals with disabilities more likely to report being treated poorly in the workplace and having limited advancement opportunities

*Note: The supporting evidence in this table is not exhaustive. See the **main report** for the findings and each takeaway with supporting evidence.*

Strategy #1: State agencies should create and implement an integrated career pathways tool to bridge the gap between education and training to employment.

A career pathways tool leverages occupational data from relevant labor market sources and connects them with educational programming offered by training providers and career development agencies. Easy access to comprehensive and up-to-date information can enhance career aspirations and enable informed decision-making regarding career pathways and corresponding education and training programs specifically for the energy-efficiency sector. State agencies can partner to build upon the **New Jersey Training Explorer** tool as an example. Customizing this tool can include specific pathways outlined within the energy-efficiency sector and match to relevant training programs.

Supporting Evidence

- ▶ The public lacks awareness of energy efficiency in general but especially rebate and incentive programs for adopting energy-efficient technologies that help drive demand for workers in the sector (see **Finding #1**).
- ▶ Clearly defined pathways and career trajectories are absent in the energy-efficiency sector. Sixty-two survey respondents felt they would be better supported with easier access to entry-level positions and clearer opportunities for advancement (see **Finding #1**).
- ▶ There is limited information on quality training providers and appropriate areas of study.⁵ Forty-two survey respondents felt that college and university students should have more explicit information on opportunities in the energy-efficiency sector (see **Finding #1**).
- ▶ Individuals lack sufficient information on which skills are necessary for securing employment in this sector. Twenty-nine survey respondents suggested incorporating more hands-on exposure to specific topics as an introduction to potentially important skills in the sector (see **Finding #1**).

⁵ Researchers assessed training quality based on **program design**, which includes content and execution of the training program; **competencies**, such as the skills and knowledge that training participants earn; and **outcomes**, which include educational and employment outcomes that benefit individuals and employers. Included in this assessment is matching each factor (program design, competencies, outcomes) to specific industry needs.

- ▶ There are distinct but varied requirements for entry-level jobs in the energy-efficiency sector, making it difficult for students and trainees to decipher when, where, and how to pursue education and training programs (see **Finding #6**).

Strategy #2: State agencies should engage relevant stakeholders to strengthen awareness of energy-efficiency careers among youth.

State agencies should increase efforts to engage employers, training providers, CBOs, associations, and unions to create programming within the K-12 educational system that introduces youth to careers in the energy-efficiency sector. Exploratory and experiential opportunities – such as age-appropriate demonstrations and hands-on learning activities – in elementary, middle, and high schools across New Jersey would help boost exposure to potential career opportunities and, at the same time, create valuable recruitment mechanisms for the energy-efficiency sector. State agencies should also provide school counselors, career coaches, and career and technical education staff with additional information about the energy-efficiency sector to expand awareness for youth.

Supporting Evidence

- ▶ The lack of awareness and clearly defined career pathways make it harder for youth to pursue opportunities in the sector (see **Finding #1**).
- ▶ Misconceptions about working in the trades discourage youth from enrolling in education and training programs. Training providers are working to combat these misconceptions by ensuring that staff provide accurate and helpful information to interested individuals (see **Finding #1**).

Strategy #3: State agencies should develop PPPs to address workforce gaps and help facilitate feedback loops between employers and training providers to ensure curricula can better meet sector needs.

PPPs can be effective in addressing the skills gap and the disconnect between the energy-efficiency industry and education and training institutions. These partnerships can help training providers keep up to date with changing technology and industry. Specifically, PPPs can help ensure that education and training programs provide students and trainees with valuable, industry-recognized skills and credentials for in-demand technologies. Establishing and strengthening feedback loops within PPPs, especially for employers and training providers, can reduce existing siloes, increase collaboration, and ensure workforce development infrastructure that provides employers with what they need. An example of an effective PPP is the Arizona Clean Energy Workforce Development Program, a collaboration between the state of Arizona and Microsoft that provides vocational training and educational pathways focused on recruiting students and trainees from disadvantaged groups and underserved communities.

Supporting Evidence

- ▶ Stakeholders rely on employers to offer on-the-job training with specialized knowledge and expertise to fill skills gaps, with 126 survey respondents (36%) self-reporting that they received education and training through their employer (see **Finding #2**).
- ▶ Employers face challenges in identifying candidates with the necessary licenses, resulting in hiring delays and additional training requirements (see **Finding #2**).

- ▶ Some education and training programs are misaligned with sector needs. Stakeholders felt that education and training programs are not currently designed to adequately produce workers for jobs with niche specializations but instead give students and trainees the “general flavor” of working in the energy-efficiency sector, with 154 survey respondents (44%) reporting that they do not provide information beyond basic foundational concepts (see **Finding #2**).
- ▶ Education and training programs struggle to sufficiently integrate energy-efficiency-related topics. These programs often have few components dedicated to energy efficiency, though many stakeholders, including 17 survey respondents, acknowledge the difficulty of adapting curricula with rapid technological changes (see **Finding #2**).
- ▶ Stakeholders, especially small employers, have had limited success with job posting platforms like LinkedIn and Indeed. Fewer than 1% of survey respondents found their current job on these platforms, and one employer even mentioned that it is far easier to poach potential candidates from other firms (see **Finding #4**).

Strategy #4: State agencies should partner with NJDOL to expand registered apprenticeship opportunities in the energy-efficiency sector and offer incentive mechanisms that encourage employers to increase participation among women, individuals of color, individuals with disabilities, and individuals who were formerly incarcerated.

State-funded programs, though nascent, have shown promise in meeting these goals. Stakeholders could collaborate with NJDOL to expand state-funded registered apprenticeships for jobs in the energy-efficiency sector, recruiting potential students and trainees from disadvantaged groups and underserved communities. Organizations such as PSE&G have already begun to explore these opportunities. The state can also achieve increased diversity among participants in pre-apprenticeship programs and apprenticeships by providing employers with additional incentive mechanisms, such as certifications, enhanced business prospects, or tax rebates. Providing incentive mechanisms, including targeted support, technical assistance, and capacity-building initiatives, to small, minority, and/or women-owned businesses can help these businesses offer paid apprenticeships and contribute to local job creation. These combined efforts would help engage employers to actively participate in the development of a diverse skilled workforce.

Supporting Evidence

- ▶ The energy-efficiency workforce in New Jersey is largely white (66%) and Hispanic/Latino (22%), with limited representation from Black and Asian workers (see **workforce trends** section).⁶
- ▶ An overwhelming percentage of the workforce are men (95%). However, there are certain occupations, largely concentrated in engineering, that have greater representation among women (see **workforce trends** section).
- ▶ There are significant barriers, including cost and transportation, that limit participation, especially among disadvantaged groups and underserved communities. Twenty-seven survey respondents mentioned tuition fees and nine interviewees highlighted the lack of accessible public transportation (see **Finding #6**).
- ▶ Survey respondents who identify as women, individuals of color, and/or individuals with disabilities reported having negative experiences in the workplace. For example, 50% of Hispanic/Latino respondents felt that someone treated them as if they were less competent or valuable at their current or previous job(s). Those who identify as women, individuals of color, and/or individuals with disabilities also reported limited employment prospects and advancement and promotion opportunities at their current or previous job(s). For example, 54% of respondents who identify as women reported earning less than a co-worker doing the same job compared to one-third of men – a 21 percentage point difference (see **Finding #7**).

⁶ Much of the supporting evidence on the current energy-efficiency workforce in New Jersey is based on data from NJDOL and the New Jersey Council on the Green Economy. The **workforce trends** section provides additional information on the data sources related to the workforce.

Strategy #5: State agencies should establish or expand existing financial assistance to participants of education and training programs.

Additional financial support can help students and trainees overcome barriers associated with participating in education and training programs. Employers, training providers, CBOs, associations, and unions can, with support from the state, offer scholarships, grants, and/or subsidized training programs that can help alleviate the financial burden of tuition fees. Increased financial support should specifically target students and trainees from disadvantaged groups and underserved communities, which includes women, low-income individuals, individuals of color, individuals with disabilities, and/or individuals who were formerly incarcerated.

Supporting Evidence

- ▶ The direct and indirect costs associated with participating in education and training programs overburden students and trainees. The prohibitive costs of transportation and child care often prevent low-income students and trainees from participating. Of the 37 survey respondents indicating they faced barriers to participating in education and training programs, 72% indicated that financial assistance to cover the cost of the training program, transportation, and/or child care would have made it easier for them to participate. Though five interviewees cited training providers that offer financial assistance, this practice does not exist among all programs for the energy-efficiency sector (see **Finding #6**).

Strategy #6: State agencies should require state-funded education and training programs to include externships and/or an experiential learning component.

In addition to gaining exposure to the latest information and technologies in the field, externships and/or experiential learning components provide an opportunity for students and trainees to obtain necessary credentials and/or licensing. Requiring state-funded registered apprenticeships to provide experiential learning components, for example, would help ensure that students and trainees get the knowledge, skills, and expertise required to be successfully employed in the energy-efficiency sector.

Supporting Evidence

- ▶ Training providers struggle to provide specific skills required to be successful in the energy-efficiency sector. Fifty-two survey respondents discussed the increased demand for candidates with specialized skills that experiential learning components can help provide (see **Finding #2**).
- ▶ Stakeholders attribute part of the skills gap to poor integration of energy-efficiency-related topics (see **Finding #2**).

Strategy #7: State agencies should provide stipends, bonuses, and/or rewards to field practitioners willing to instruct classes for education and training programs.

State agencies and other stakeholders can offer additional financial support to incentivize qualified individuals, especially field practitioners with relevant knowledge, skills, and expertise, to become instructors and teach approved curricula at education and training programs across New Jersey. Providing stipends, bonuses, and/or rewards to prospective instructors would help offset the opportunity cost of leaving high-paying jobs in the field.

Supporting Evidence

- ▶ There are few qualified candidates available to fill instructor positions. Five interviewees indicated that the low salary can disincentivize practitioners from becoming instructors (see **Finding #2**).
- ▶ Stakeholders partly attributed the skills gaps to the lack of knowledgeable instructors who have recent field experience with currently used technologies (see **Finding #2**).
- ▶ The small pool of qualified instructors limits the availability and accessibility of education and training programs, especially given the subject-matter expertise required to facilitate programs and the rapidly changing nature of the energy-efficiency sector (see **Finding #5**).
- ▶ Training providers must often get creative in sourcing grant funds to hire qualified candidates for instructor positions. Five training providers have attempted to mitigate this cost by partnering with employers to find qualified instructors. Someone affiliated with the employer, for example, then teaches the class and can recruit potential candidates for open positions (see **Finding #5**).

Strategy #8: State agencies should leverage stakeholder partnerships to provide and/or connect students and trainees with wraparound services, such as transportation, counseling, and child care, to reduce participation barriers.

State agencies should leverage partnerships between employers, training providers, CBOs, associations, and unions to reduce participation barriers by providing and/or connecting students and trainees with wraparound services. Stakeholder partnerships, with support from the state, can pool resources to arrange transportation, counseling, and childcare services. Addressing these barriers through wraparound services is key to recruiting, training, hiring, and retaining individuals from disadvantaged groups and underserved communities. Provided through the PSE&G Partnership Grant, the **Clean Energy Jobs Training Program** is an example whereby grantees in Camden, Elizabeth, Newark, New Brunswick, Paterson, and Trenton will recruit, train, and employ 2,000 residents during the grant period, offering participants with workforce readiness and financial literacy education, wraparound services, job coaching, and job placement services.

Supporting Evidence

- ▶ Few students and trainees can afford to take time away from work to participate in education and training programs (see **Finding #6**).
- ▶ The lack of robust public transportation, prohibitive costs of fuel, and long travel times were frequently cited as barriers for students and trainees in participating. Among those who self-reported experiences with participation barriers, 10 survey respondents cited transportation, suggesting subsidized transportation costs or temporary accommodations close to training facilities as short-term solutions (see **Finding #6**).

Strategy #9: State agencies should facilitate community partnerships that help connect graduates of education and training programs with high-quality, good-paying jobs.

Community partnerships between local employers, training providers, CBOs, associations, and unions are crucial to successfully connecting students and trainees with high-quality, good-paying jobs after graduation.⁷ These partnerships help local training providers maintain personal relationships with employers, especially local contractors, in the energy-efficiency sector through formal and informal hiring agreements.

Supporting Evidence

- ▶ Entry-level jobs for energy efficiency have distinct but varied requirements. For some entry-level jobs, a high school diploma is sufficient, whereas others require a bachelor's degree with two to five years of relevant experience. Twenty-six survey respondents recommended that stakeholders clarify these requirements, including established educational attainment and years of experience needed to enter specific careers (see **Finding #3**).
- ▶ Small employers struggle to recruit potential candidates using job posting platforms in ways that better community partnerships can help alleviate (see **Finding #4**).
- ▶ Negative experiences and limited advancement opportunities for women, individuals of color, and individuals with disabilities highlights the need for **high-quality jobs** that offer fair wages to all (see **Finding #7**).
- ▶ Employers are less intentional about hiring diverse candidates, given the current demand for and limited supply of qualified workers in the energy-efficiency sector. Eleven out of 36 interviewees shared that they do not have established guidelines for hiring diverse candidates (see **Finding #8**).
- ▶ Stakeholders attribute the overrepresentation of Hispanics/Latinos in the energy-efficiency workforce to hiring practices aimed at exploiting low-cost labor from immigrant and often undocumented workers. This is well substantiated by the literature, which shows that Hispanic/Latino workers are concentrated in low-wage positions, with less racial and ethnic diversity in higher-paying positions (Shoemaker, Ayala, & York, 2020) (see **Finding #8**).

Strategy #10: Who does recruitment and outreach matters. State agencies should build trust with communities and stakeholders by meeting them where they are.

Trust is one of the most crucial aspects of increasing awareness within specific communities. Efforts to increase awareness about the sector must come from those who are already trusted and embedded within the community. Training providers should take initiative and connect with local leaders and community members. Meeting workers in communities where they are is another way to build trust. Stakeholders can connect with students and trainees in spaces they are familiar and comfortable with, including faith-based institutions, community centers, public places, and other areas where communities tend to congregate.

Supporting Evidence

- ▶ Interviewees felt strongly about the importance of community partnerships for recruitment. Four training providers mentioned that these relationships and networks can help connect potential program participants with relevant opportunities in spaces wherein they are comfortable. Relatedly, two interviewees also highlighted marketing efforts, stating that who does the messaging matters.

⁷ Researchers used the New Jersey Council on the Green Economy's (2022) report *Green Jobs for a Sustainable Future* to define high-quality jobs in the energy-efficiency sector, which states that these jobs offer "family sustaining wages and long-term career pathways" (p. 8). Other related measures include union neutrality; local hiring provisions; safety and health; diversity, equity, inclusion, and accessibility; and workforce development opportunities. See the Good Jobs Initiative Job Quality Check List at the U.S. Department of Labor for more information: <https://www.dol.gov/general/good-jobs/job-quality-check-list>.

- ▶ One Workforce Development Board member mentioned their community partnership in depth. By requesting the help of CBOs embedded in the community, the Workforce Development Board member felt that they were able to share information about training and services more widely. The Workforce Development Board member felt that there was greater uptake of services because of efforts through the community partnership.

Strategy #11: State agencies should implement geographic-based hiring targets to ensure equitable access to employment opportunities across regions.

Prioritizing local and targeted job creation will allow New Jersey to maximize the benefits of green job growth, create opportunities for disadvantaged groups and underserved communities, and foster inclusive and sustainable economic development. Such an approach not only supports the advancement of clean energy, including the energy-efficiency sector, but also contributes to a more equitable future for all residents of New Jersey.

Supporting Evidence

- ▶ Participation barriers limit opportunities for students, trainees, and workers from disadvantaged groups and underserved communities, thereby reducing access to employment opportunities (see **Finding #6**).
- ▶ Current employment practices can limit the state's ability to advance equity. Implementing additional measures is necessary to ensure equitable access to employment opportunities across regions (see **Finding #8**).

Strategy #12: State agencies should require stakeholders to better collect and track equity measures.

To improve workforce equity, state agencies should clarify targets and require better data collection and tracking among stakeholders. State agencies should disseminate additional information to increase awareness about specific targets and require that employers, training providers, CBOs, associations, and unions strengthen efforts to collect and track common equity measures, such as race, ethnicity, gender, age, education, language, disability status, and union rate. More informed assessments of workforce diversity, however, require additional data beyond commonly used metrics. This includes new hires, recruitment sources, retention, representation across job levels and business units, promotions, compensation, and performance ratings. State agencies should then disaggregate data across separate maps that include overburdened community populations (e.g., low income, minority, and limited English).

Supporting Evidence

- ▶ Current hiring practices feel less intentional because of supply issues for qualified workers in many niche occupations, demonstrating the need to better track equity measures (see **Finding #8**).
- ▶ Respondents who identify as women, individuals of color, and/or individuals with disabilities are more likely to report being treated poorly in the workplace and having limited advancement and promotion opportunities. Expanded and improved data collection efforts across stakeholders are needed to better understand these experiences, especially around retention, promotion, compensation, and performance (see **Finding #7**).



Project Overview and Design

The energy-efficiency sector, though increasingly important for New Jersey in achieving aggressive clean-energy goals outlined in the Energy Master Plan and a follow-up mandate in **Executive Order No. 315**, has clear challenges in its workforce development infrastructure, particularly around diversity, equity, and inclusion (DEI). In New Jersey, energy-efficiency jobs are largely concentrated in construction and often use traditional heating, ventilation, and air conditioning (HVAC) technologies. And yet these high-paying, good-quality jobs lack gender and racial diversity.

Guided by the research questions presented in Table 2, researchers used multiple methods to meet two **objectives**: to better understand and document workforce needs and areas for growth in training, recruiting, hiring, and retaining students, trainees, and workers from diverse backgrounds in the energy-efficiency sector, and to produce strategies for improving workforce development infrastructure for state agencies to consider for implementation.

Table 2: Research Questions

- ▶ How do education and training providers prepare workers and recent graduates for careers in the energy-efficiency workforce?
 - ▶ What are the experiences of students, trainees, and workers as participants in education and training programs and throughout the recruitment process?
 - ▶ To what extent is the energy-efficiency workforce and pipeline advancing equity?
 - ▶ How do employers in the energy-efficiency sector recruit, hire, and retain diverse candidates?
 - ▶ How do employers, education and training providers, and other organizations track equity?
-

The study involved two phases. The first phase, which lasted 10 months, involved preliminary assessments of the energy-efficiency sector, whereby researchers conducted a literature review, developed an inventory of training providers, produced Public Use Microdata Area-level analyses of energy-efficiency jobs, and scanned national decarbonization programs and initiatives (see Appendix D for Phase I deliverables).

The purpose of Phase II, which took place over 11 months, was to assess stakeholder perspectives to highlight strategies that improve equity in the education-to-workforce pipeline. During Phase II, researchers conducted labor market and job posting analyses, distributed a survey via Qualtrics⁸ to students and workers that generated 350 valid responses (see Appendix C for the survey topline), and conducted 36 interviews with key stakeholders (see Table 3 for the number of study participants in each stakeholder group). Based on survey and interview responses, researchers developed a typology of diversity, equity, inclusion, and belonging practices to categorize the various aspects that energy-efficiency employers discussed. Persistent recruitment challenges and small sample sizes limited activities conducted in Phase II, which affects the generalizability of results across the state (see Appendix A for more detailed information). Given the non-probability recruitment methods and challenges in response rates, there is likely sampling bias of who was able to participate in this study. However, saturation was reached with the interviews, and themes described from the survey results provide important context and lived experiences, while not achieving causal evidence. Additional information regarding methodology and limitations is provided in Appendix A.

Table 3: Study Participants, by Stakeholder Group

Stakeholder Group	Number of Participants
<i>Interviews</i>	
Employers	10
Training providers	15
Nonprofits and community-based organizations (CBOs)	6
Associations and unions (or union-affiliated organizations)	5
<i>Total # of Interviews</i>	36
<i>Survey responses</i>	350

The **literature and policy background** section briefly summarizes energy efficiency, decarbonization and electrification, workforce equity, and the energy-efficiency landscape in New Jersey. The **findings** section discusses the findings that correspond with three key trends – pipeline and career pathways, availability and accessibility of education and training programs, and equity in workforce development – and provides 12 strategies for advancing equity in workforce development infrastructure. The conclusion addresses future implications for the energy-efficiency sector in New Jersey.

⁸ The Heldrich Center contracted the Eagleton Center for Public Interest Polling at the Eagleton Institute of Politics at Rutgers University to increase the number of survey responses. See the technical methodology for more detailed information.



Literature and Policy Background

Researchers conducted an extensive literature review of studies on the energy-efficiency sector,⁹ which includes energy efficiency and electrification as part of decarbonization and equity in the workforce. Though there has been significant growth in clean energy in New Jersey since the early 2010s (Athawale et al., 2014), the clean-energy economy remains nascent, with fewer than 35,000 workers in the energy-efficiency sector as of 2022.¹⁰ Additional observations are provided below.

Energy Efficiency

- ▶ **The energy-efficiency sector has grown, though there are documented challenges that employers face in hiring workers.** There are approximately 2,165,000 workers in the national energy-efficiency sector. The construction industry accounts for 54% of the energy-efficiency sector. Installation and repair positions represent the largest occupational group (32%), followed by administrative positions (23%) and production and manufacturing positions (16%). However, 80% to 91% of employers in the energy-efficiency sector reported difficulties and attributed them to competition or small application pools (National Association of State Energy Officials, Energy Futures Initiative, & BW Research Partnership, 2021a).
- ▶ **Many states, like New Jersey, emphasize energy efficiency within statewide clean-energy initiatives. Strong examples are the Renewable Energy Access Plan in Illinois and the Healthy Climate Plan in Michigan.** In 2021, Illinois Governor JB Pritzker set aggressive goals by enacting the Climate and Equity Jobs Act as part of the Renewable Energy Access Plan, aiming for 100% economy-wide clean energy and 100% clean electricity by 2050, as well as a 50% renewable portfolio standard by 2040 (Illinois Commerce Commission, The Brattle Group, & Great Lakes Engineering,

⁹ The energy-efficiency sector “covers both the production and installation of energy-saving products and the provision of services that reduce end-use energy consumption” (National Association of State Energy Officials, Energy Futures Initiative, & BW Research Partnership, 2021a, p. 111). These jobs include the manufacture of ENERGY STAR® products and building design and contracting services that provide insulation, improve natural lighting, and reduce energy consumption across homes and businesses.

¹⁰ Additional reports have been published since the completion of research activities in September 2023. See the 2023 *U.S. Energy & Employment Jobs Report* and other recent publications for up-to-date information.

2022). The Climate and Equity Jobs Act emphasizes an equitable clean-energy transition by creating “equitable access to new jobs, tax revenues, and mitigation of effects from possible losses,” specifically for environmental justice communities and other disadvantaged groups (Illinois Commerce Commission, The Brattle Group, & Great Lakes Engineering, 2022, p. 5).

In April 2022, Michigan Governor Gretchen Whitmer announced *MI Healthy Climate Plan*, which outlines efforts to expand economic development, create good-paying jobs, and address environmental injustices (Michigan Department of Environment, Great Lakes, and Energy, 2022). The state’s plan provides specific recommendations around workforce development, including strengthening job training, pre-apprenticeships and apprenticeships, joint labor management training, and other programs for in-demand energy jobs. Notably, the *MI Healthy Climate Plan* emphasizes the recruitment of Michiganders who are experiencing energy-related employment displacement and those in underserved communities to participate in workforce development opportunities in the clean-energy sector. As articulated by the Michigan Department of Environment, Great Lakes, and Energy (2022), “It is crucial that workers who may be displaced by the energy transition – and residents who have been disproportionately impacted by climate change – are able to take advantage of new energy clean job opportunities” (p. 32).

Energy Efficiency and Electrification within Decarbonization

- ▶ **Building decarbonization often includes energy efficiency and electrification.** Decarbonization broadly involves reducing the intensity of carbon emissions through electrification by replacing fossil fuel with renewable-energy sources such as solar, wind, hydro, and geothermal (Cohn & Wang Efram, 2022). One of the biggest contributors of carbon emissions are buildings (Bolin et al., 2022). Building decarbonization – that is, using more energy-efficient heating and cooling technologies – can reduce carbon emissions and help mitigate the effects of climate change (Cohn & Wang Efram, 2022). An example of **residential** decarbonization includes the installation of electric heat-pump technologies, increasing energy efficiency and thereby reducing end-use energy consumption (Bolin et al., 2022). See Appendix D for more information about decarbonization.
- ▶ **Not everyone has access to opportunities that electrify their homes, and low-income communities and communities of color historically experience higher energy and housing costs as well as poor indoor air quality** (Sierra Club New Jersey Chapter, n.d.; Tan & Jung, 2021). As such, electrifying homes in overburdened communities¹¹ has become increasingly important because it can “help lower cost burdens and protect public health while helping meet the country’s climate goals in a way that benefits all Americans, not just a select few” (Sierra Club New Jersey Chapter, n.d.). Because of substantial overlap with other sectors, the annual *U.S. Energy and Employment Jobs Report* does not yet capture demographic and employment-related data specifically related to decarbonization or electrification.

Workforce Equity

- ▶ **The issue of energy equity (also referred to as energy justice) has emerged as an important part of the clean-energy transition.** According to Carley and Konisky (2020), “Potential benefits of the transition – including but not limited to new employment opportunities, involvement in decision making processes, and access to advanced, low carbon and efficient technologies – are also unevenly spread across populations, as well as across socioeconomic groups” (p. 572). Historically underserved communities, such as low-income communities and communities of color, have lower access to quality jobs and are less likely to participate in clean-energy programs, including energy-efficiency programs (Nathan et al., 2021).

¹¹ Communities in New Jersey qualify as overburdened if they meet the following criteria: at least 35% are low-income households, at least 40% of residents identify as racial or ethnic minorities or as members of a state-recognized tribal community, and/or at least 40% of the households have limited English proficiency. The New Jersey Department of Environmental Protection provides more information on its website: <https://dep.nj.gov/ej/communities/>.

- ▶ **The energy-efficiency workforce lacks diversity in terms of gender and race.** The 2022 *U.S. Energy and Employment Jobs Report* shows that workers are overwhelmingly male (73%) compared to the national workforce (53%).¹² Though more energy-efficiency workers identify as non-white (24%) in the energy-efficiency workforce than nationally, Hispanic/Latino and Black workers are slightly underrepresented and only represent 16% and 8% of the energy-efficiency workforce, respectively compared with 18% and 12% of the national workforce, respectively. Though Hispanic/Latino workers held more jobs in the energy-efficiency sector compared to Black or African-American workers, they were concentrated in low-wage, low-skilled occupations (Shoemaker, Ayala, & York, 2020).

Slightly more veterans are represented in the energy-efficiency workforce (8%) compared to the national average. Energy efficiency has increased union representation compared to the national workforce, with 11% of workers unionized (or under a labor agreement). Only 1% of workers in the energy-efficiency sector were previously incarcerated compared with 2% of the national workforce (National Association of State Energy Officials, Energy Futures Initiative, & BW Research Partnership, 2021b, p. 211).

- ▶ **There are several approaches to increasing equity at the employer level in the energy-efficiency sector.** Energy-efficiency firms can increase efforts toward developing a pipeline for underrepresented workers by creating partnerships with skills training providers, CBOs, and state agencies as well as offering training for both contracting firms and students. Additionally, energy-efficiency firms can create work-based and on-the-job training opportunities through apprenticeship and internship programs. Another upstream approach would be to partner with K-12 institutions to address the lack of diversity in science, technology, engineering, and math education.

¹² The 2022 *U.S. Energy and Employment Jobs Report* captured data on gender non-binary workers in the energy-efficiency sector. Gender non-binary workers constitute less than 1% of the energy-efficiency workforce. The annual report cannot yet make direct comparisons to the national workforce due to limited aggregate data on this group. Additionally, the 2022 *U.S. Energy and Employment Jobs Report* was the latest available data at the time of this analysis. More recent reports are available here: <https://www.energy.gov/policy/us-energy-employment-jobs-report-useer>.



Energy-Efficiency Landscape in New Jersey

This section reviews related programs, initiatives, and workforce trends in New Jersey based on an analysis of labor market and job posting data. The current landscape described in this section underscores the importance of the findings and recommendations outlined in later sections of this report.

Programs and Initiatives

- ▶ **The Energy Master Plan and follow-up Executive Order No. 315 set aggressive goals around 100% clean energy by 2035.** The state will reduce energy consumption, accelerate renewable energy usage, maximize energy efficiency, decarbonize the building sector, and support planning and action within disadvantaged groups and underserved communities (State of New Jersey, 2020). The Energy Master Plan places a strong emphasis on decarbonization. Strategy 4 focuses on decarbonizing and electrifying buildings, especially homes. Strategy 5 invests in infrastructure to reduce reliance on natural gas. Lastly, Strategy 7 invests in developing clean-energy knowledge, services, and products to drive additional investments and job growth. Under Executive Order No. 315, Governor Murphy mandated an additional 400,000 dwelling units and 20,000 commercial spaces and/or public facilities statewide to be electrified by 2030. More recently, Executive Order No. 317 mandated the development of new natural gas utility plans to reduce emissions, including electric grid readiness to deal with electrification.
- ▶ **Tasked with developing recommendations on how to build green job pathways and increase workforce capacity, the New Jersey Council on the Green Economy produced nine strategic recommendations.** Some recommendations include local and targeted job creation, high-quality green jobs that offer family-sustaining wages and long-term career pathways, targeted workforce development initiatives, wraparound services, and key partnerships. The council's report details a 12-month work plan that focuses on launching new programs to promote diversity, completing a workforce needs gap analysis for current jobs and future employment projections, launching decarbonization pilots, and engaging with labor unions (New Jersey Council on the Green Economy, 2022).

- ▶ **New Jersey supports myriad programs and initiatives aimed at promoting workforce development and ensuring equitable access to opportunities in the clean-energy sector.** These programs and initiatives reflect the state’s commitment to advancing the clean-energy goals outlined by New Jersey’s **Energy Master Plan**, which emphasizes economic growth and development in the sector. Such efforts underscore the importance of better understanding the emerging energy-efficiency sector in New Jersey.

Most workers are concentrated in industries like construction (59%), professional services (16%), and the trades (12%), with commonly installed technology applications, such as traditional HVAC technologies (31%), ENERGY STAR® products (22%), or high-efficiency, renewable heating and cooling technologies (20%) (National Association of State Energy Officials, Energy Futures Initiative, & BW Research Partnership, 2021b). Table 4 provides a snapshot of programs and initiatives in New Jersey (see Table B-3 in Appendix B for more detailed information on each clean-energy workforce program and initiative listed).

Table 4: Snapshot of Clean-Energy Workforce Programs and Initiatives in New Jersey

Initiative	Description	Focus Area
New Jersey Pathways to Career Opportunities	Aims to foster partnerships among employers, industry associations, labor unions, educational institutions, and workforce development partners	Pipeline and career pathway
Clean Energy Apprenticeship Program	Aims to create approximately 3,200 direct jobs through the initiative of which 2,000 will be produced directly through PSE&G’s Clean Energy Jobs Program	Pipeline and career pathway
New Jersey Scholarship and Transformative Education in Prisons “Prison-to-Prosperty Pipeline” Program	Includes previously incarcerated individuals who have also been included in the New Jersey Clean Energy Program	Workforce equity; DEI
Clean Energy Jobs Program Sponsored by PSE&G	A public-private workforce development initiative that supports the hiring of New Jersey residents to entry-, mid- and senior-level positions, helping to advance their professional skills and career paths to work in New Jersey’s clean-energy industry	Recruitment, retention, DEI, pipeline and career pathways; workforce equity
Clean Energy Employment and Training Program Grant (PSE&G Partnership Grant)	Recruits eligible participants from New Jersey’s overburdened communities interested in clean-energy careers	Recruitment and retention, DEI
New Jersey Innovation Fellows	Provides support to aspiring entrepreneurs, with a focus on promoting diversity	Entrepreneurship, pipeline and career pathway
New Jersey Clean Energy Loans - New Jersey Economic Development Authority	Provides working capital for business expansion/ operations to eligible companies that provide clean-energy-related services; funded through the state’s Small Business Credit Initiative	Entrepreneurship, pipeline and career pathway
Small Business Services – New Jersey Economic Development Authority	Supports small businesses in the state, which are independent of business type	Entrepreneurship, pipeline and career pathway
New Jersey Natural Gas	Provides training to contractors at different levels, addressing barriers to a diverse workforce	Pipeline, workforce equity

Table 4: Snapshot of Clean-Energy Workforce Programs and Initiatives in New Jersey (continued)

Initiative	Description	Focus Area
Growing Apprenticeships in Nontraditional Sectors - New Jersey Department of Labor and Workforce Development (NJDOL) (competitive)	Provides New Jersey businesses and organizations or current registered apprenticeship sponsors in targeted sectors with support for new registered apprenticeship program development, or existing registered apprenticeship programs that seek to expand into new U.S. Department of Labor-approved apprenticeable occupations	Pipeline and career pathway
Pre-Apprenticeship in Career Education - NJDOL (competitive)	Provides education and training that leads to admission into a U.S. Department of Labor-registered apprenticeship program or employment with a starting wage of not lower than \$15 per hour or admission into a postsecondary college or occupation-specific career training	Pipeline and career pathway
Youth Transitions to Work - NJDOL (competitive)	Recruits, screens, and facilitates effective transitions of high school juniors, seniors, and out-of-school youth (ages 16 to 24) to high-skill, high-wage employment in labor-demand occupations	Pipeline and career pathway
New Jersey Builders' Utilization Initiative for Labor Diversity - NJDOL (competitive)	Provides greater opportunities and incentives for women and minorities by providing occupation-specific training, basic-skills instruction, workforce readiness (employability skills) instruction, and a structured work experience with employment into a registered apprenticeship program or employment within the construction industry with a wage of not lower than \$15 per hour	Workforce equity; DEI
New Jersey's One-Stop Career Centers - NJDOL	Offers the most services and provides the most direction for job seekers; staffed with qualified employment counselors to provide guidance to job seekers; other services include: job search assistance, training and education assistance, specialized services, assistance for transportation, uniform assistance, and other services if eligible	Pipeline and career pathway
NJDOL wraparound	NJDOL's competitive grants referenced above allow for applicants to include wraparound support services to trainees to be successful while engaged in training; examples of support services include: childcare assistance, transportation assistance, obtaining a driver's license, expungement programs, substance abuse services, and obtaining a high school equivalency diploma or a General Education Diploma	Wraparound support
NJDOL's new career network development and outreach	NJDOL will expand on the Training Explorer Initiative to enable residents to access a centralized online collection of resources that houses all existing green training programs, open green jobs, and skills-based career pathway maps where all workers can learn about these fields, find opportunities for upskilling or reskilling, and be connected to potential employers and new job opportunities	Pipeline and career pathway

Note: This is not an exhaustive list of clean-energy workforce programs and initiatives in New Jersey but instead provides limited information on select examples.

Workforce Trends

This section presents findings from the analyses of labor market and job posting data (see Appendix A for more detailed information). From common technology applications used to top occupations, researchers identified several relevant workforce trends in New Jersey. Table 5 shows the data sources and key data points associated with each analysis. Researchers briefly summarize the findings below.

Table 5: Components of Labor Market and Job Posting Analyses

	Labor Market Analysis	Job Posting Analysis
Data Points	<ul style="list-style-type: none"> ▶ Technology applications ▶ Number of jobs and hires ▶ Number of employers ▶ Median income ▶ Demographics 	<ul style="list-style-type: none"> ▶ Job postings ▶ Hires ▶ Type ▶ Location ▶ Duration ▶ Educational requirements ▶ Experience level
Source	NJDOL and the New Jersey Council on Green Economy	Lightcast

- ▶ **Most energy-efficiency workers in New Jersey engage with traditional HVAC technologies (see Table 6).** Fewer workers in this sector report working with ENERGY STAR® and efficient lighting technologies (22%) and advanced materials and other energy-efficiency technologies (27%). Several sources, including the *U.S. Energy and Employment Jobs Report* and *Green Jobs for a Sustainable Future*, indicate the total number of energy-efficiency jobs in the state at around 30,000. Other public data, such as the Quarterly Census of Employment and Wages, may have higher estimates given the inexact measure of counting energy-efficient jobs within existing industries and occupations.

Table 6: Number of Jobs in the Energy-Efficiency Sector in New Jersey, by Technology

Technology Application	2020 Jobs
Traditional and high-efficiency HVAC/renewable heating and cooling	16,775 (51%)
ENERGY STAR® and efficient lighting	7,167 (22%)
Advanced materials and other energy-efficiency technologies	8,938 (27%)
Total	32,880

Source: New Jersey Council on the Green Economy (2022).

- ▶ **Though there was variation in the number of jobs and hires between 2020 and 2021 in New Jersey, the COVID-19 pandemic presented substantial challenges in reporting and identifying short- and long-term trends.** Figures 1 and 2 show that the number of jobs and hires in construction and plumbing grew over time. The insulation sector, however, experienced a substantial hiring decline between 2020 and 2021, decreasing from 937 to 541 new hires (see Table B-2 in Appendix B for the number of jobs and hires in 2020 and 2021 for all additional occupations).

Figure 1: Top Occupations for New Jersey Energy-Efficiency Job Postings, 2020-21

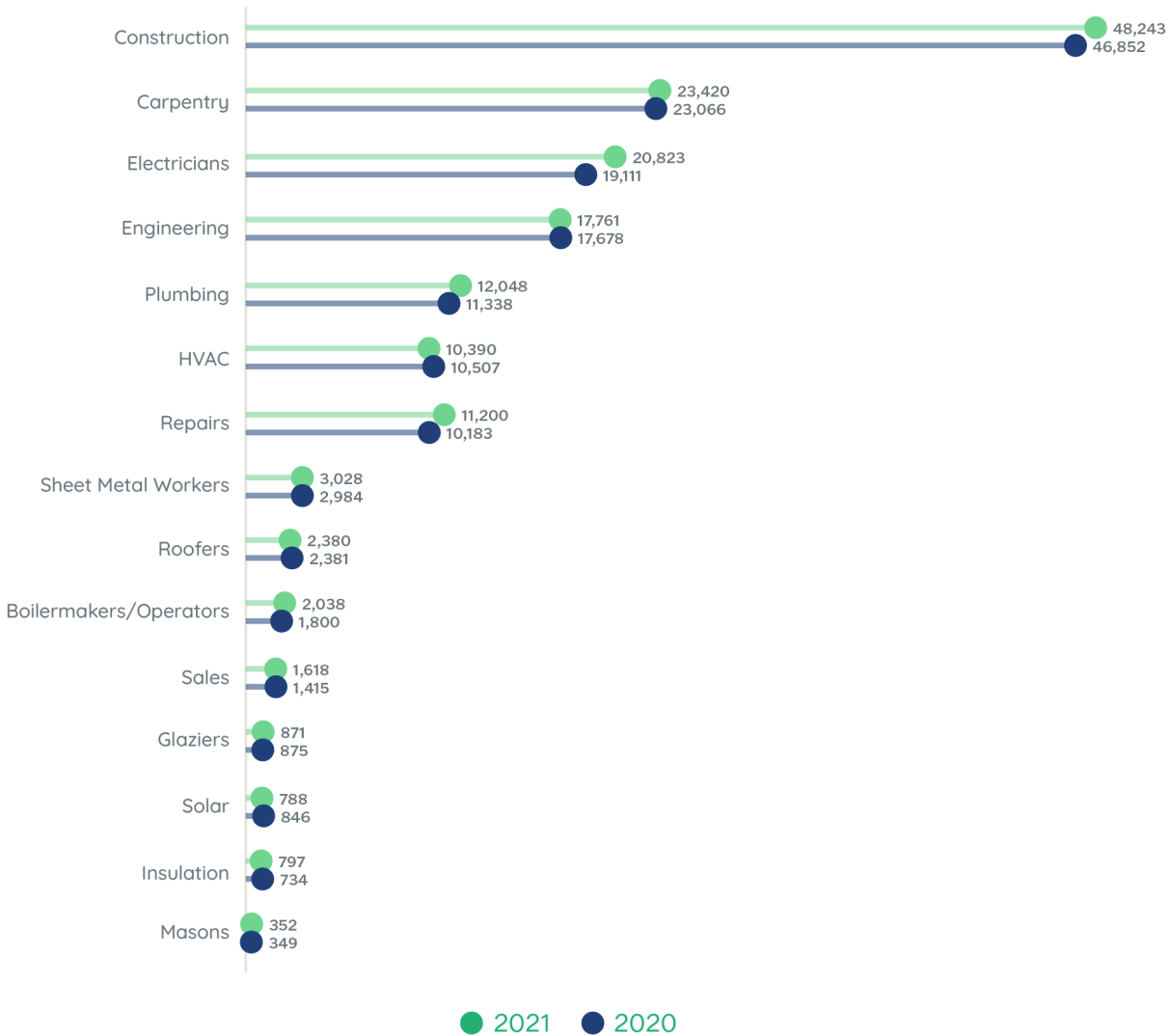
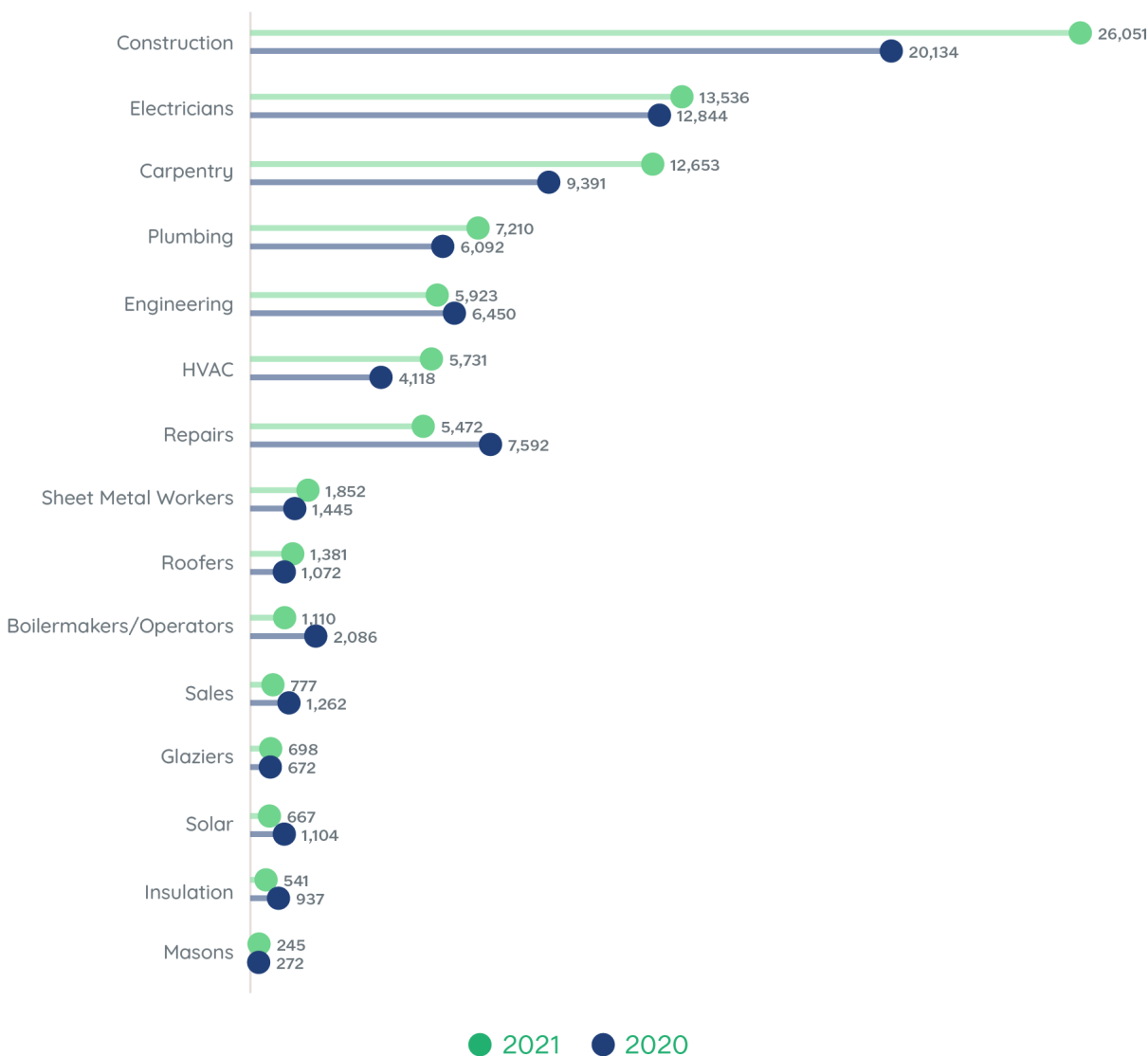
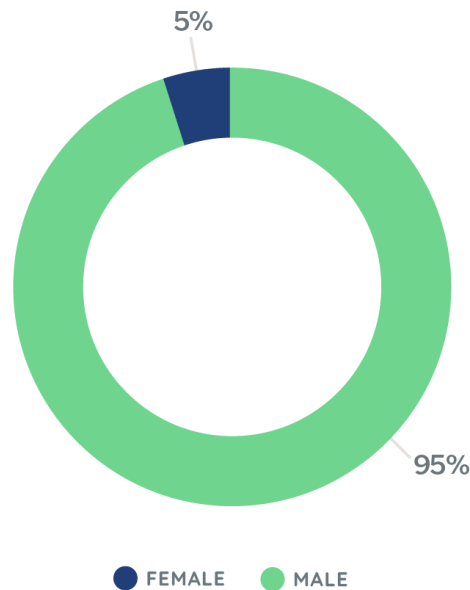


Figure 2: Top Occupations for Energy-Efficiency Hires in New Jersey, 2020–21



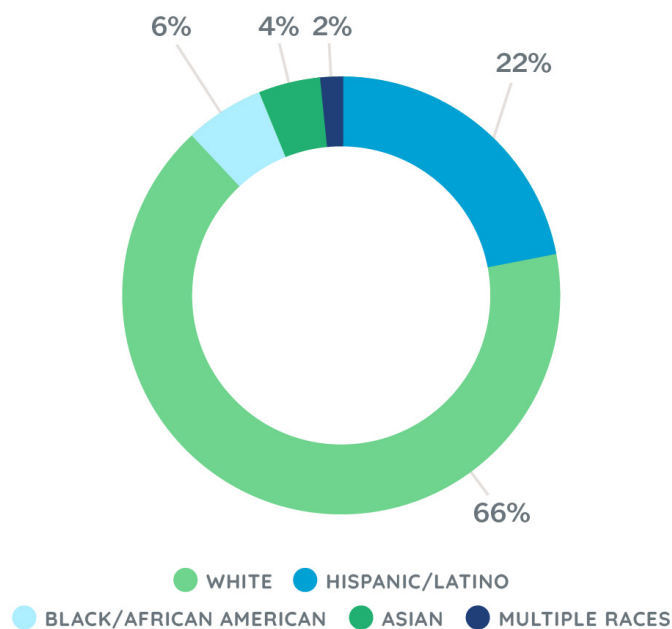
- ▶ **Energy-efficiency workers in New Jersey earn an average of \$32.38 per hour.** This surpasses average compensation for other occupations in other industries in the state, demonstrating the potential for good-paying jobs in the energy-efficiency sector in New Jersey.
- ▶ **There is an overwhelming lack of gender diversity in the energy-efficiency sector in New Jersey.** Based on labor market data, Figure 3 shows that 95% of energy-efficiency workers are men. The proportion of women in the energy-efficiency sector in New Jersey (5%) is far less than the national energy-efficiency sector (27%) and the broader national workforce (53%). Occupations with higher shares of women in New Jersey include Engineering Technologists and Technicians (20%), Civil Engineering Technologists and Technicians (18%), and Engineers (All Other) (13%). This represents an opportunity to create and/or further develop existing programs and initiatives that increase gender diversity among workers in the energy-efficiency sector in New Jersey.

Figure 3: Energy-Efficiency Workforce in New Jersey, by Gender



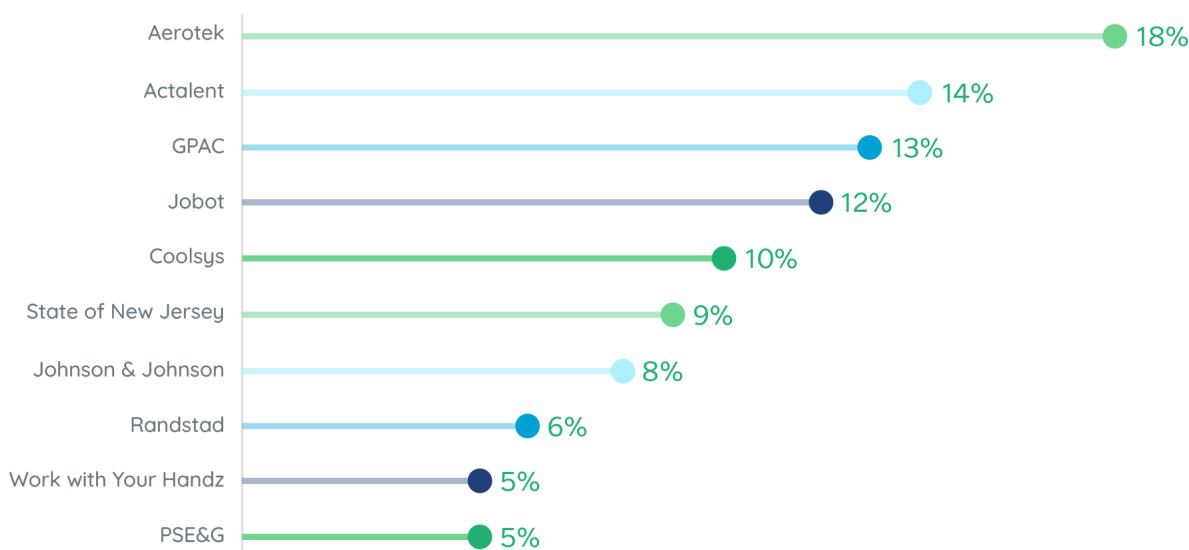
► **Though Hispanic/Latino individuals have greater representation in the energy-efficiency workforce in New Jersey, Black and Asian individuals are significantly underrepresented compared to the national workforce.** Figure 4 shows that most energy-efficiency workers are white (66%) followed by Hispanic/Latino (22%). Fewer energy-efficiency jobs are held by Black/African-American (6%) and Asian (4%) workers. These findings call attention to the opportunity to promote greater inclusion and equity in the workforce.

Figure 4: Energy-Efficiency Workforce in New Jersey, by Race



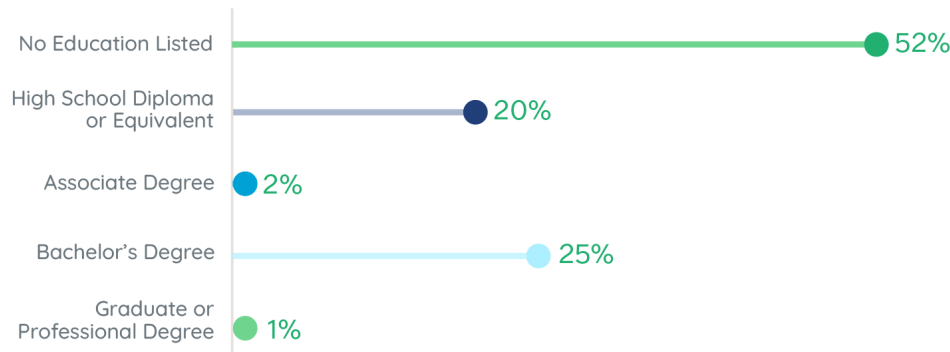
- ▶ **The energy-efficiency sector in New Jersey appears to have many employers.** In the second quarter of 2023, there were over 23,000 job postings for positions related to energy efficiency in New Jersey, with more than 3,800 employers vying for talent in 2022. It is important to note, however, that many are recruiters or temporary firms, not unique employers. In addition, it is also important to note that a job posting does not always equate to one job opening. Companies may use one job posting for multiple openings, or have multiple job postings for one position. The language used in the postings was closely matched to energy-efficiency terms, but again it is not a direct match to the number of energy-efficiency jobs available.
- ▶ **The 10 employers and recruitment organizations posting the most job opportunities in the energy-efficiency sector include Actalent, Aerotek, GPAC, and Jobot** (see Figure 5). Other prominent employers include the State of New Jersey. Based on this analysis, these companies play a prominent role in shaping the job market in the energy-efficiency sector. This presents an opportunity to further engage these companies in workforce development infrastructure in this sector.

Figure 5: Top Employers and Recruitment Organizations Posting Energy-Efficiency Employment Opportunities in New Jersey



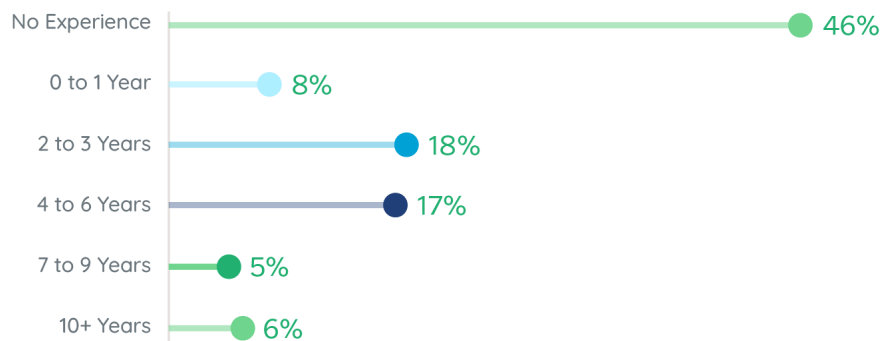
- ▶ **Job postings related to the energy-efficiency sector remain active for approximately 32 days.** When disaggregated by industry, education-related job postings are active for 36 days, on average, compared to 31, 28, and 25 days for construction; plumbing and HVAC; and engineering-related job postings, respectively.
- ▶ **More than half of job postings (52%) do not list any educational requirements.** Figure 6 shows that at least 20% of job postings required at least a high school diploma or equivalent. By comparison, one-fourth of job postings required at least a bachelor's degree.

Figure 6: Minimum Education Required on Energy-Efficiency Job Postings in New Jersey



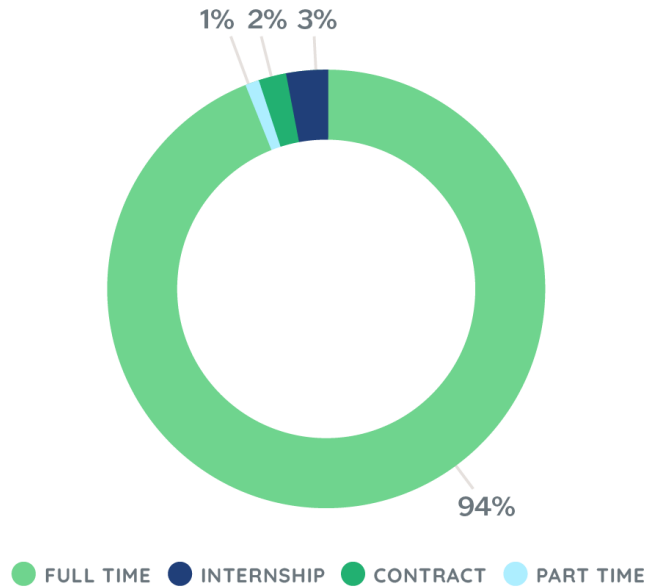
Nearly half of the job postings (46%) did not specify any required minimum experience. More than one-third of job postings (35%) did, however, require at least two to six years of minimum experience (see Figure 7). Approximately 11% of job postings required seven or more years of experience. Requiring significant minimum experience for entry-level positions can pose major barriers to individuals interested in entering careers in the energy-efficiency sector. This represents an opportunity for employers and other related stakeholders to reconsider required minimum experience for entry-level positions to increase the number of potential candidates.

Figure 7: Minimum Required Experience on Energy-Efficiency Job Postings in New Jersey



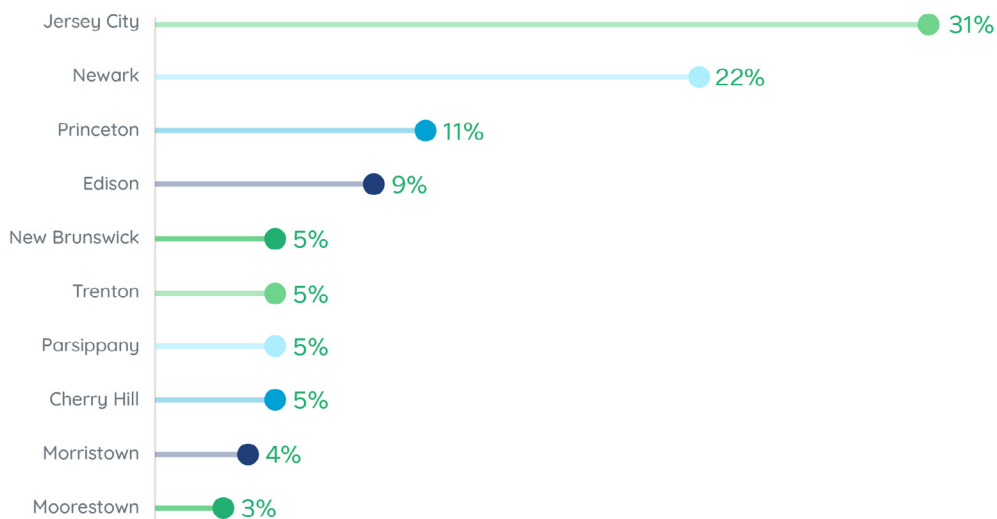
► **An overwhelming majority of job postings were for full-time employment (94%).** Figure 8 shows that few job postings were for part-time employment (1%). Job postings for internships and contract employment were also scarce at 3% and 2%, respectively.

Figure 8: Type of Employment on Energy-Efficiency Job Postings in New Jersey



► **Most job postings were in northern New Jersey.** Figure 9 shows that 53% of job postings were in either Jersey City or Newark. There were also a substantial number of job postings in central New Jersey, specifically in Princeton (11%), Edison (9%), and New Brunswick (5%). The 10 cities and towns shown in Figure 9 serve as key hubs for energy-efficiency-related job opportunities in New Jersey.

Figure 9: Cities and Towns in New Jersey with the Most Energy-Efficiency Job Postings



The workforce trends discussed in this section illustrate some of the publicly available data, including common equity metrics, such as race and gender (see Table 7 for a summary of publicly available data for the energy-efficiency workforce compared to the overall statewide workforce). Researchers highlighted the metrics below within the *Literature Review of the Energy-Efficiency Sector and Workforce* report as part of Phase I (see Appendix D for a link to the full report). The state can require employers to collect the additional metrics included in that report to better capture equity in the workforce.

Table 7: Baseline Demographic Characteristics

	New Jersey	
	Energy Efficiency	Statewide
Age		
Under 21	6%	7%
22 to 24	22%	5%
25 to 34	22%	20%
35 to 44	22%	20%
45 to 54	20%	20%
55 to 64	4%	19%
65+	3%	8%
Sex/Gender		
Male	95%	50%
Female	5%	50%
Race		
Hispanic or Latino	22%	16%
White	66%	71%
Black or African American	6%	16%
Asian	4%	11%
Two or more races	2%	2%
American Indian/Alaska Native/Native Hawaiian or Pacific Islander	0%	1%

Source: Bureau of Labor Statistics (2021).



Key Trends and Takeaways

This section addresses the research questions that guided the study, presenting evidence-based findings from the survey of students, trainees, workers, and business owners; labor market and job posting data; and interviews with key stakeholders. Eighty-one percent of survey respondents were currently working in energy-efficiency jobs when the survey was fielded, and 37% of respondents completed training programs in related fields after high school. A majority of interviewees were training providers (42%) or employers (28%), with representation from nonprofits and CBOs (17%) and associations and union-affiliated organizations (13%).

The findings are based on **three** key trends: lack of pipeline and career pathways, challenges with availability and accessibility of education and training programs, and limited equity in workforce development infrastructure. Researchers also contextualize findings within existing literature and the current landscape in New Jersey. Table 8 maps key trends, findings, and strategies.

Table 8: Findings and Strategies by Key Trend

Key Trends	Findings	Strategies
<p>Pipeline and Career Pathways</p>	<p>Finding #1: Lacking sector awareness and insufficient accessible information hinders the pipeline and career pathways.</p> <p>Finding #2: Some education and training programs are misaligned with sector needs.</p> <p>Finding #3: Skills gaps, licensing and industry-recognized credentials, and entry-level requirements may encumber students, trainees, and workers in pursuing careers in the energy-efficiency sector.</p> <p>Finding #4: Stakeholder partnerships often face internal and external barriers.</p>	<p>Strategy #1: State agencies should create and implement an integrated career pathways tool to bridge the gap between education and training to employment.</p> <p>Strategy #2: State agencies should engage relevant stakeholders to strengthen awareness of energy-efficiency careers among youth.</p> <p>Strategy #3: State agencies should develop public-private partnerships (PPPs) to address workforce gaps and help facilitate feedback loops between employers and training providers to ensure curricula can better meet sector needs.</p> <p>Strategy #4: State agencies should partner with NJDOL to expand registered apprenticeship opportunities in the energy-efficiency sector and offer incentive mechanisms that encourage employers to increase participation among women, individuals of color, individuals with disabilities, and individuals who were formerly incarcerated.</p>
<p>Availability and Accessibility of Education and Training Programs</p>	<p>Finding #5: Difficulty hiring qualified instructors and underdeveloped curricula affect the availability and accessibility of education and training programs.</p> <p>Finding #6: The cost of participating in education and training programs, as well as facility location and access to transportation, frequently limit the ability to participate.</p>	<p>Strategy #5: State agencies should establish or expand existing financial assistance to participants of education and training programs.</p> <p>Strategy #6: State agencies should require state-funded education and training programs to include externships and/or an experiential learning component.</p> <p>Strategy #7: State agencies should provide stipends, bonuses, and/or rewards to field practitioners willing to instruct classes for education and training programs.</p>
<p>Equity in Workforce Development</p>	<p>Finding #7: Individuals from disadvantaged groups frequently have negative experiences in the workplace.</p> <p>Finding #8: Employment practices can undermine efforts to advance equity.</p>	<p>Strategy #8: State agencies should leverage stakeholder partnerships to provide and/or connect students and trainees with wraparound services, such as transportation, counseling, and child care, to reduce participation barriers.</p> <p>Strategy #9: State agencies should facilitate community partnerships that help connect graduates of education and training programs with high-quality, good-paying jobs.</p> <p>Strategy #10: Who does recruitment and outreach matters. State agencies should build trust with communities and stakeholders by meeting them where they are.</p> <p>Strategy #11: State agencies should implement geographic-based hiring targets to ensure equitable access to employment opportunities across regions.</p> <p>Strategy #12: State agencies should require stakeholders to better collect and track equity measures.</p>

Lack of Pipeline and Career Pathways

Education-to-workforce pipelines (referred to hereafter as “pipeline”) and career pathways play an important role in preparing workers to enter and later advance in any sector. There are key barriers for the energy-efficiency sector, however, related to the supply and demand of workers. The barriers highlighted in this section hinder the ability of stakeholders to establish, develop, and maintain the pipeline and clear career pathways in this sector. The strategies outlined later in this report can help the state and other key stakeholders improve workforce development infrastructure that helps connect prospective students and trainees with the appropriate education and training programs and workers with high-quality, good-paying employment opportunities in New Jersey.

Finding #1: Lacking sector awareness and insufficient accessible information hinders the pipeline and career pathways.

Consistent in every (100%) study stakeholder interview was a general lack of knowledge of the energy-efficiency sector and reporting of insufficient accessible information on the appropriate areas of study. Stakeholders frequently attributed the lack of awareness and insufficient information to limited information overall on appropriate areas of study, absent instruction on which education and training programs to pursue, and misconceptions associated with working in the trades. There were 17 survey respondents who also expressed frustration with limited accessible information when prompted about what can better support them at their current job. Researchers detail these barriers below.

Takeaways

- ▶ **Stakeholders reported that individuals are unaware of the energy-efficiency sector.** Ten survey respondents felt that the public lacks awareness of energy efficiency in general, but especially rebate and incentive programs for adopting energy-efficiency technologies that help drive demand for workers in the sector. Contributing to the lack of awareness is the absence of clearly defined pathways and career trajectories. Individuals often do not know how to enter their career and are not aware of opportunities for advancement. This is evident by 62 survey respondents (18%) who felt that easier access to entry-level positions and clearer opportunities for advancement would make them feel better supported in their current positions. Despite existing studies documenting consistent growth in clean energy within the past decade (Athawale et al., 2014), the complexity around awareness persists.
- ▶ **There is limited accessible information on the appropriate areas of study and/or quality training providers for pursuing specific energy-efficiency careers.** Though some students have familiarity with terms such as “green energy” and “green building,” training providers highlighted that students and trainees face substantial barriers in identifying the appropriate college major that aligns with their career aspirations. Forty-two survey respondents (12%) felt that college

“There’s a large number of people that do not know yet that these fields exist.”

- Education and training provider staff member

“We have to do a better job of understanding what exactly green energy means – and everything that it can encompass – so that we define it better...We can then get that understanding to the people we’re working with.”

- Workforce Development Board staff member

“[We need] more awareness and a call to action for students to be taking classes in energy efficiency. I wish I knew more about it because some of my friends are taking jobs in this sector and I’m unable to because I didn’t know much about it.”

- Student

and university students should have more explicit information on opportunities in the energy-efficiency sector. Those seeking education and training programs also struggle to identify quality providers. As such, students and trainees are inhibited from making informed decisions to pursue relevant education and training pathways in the energy-efficiency sector. Stakeholders felt that school counselors and career coaches can better introduce students and trainees to specific college majors, training opportunities, and career pathways. Professional development can help school counselors and career coaches achieve this.

► **Individuals lack sufficient information on which skills are necessary for securing employment in this sector.**

When asked about what education and training programs could improve upon, survey respondents hoped for more concrete outcomes upon completion, especially industry-valued credentials. Other survey respondents highlighted the need to develop more specialized technical skills. Twenty-nine survey respondents suggested incorporating more hands-on exposure to specific topics, such as trash and recycling, repair and refurbishing, safety, client management, and business. Job preparation activities, such as tests and mock interviews, were cited by 15 survey respondents as helpful in gaining employment. Relatedly, stakeholders felt that prospective students and trainees often do not know which programs to pursue to equip them with the appropriate skills. Little awareness of education and training programs means that fewer students and trainees enter the energy-efficiency workforce than demand requires. Without more information on relevant educational pathways, such as college majors and training opportunities, students, trainees, and workers face additional hurdles to becoming employed in the energy-efficiency sector in New Jersey.

“There needs to be more public information about these types of [energy efficiency] initiatives and then that will spark more interest in getting involved employment wise.”

- Association employee

► **Persistent misconceptions associated with working in the trades often prevent youth from pursuing education and training programs in the energy-efficiency sector.**

Training providers are working to combat misconceptions by ensuring that advising and recruitment staff inform interested individuals about what work looks like in the sector. One education and training provider shared that they regularly met with staff responsible for recruiting interested individuals to improve communication and marketing efforts. Another education and training provider emphasized, “This is no longer your grandfather’s trade,” highlighting efforts to market careers in the energy-efficiency sector to new generations. Four survey respondents also discussed the importance of recruiting more youth into the trades.

“Everybody thinks it’s blue collar, dirty, dingy work. It’s so different these days. Our guys ride around these bright shiny trucks, working on laptops or tablets, plugging into mechanical systems and reading diagnostic charts.”

- Association employee

Finding #2: Some education and training programs are misaligned with sector needs.

Stakeholders spoke about the misalignment between the knowledge, skills, and expertise taught by education and training programs and the changing needs of the energy-efficiency sector. Addressing gaps in hiring qualified instructors, teaching practical technology applications, integrating energy-efficiency-related topics, and relying on on-the-job training is crucial to improving the workforce development infrastructure. Researchers outline these barriers below.

Takeaways

- ▶ **Fewer qualified candidates available to fill open instructor positions and largely conceptual curricula affect the ability of education and training programs to adequately prepare workers to enter energy-efficiency jobs.**

Employers consistently attributed the shortcomings of education and training programs to the limited availability of qualified candidates.

Five interviewees indicated that the low salary often disincentivized field practitioners from becoming instructors.

Though some institutions offer courses and specialization in energy efficiency, the prevailing emphasis of education and training curricula remains on general conceptual knowledge. Stakeholders repeatedly indicated that education and training programs are not currently designed to adequately produce workers for jobs with niche specialization but instead give students and trainees the “general flavor” of working in the energy-efficiency sector and often require additional on-the-job training. One hundred and fifty-four survey respondents (44%) agreed with this sentiment, arguing that education and training programs often do not provide information beyond basic foundational concepts.

“I don’t care how good the education is. You have to have practical experience doing this stuff to be an effective applier of these measures.”

– Association employee

- ▶ **Stakeholders reported that education and training programs do not sufficiently integrate energy-efficiency-related topics.** Instead of incorporating several modules or creating an entire course, education and training programs often have few components dedicated to energy efficiency. Training providers noted that the evolving nature of the energy-efficiency sector poses additional challenges to incorporating energy-efficiency-related topics, such as technology, advancement, and regulation. Offering relevant curricula becomes challenging because of the frequency of technological change. Seventeen survey respondents also acknowledged the impact of rapid changes. As one survey respondent mentioned, it has become “hard to keep up with the changes.” Another survey respondent underscored the changing nature of the energy-efficiency sector by advising students and trainees to consider whether curriculum “evolves with the latest technological changes and policy advancements.”

Additionally, the practical training offered by education and training programs is often limited and not fully integrated into curricula.

Though some programs collaborate closely with employers to receive relevant technologies for students and trainees for practice, the extent of practical training varies across providers.

The lack of education and training programs specifically dedicated to energy efficiency and limited practical training highlights the need to produce skilled business owners equipped with the practical expertise necessary for success in energy-efficiency roles.

“The current labor market for careers related to energy efficiency in New Jersey is described as lacking adequate workforce development and education specifically tailored to the sector.”

– Employer

- ▶ **Education and training programs struggle to provide specific skills and qualifications that are required to be successful in the sector.**

Coupled with the evolving demands of the energy-efficiency sector, this contributes to the misalignment between the knowledge, expertise, and skills taught by education and training programs and what employers are seeking.

While basic foundational concepts are important, feedback from various stakeholders suggests broadening the scope of existing education and training programs. Fifty-two survey respondents (15%) discussed the increased demand for candidates with specialized skills and felt that training

“There isn’t a really significant population of skilled business owners coming out of anywhere.”

– Employer

providers can better incorporate industry-recognized credentials within the curricula to meet the need. One survey respondent specifically suggested more guidance from the state to help employers know which specialized areas to train their employees, stating: “[We] need more consistency in state program benefits and rules. Without a long-term roadmap, it is hard for employers to invest in our employees.” More guidance from the state and improved communication between employers and training providers, in addition to incorporating more advanced topics and teaching specific technical skills, could help stakeholders offer experiential learning opportunities key to providing specific skills and qualifications, realigning efforts to train students and trainees according to sector need.

► **Stakeholders often rely on on-the-job training offered by employers to provide specialized knowledge and expertise and fill skills gaps.**¹³

Many jobs within the energy-efficiency sector require specialized knowledge and expertise. There are practical

constraints, however, for training providers in offering specialized training that covers all occupations in the sector. Employers reported taking responsibility of providing substantial on-the-job training to equip workers with the knowledge and expertise required for specific occupations. Indeed, 126 survey respondents (36%) received education and training through their employer. On-the-job training plays a crucial role in the success of workers in the field. Because recent graduates of education and training programs lack specific knowledge, the hands-on nature of on-the-job training allows workers to learn and/or further develop the knowledge, expertise, and skills needed to perform specific work in a practical manner. For example, one small business owner shared that new hires receive three to six months of on-the-job training. The training offered by this small business is taught by staff and covers energy-efficiency concepts, credentialing processes, and problem-solving.

“We do a tremendous amount of on-the-job training.”

- Employer

Finding #3: Skills gaps, licensing and industry-recognized credentials, and entry-level requirements may encumber students, trainees, and workers in pursuing careers in the energy-efficiency sector.

Stakeholders highlighted limited specialized knowledge resulting from gaps in basic skills (e.g., math, writing) and durable skills (e.g., customer service, critical thinking). The uncertainty around licensing requirements and variation in entry-level requirements creates a disconnect between what training providers offer and what employers need. Overcoming these obstacles is essential for students, trainees, and workers in developing the necessary knowledge, skills, and expertise to enter and advance within careers in the energy-efficiency sector.

Takeaways

- **There are substantial gaps in the basic and durable skills (also referred to as “soft skills”) required to secure employment and become successful in the energy-efficiency sector.** Many education and training programs are working with students and trainees who have experienced challenges with traditional schooling and may be more likely to struggle with basic math and reading. Stakeholders spoke about incorporating math and reading into their curricula to help students and trainees develop their basic skills. Getting all students and trainees on the same baseline appears to be the focus for many education and training programs. The focus on basic math and reading skills, though necessary, does not allow time for specialized skills, knowledge, and expertise required for niche occupations. Indeed, many employers said they were not able to find qualified candidates for open positions because the gaps in skills, knowledge, and expertise are too great.

¹³ The New York State Energy Research and Development Authority (NYSERDA) provides key definitions for workforce development infrastructure: <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Workforce-Development-and-Training/Resources/Definitions>.

Employers report that candidates often lack durable skills. Stakeholders note that students, trainees, and workers frequently struggle with communication, collaboration, and critical thinking. Three employers mentioned recruiting individuals from other sectors, such as the hospitality industry, that require strong durable skills because they felt that it is easier to teach technical skills. In an open-ended response, four survey respondents also highlighted increased demand for candidates with soft skills, especially adaptability, collaboration, and communication. Five stakeholders commented that students, trainees, and workers from disadvantaged groups and underserved communities were less likely to have durable skills that align with industry expectations, which poses an additional barrier on individuals from diverse backgrounds in pursuing education and training programs.

► **Uncertainty around licensing requirements and industry-recognized credentials frequently arises from rapidly changing technologies and accompany regulatory policy.** Different occupations also require different licensing requirements. The lack of understanding around industry-recognized credentials and different licensing requirements poses a challenge for small businesses and contractors because they must recruit students, trainees, and workers with specific licenses and/or credentials or help workers obtain them. Businesses may also be required to secure licenses that allow them to do specific work within the energy-efficiency sector depending on the municipality in which they are doing the work.

Additionally, few job descriptions explicitly mention licenses required for certain roles, such as the Black Seal High-pressure In-charge License, Blue Seal License, and Licensed Electrician. This uncertainty means that students, trainees, and workers may struggle to understand the qualifications needed and may face difficulties in securing licenses or credentials. On the other hand, employers may face challenges in identifying candidates with the necessary licenses, resulting in hiring delays or additional training requirements. Greater clarity and transparency regarding industry-valued credentials and licensing requirements are necessary in the energy-efficiency sector. Explicitly stating licenses and certifications required in job descriptions would help students, trainees, and workers make informed decisions about pursuing specific careers and assist employers in both identifying qualified candidates and ensuring regulatory compliance.

“How do you finally help someone who we’re reaching them at a time after school where they already should have gone through and developed some of these skills already? You’re trying to equip these people who are already far behind.”

- Workforce Development Board member

“The things we often see are lacking simple math skills – the ability to use a ruler, to do some basic calculations. That’s a real problem.”

- Contractor

“Finding people who want to work in the field is less of an issue than finding people who hold the licenses required to be able to work in the field... because the licensing requirements are so extreme. In addition to individual licenses, many trades also require business-level licenses. We’re a large business and it’s difficult for us to keep up with them. For a small business, keeping track of all the different licenses required can certainly be a barrier.”

- Employer

► **Entry-level requirements for energy-efficiency jobs are distinct but vary.** Job postings often indicate that a high school diploma or its equivalent is sufficient but prefer candidates with a bachelor's degree. These requirements are often accompanied by two to five years of relevant experience. Job descriptions also emphasize the importance of possessing specific technical knowledge, such as familiarity with energy-efficiency practices and regulations, which can be attributed to upskilling and certifications required to perform the job. As previously noted, this contradicts information available at and provided by education and training programs and postsecondary institutions. Interviews with training providers revealed that a substantial portion of students may be disinclined to pursue bachelor's degrees and instead perceive the energy-efficiency sector as a promising pathway for career advancement. This discrepancy underscores the need for closer collaboration between educational institutions to provide suitable opportunities for students and trainees who opt for alternative educational pathways. To that end, 26 survey respondents (7%) recommended that appropriate stakeholders clarify requirements, including preferred educational attainment and years of experience needed to enter specific careers.

"[Parents] realized that when they were sending their children to a four-year college, they were coming out with huge amounts of debt, and later their children were sitting at home because they had a degree but couldn't find a job. So, parents have started to see the practical side of certificate programs. I think it's important that students have some certification or license when they walk out the door."

- Education and training provider

Finding #4: Stakeholder partnerships often face internal and external barriers.

Stakeholders felt that a specialized workforce development infrastructure tailored for energy efficiency is largely absent in the state, which limits partnership opportunities. Limited success with recruitment and outreach through job posting platforms also emphasized the need for stronger partnerships to improve the pipeline. Additional limitations stem from communication barriers and the COVID-19 pandemic.

Takeaways

► **Limited success with job posting platforms underscores the need for better partnerships between stakeholders to improve the pipeline and career pathways.** Stakeholders felt that they received few applicants on job postings on platforms like LinkedIn and Indeed. The survey showed that less than 1% of all respondents found their current job on these platforms. Thirty percent of respondents found their current job through networking (105) and 15% found their current job via advertisements elsewhere (52). One employer even mentioned that it was far easier to poach candidates from other firms. Despite these challenges observed by employers, most survey respondents felt that the hiring experience was excellent (46%) or good (26%), with less than 2% saying poor or very poor.

"There isn't very good workforce development and education geared around the energy-efficiency sector. It's very high level and conceptual. There aren't people going to school to become energy-efficiency consultants and verifiers...There needs to be other types of development funnels."

- Employer

Other stakeholders spoke to the need for better partnerships between training centers, employers, nonprofits and CBOs, and associations could help resolve this issue. Despite the willingness of various stakeholders to collaborate, communication barriers and other challenges negatively affect effective connections. The COVID-19 pandemic

presented additional barriers to creating effective partnerships for this emerging barrier. Improved strategies are needed to enhance communication and foster effective partnerships that support development of skills, knowledge, and expertise, and growth of the energy-efficiency sector.

Challenges with Availability and Accessibility of Education and Training Programs

Other consistent findings were challenges for education and training programs and participation barriers that affect the availability and accessibility of education and training programs in the energy-efficiency sector in New Jersey. From difficulty hiring qualified instructors to the direct and indirect costs associated with participating, these findings pose additional challenges for stakeholders offering education and training programs and often prevent students, trainees, and workers from accessing opportunities in this sector.

Finding #5: Difficulty hiring qualified instructors and underdeveloped curricula affect the availability and accessibility of education and training programs.

Stakeholders felt that difficulty hiring qualified instructors and locating niche content experts are urgent challenges facing education and training programs in the state. Coupled with rapid technological advancements and changing regulatory policy, these factors make it challenging for training providers to develop and offer relevant curricula to energy efficiency, thereby limiting the overall availability and accessibility of programs in New Jersey. Addressing these challenges, though not unique to the state, is paramount to improving the availability and accessibility of education and training programs.

Takeaways

- ▶ **The small pool of qualified instructors negatively affects the ability of training providers to offer education and training programs, weakening efforts to increase accessibility across the state.** Training providers noted the small pool of qualified instructors, especially given the subject-matter expertise required to facilitate programs and the rapidly changing nature of the energy-efficiency sector. Compounding hiring difficulties is that instructors earn significantly less than practitioners in the field. Interviewees frequently expressed that low pay prevented experienced practitioners from becoming instructors, further limiting the talent pool.

“You’re making a lot more money in the work in the workforce rather than in education. It’s always a struggle to find people who are willing to teach.”

– Education and training provider

“Probably one of the hardest jobs that community colleges face teaching the trades is finding people who are up on things and willing to teach for the money.”

– Education and training provider

The cost of hiring qualified instructors presents additional challenges. Training providers highlighted that organizations that use grant funds for instructors’ salaries must pay for the individual Teacher Pension and Annuity Fund if they are eligible, per New Jersey Department of Education requirements. Five training providers have attempted to mitigate this cost by partnering with employers to find qualified instructors, whereby someone affiliated with the employer (e.g., an employee) teaches the class and can recruit potential candidates for open positions at their company.

The hiring challenges outlined above directly affect the availability and accessibility of education and training programs. Training providers offer fewer programs than needed because they do not have an instructor. Prospective students and trainees must, therefore, travel further to participate in the appropriate education and training program.

- ▶ **The lack of niche content experts and rapid technological changes make it difficult for training providers to develop education and training programs that meet industry needs, which reduces overall availability.** Seven employers noted that curricula being used by education and training programs need to be revised more frequently to remain relevant. Twenty-eight survey respondents also felt that curricula needed to be more responsive to modern technologies. Stakeholders, when asked about teaching curricula, preferred instructors who are experienced field practitioners. In some cases, education and training programs are using curricula that closely follow licensing exams, which can be problematic when tests are written for obsolete technology and outdated practices. Four interviewees addressed related regulatory policy. Though two felt that New Jersey did better than other states, two others expressed frustration with slow adaptation to modern technologies.

"The problem is the people who are full-time academics. They're not in touch with the field... The field is different, and academia is different, so there's always a gap. Our curriculum is always developed by the people who are working in the field, and all our instructors are the people that come from the field."

- Education and training provider

To ensure that curricula meet industry needs, one education and training provider set up their program so that only field practitioners develop and teach the curriculum. Another education and training provider utilizes industry partnerships to provide relevant, up-to-date curricula. These findings illustrate the ways that training providers leverage partnerships to navigate changes to manufacturing processes, technological applications, regulatory policy, employer practices, and industry needs that affect curricula and day-to-day operations. Struggling to locate content experts and adapt curricula based on current technologies, many training providers continue to face challenges that limit the availability and accessibility of programs crucial to recruiting and training prospective students and trainees for jobs in the energy-efficiency sector.

Finding #6: The cost of participating in education and training programs, as well as facility location and access to transportation, frequently limit the ability to participate.

Consistent among most interviews was the discussion of participation barriers. Stakeholders felt that participation barriers – namely, cost, location, and transportation – present unnecessary obstacles for students, trainees, and workers in pursuing education and training programs. Many stakeholders noted that participation barriers disproportionately affect disadvantaged groups, such as individuals of color, low-income individuals, and/or individuals with disabilities. Reducing participation barriers, especially among disadvantaged groups, is key to ensuring that students, trainees, and workers are successful in pursuing education and training programs in this sector.

Takeaways

- ▶ **The direct and indirect costs associated with participating in education and training programs related to energy efficiency often overburden and limit accessibility for students and trainees.** Twenty-seven survey respondents (7%)

"The combination of providing the training at no cost with the wraparound services is important if you want to get to the equity of bringing all people and communities along in terms of who's getting to grow in this clean-energy economy."

- Employer

mentioned tuition fees as a significant barrier. When asked about how to improve education and training programs, many survey respondents suggested providing additional financial assistance through reduced fees. Five training providers mentioned that eligible students and trainees receive tuition assistance through the program and/or local One-Stop Career Center. This practice, however, does not exist among all training providers for programs in the energy-efficiency sector. The cost of participating in education and training programs poses significant challenges related to equity. While some students and trainees can afford to take time away from work to participate, low-income students and trainees cannot afford to do so. Without an income, low-income students and trainees cannot afford transportation, childcare, and other indirect costs.

▶ **The location(s) of the program and/or facility, especially by region and county, affects the availability and accessibility of education and training programs across New Jersey.**

Thirteen interviewees mentioned that some areas of New Jersey are better suited than others for certain energy-efficiency initiatives, especially considering the size of the state. Some found this especially true for sectors adjacent to (and often overlapping with) energy efficiency, including solar and offshore wind, which tend to be situated in regions without robust public transportation (e.g., southern New Jersey). Though urban centers have training facilities, the education and training programs offered can be limited, requiring prospective students and trainees to pursue opportunities elsewhere throughout the state. A recent high school graduate from Newark, for example, may want to pursue education and training in solar and wind, but training centers are largely concentrated in southern New Jersey. Individuals who live in rural areas also struggle with accessing appropriate training facilities. This can present additional barriers for individuals in pursuing specific education and training programs throughout the state.

“Many trade or non-desk jobs require on-site training and fulfillment of certain training hours and requirements...transportation and travel can be an issue, particularly in the solar PV (photovoltaic) industry, where projects and jobs are often located far from urban areas and vary throughout the state.”

- Education and training provider

▶ **The lack of accessible public transportation throughout the state creates substantial barriers to participating. Nine training providers identified transportation as a significant barrier to participating.**

Namely, the lack of robust public transportation systems, prohibitive fuel costs, and long travel times to facilities were cited as presenting difficulties for students and trainees in participating in education and training programs. Transportation also presents challenges for hiring, as public transit schedules do not always align with the hours that employees are expected to work. Among those who experienced barriers to participating in education and training programs, 10 survey respondents cited transportation, suggesting subsidized transportation costs and temporary accommodations near training facilities as potential short-term solutions.

“In rural areas, there’s a problem with public transportation...[There are] similar problems with education, lead toxicity, balancing child and elderly care, and then simultaneously obtaining training. But a big problem, especially in rural areas, is transportation. It’s like, ‘Where is this being held?’ And if it’s online, ‘Do I have broadband access?’ or ‘Where’s the WIFI?’

- CBO staff member

“Transportation is a huge [barrier], and I think it keeps people from some of these higher-paying energy-efficiency jobs.”

- CBO staff member

“It can be challenging for individuals without reliable transportation options to access and participate in these programs.”

- Education and training provider

Limited Equity in Workforce Development Infrastructure

Equity in the energy-efficiency sector has been an important topic in the past decade. The **background** section of this report shows that the energy-efficiency workforce nationally and in New Jersey consists mostly of white men, with large pools of talented women and/or individuals of color untapped. Diversifying the workforce will be instrumental to the future of energy efficiency, ensuring the sector has talented workers from backgrounds that represent the communities it hopes to serve. The analysis of survey responses from students, trainees, workers, and business owners, and interviews with key stakeholders, builds on equity measures identified in the literature review and revealed several observations related to equity in the sector. Researchers summarize these findings below.

Finding #7: Individuals from disadvantaged groups frequently have negative experiences in the workplace.

Stakeholders noted the importance of fostering an inclusive workplace environment where students, trainees, and workers have equitable access to high-paying, good-quality jobs with clear opportunities for advancement and promotion. And yet the survey responses show that many women, individuals of color, and/or individuals with disabilities are treated as less competent or valuable, denied advancement and promotion opportunities, and hear or read comments, insults, or slurs directed at them by managers, supervisors, and co-workers at their current or previous job(s). These negative experiences harm students, trainees, and workers and have the potential to undermine efforts to create more equitable workforce development infrastructure. Interviews and survey responses highlight areas for improvement that employers and other stakeholders can address.

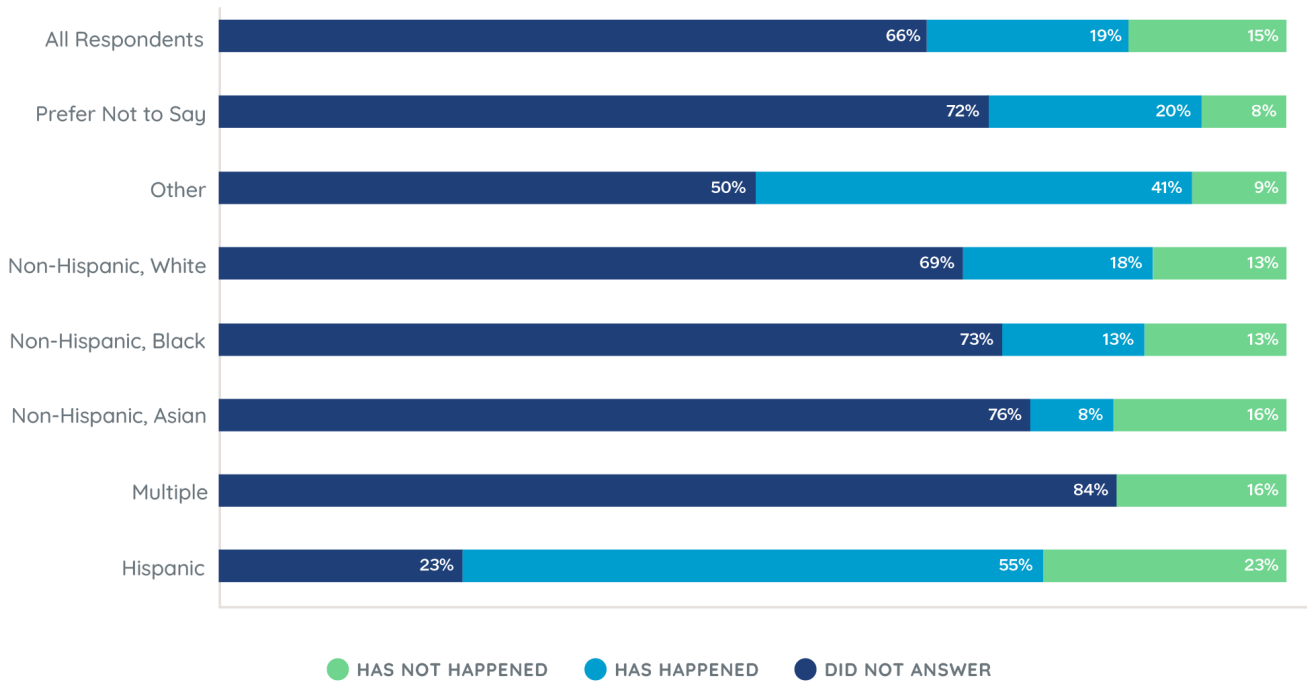
57%
of women said they
were treated as less
competent or valuable

Takeaways

- ▶ **Women, people of color, and/or individuals with disabilities said they were treated poorly in their current or previous job(s).** Many respondents said that they heard or read comments, insults, or slurs in the workplace. Figure 10 shows that more than half of Hispanic/Latino respondents (55%) said that they heard or read comments, insults, or slurs directed at them by co-workers.

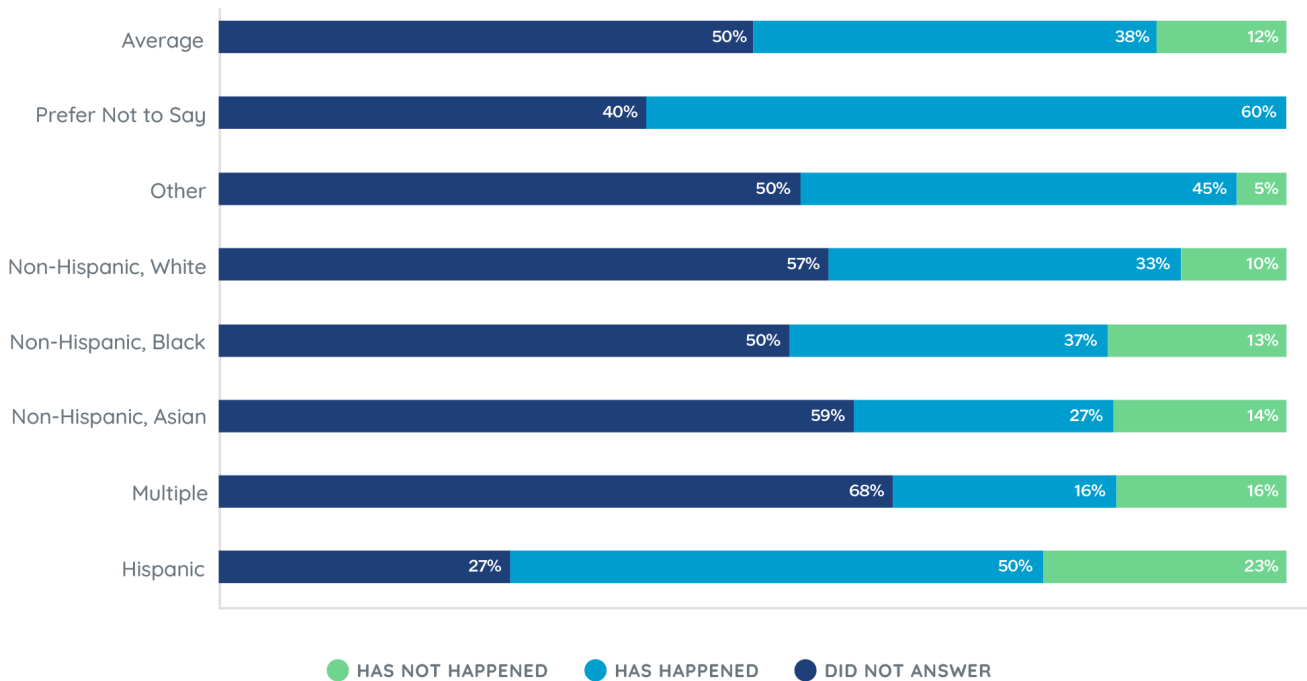
Approximately 37% of non-Hispanic Black respondents felt that someone treated them as if they were less competent or valuable at their current or previous jobs, which is two percentage points higher compared with all respondents (see Figure 11). Half of Hispanic/Latino respondents also indicated that someone made them feel this way. While 18% of all respondents experienced slights about their language or appearance, 41% of Hispanic/Latino respondents reported such an experience at their current or previous jobs. A slightly higher percentage of Hispanic/Latino respondents also experienced threats of physical violence (9%) compared with all respondents (8%).

Figure 10: Heard or Read Comments, Insults, or Slurs Directed at Them by a Co-worker in Current or Previous Jobs, by Race/Ethnicity (N = 299)



Note: Excludes respondents who left their race and ethnicity blank. Each category (has not happened, has happened, did not answer) was divided by the total number of respondents in each racial/ethnic group: Hispanic (22), multiple (19), non-Hispanic Asian (37), non-Hispanic Black (30), non-Hispanic white (183), other (22), and prefer not to say (25). Analysis of variance results indicate that the differences between groups are not statistically significant. Such results may be due to small sample sizes, but future research would be needed to determine this.

Figure 11: Treated as Less Competent or Valuable in Current or Previous Jobs, by Race/Ethnicity (N = 307)



Note: Excludes respondents who left their race and ethnicity blank. Each category (has not happened, has happened, did not answer) was divided by the total number of respondents in each racial/ethnic group: Hispanic/Latino (22), multiple (19), non-Hispanic Asian (37), non-Hispanic Black (30), non-Hispanic white (183), other (22), and prefer not to say (25). Analysis of variance results indicate that the differences between groups are not statistically significant.

► **Women were overwhelmingly more likely to have negative workplace experiences compared to men, except for receiving threats of physical violence.** Table 9 shows that the percentage of women who said they were treated as if they were less competent or valuable was 29 percentage points higher (57%) than men (28%). Women were also far more likely to hear or read comments, insults, or slurs directed at them or another co-worker by someone in their workplace, with an average of 32% for women and 19% for men. A higher proportion of women reported being assigned tasks that were undesirable or unwanted by others (48%) compared to men (40%) and the overall average (40%). In addition, 42% of women said they were passed over for the most important projects and assignments, which is 22 percentage points higher than men (22%).

Table 9: Poor Treatment in Current or Previous Jobs, by Gender

	Men (N = 239)	Women (N = 65)	Other (N = 46)
Treated as less competent or valuable* (N = 307)	28% (67)	57% (37)	43% (20)
Passed over for the most important projects and assignments* (N = 303)	22% (52)	42% (27)	28% (13)
Heard or read comments, insults, or slurs directed at you by a manager or supervisor* (N = 298)	13% (31)	28% (18)	17% (8)
Heard or read comments, insults, or slurs directed at you by a co-worker* (N = 299)	16% (38)	32% (21)	20% (9)
Heard or read comments, insults, or slurs directed at a co-worker by a manager or supervisor (N = 302)	21% (50)	29% (19)	20% (9)
Heard or read comments, insults, or slurs directed at a co-worker by another co-worker (N = 301)	25% (59)	37% (24)	22% (10)
Received a threat of physical violence (N = 295)	7% (17)	5% (3)	13% (6)
Assigned tasks that were undesirable or unwanted by others (N = 312)	40% (95)	48% (65)	48% (46)
Experienced slights about your language or appearance (N = 299)	14% (33)	22% (14)	17% (8)

Note: The darker blue gradient indicates higher percentages of respondents who reported experiences in their current or previous jobs, whereas lighter blue indicates lower percentages.

** Indicates where differences are statistically significant.*

► **Individuals with disabilities were more likely to report negative workplace experiences in current or previous jobs than those without disabilities.** Table 10 shows that the percentage of individuals with disabilities (57%) who said they were treated as less competent or valuable in their current or previous jobs is 24 percentage points higher than those without a disability (35%). An overwhelming majority of individuals with disabilities (71%) reported being assigned tasks that were undesirable or unwanted by others at their current or previous job(s). By comparison, 40% of respondents without a disability were assigned such tasks – a 31 percentage point decrease compared to those with a disability. Individuals with disabilities were also more likely to experience slights about their language or appearance (29%) compared to respondents without a disability (15%).

Though only 6% of respondents reported having a disability, the proportion is consistent with the national working-age population (7.9%) (U.S. Bureau of Labor Statistics, n.d.). Validated by the response rate for this set of questions, which ranged from 86% to 100%, these findings about individuals with disabilities provide crucial context, especially because little is known about this population in the energy-efficiency sector.

Table 10: Poor Treatment in Current or Previous Jobs, by Disability Status

	With Disability (N = 21)	Without Disability (N = 282)	Prefer Not to Say (N = 24)
Treated as less competent or valuable (N = 307)	57% (12)	35% (98)	25% (6)
Passed over for the most important projects and assignments (N = 303)	38% (8)	27% (75)	13% (3)
Heard or read comments, insults, or slurs directed at you by a manager or supervisor (N = 298)	29% (6)	16% (44)	8% (2)
Heard or read comments, insults, or slurs directed at you by a co-worker (N = 299)	19% (4)	20% (56)	4% (1)
Heard or read comments, insults, or slurs directed at a co-worker by a manager or supervisor (N = 302)	38% (8)	22% (61)	13% (3)
Heard or read comments, insults, or slurs directed at a co-worker by another co-worker* (N = 301)	48% (10)	27% (75)	13% (3)
Received a threat of physical violence (N = 295)	10% (2)	6% (18)	13% (3)
Assigned tasks that were undesirable or unwanted by others (N = 312)	71% (15)	40% (114)	42% (10)
Experienced slights about your language or appearance (N = 299)	29% (6)	15% (43)	8% (2)

Note: This table excludes responses from those who left the disability status blank (23). The darker blue gradient indicates higher percentages of respondents who reported experiences in their current or previous jobs, whereas lighter blue indicates lower percentages.

**Indicates where differences are statistically significant.*

► **Individuals from disadvantaged groups frequently report limited employment prospects and advancement and promotion opportunities in their current or previous job(s).** One-third of non-Hispanic Black respondents earned less than a co-worker doing the same job. Meanwhile, 30% of non-Hispanic Black respondents felt they received less advice, less feedback, or fewer opportunities, and 30% were denied promotions (see Figures 12 and 13).

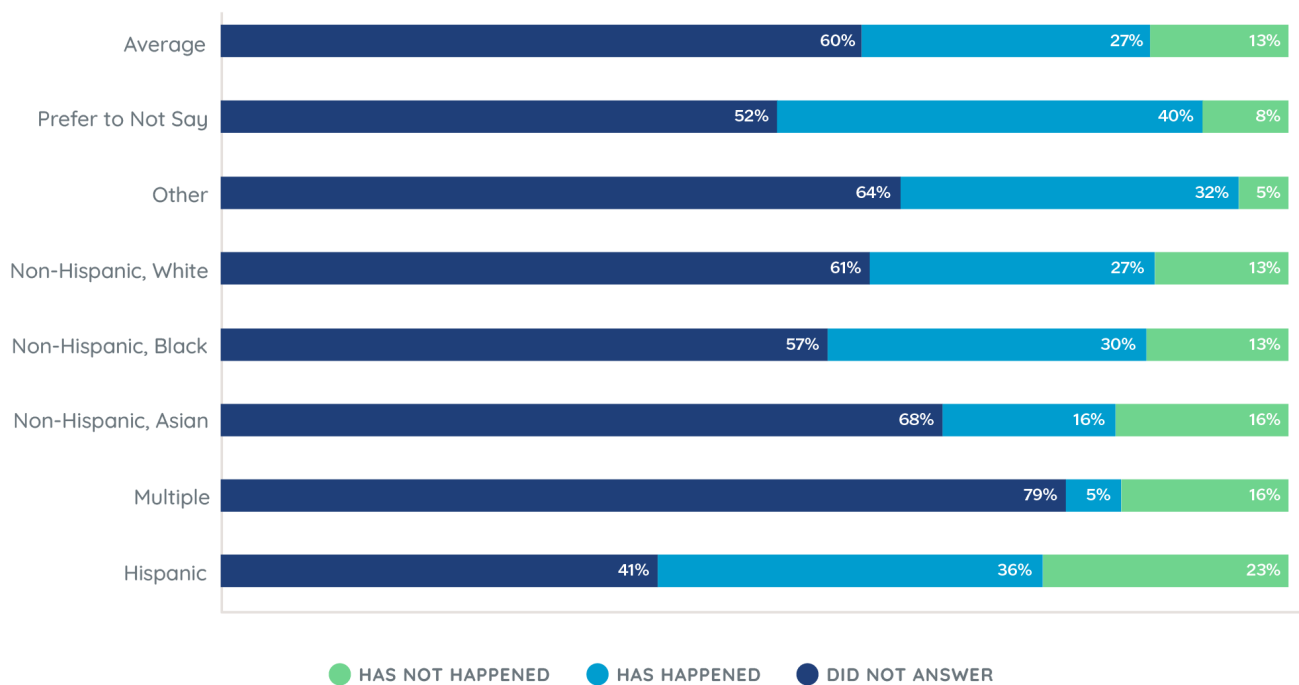
“More opportunities offered by my employer would give me a better chance at a promotion, which would give me more experience under my belt to find a better job in the future.”
- Technician apprentice

Hispanic/Latino respondents also had similar experiences, with 59% reporting they received less information about advancement and 40% were denied a promotion. Thirty-six percent of Hispanic/Latino respondents also said they were denied a raise at their current or previous job(s).

Figure 12: Received Less Advice, Less Feedback, or Fewer Opportunities for Performance Evaluation, by Race



Figure 13: Denied Promotions at Current or Previous Job(s), by Race/Ethnicity



► **Women also had different experiences with employment prospects and advancement and promotion opportunities than men** (see Table 11). More than half of women (54%) reported earning less than a co-worker doing the same job at their current or previous job compared to one-third of men – a 21 percentage point difference. Women (40%) also received less advice, less feedback, or fewer opportunities for performance evaluation than men (27%). At the same time, 35% of women reported being denied a promotion and 42% were denied a raise.

Table 11: Limited Opportunities for Advancement and Promotion in Current or Previous Jobs, by Gender

	Men (N = 239)	Women (N = 65)	Other (N = 46)
Denied a promotion (N = 299)	24% (57)	35% (23)	26% (12)
Earned less than a co-worker doing the same job* (N = 301)	33% (78)	54% (35)	26% (12)
Denied a raise (N = 305)	26% (63)	42% (27)	28% (13)
Received less advice, less feedback, or fewer opportunities for performance evaluation (N = 301)	27% (65)	40% (26)	33% (15)

Note: "Other" includes those who preferred not to report their gender, specified another gender than those listed, or left the field blank. The darker blue gradient indicates higher percentages of respondents who reported experiences in their current or previous jobs, whereas lighter blue indicates lower percentages

* Indicates where differences are statistically significant.

- **Individuals with disabilities were considerably more likely to report negative experiences related to employment prospects and advancement and promotion opportunities in their current or previous job(s) than respondents without disabilities** (see Table 12). Sixty-seven percent of individuals with disabilities said they earned less than a co-worker doing the same job compared to 35% of respondents without disabilities. This represents an overwhelming 32 percentage point difference. At the same time, 52% of individuals with disabilities were denied a raise. Individuals with disabilities were also more likely to receive less advice, less feedback, or fewer opportunities for performance evaluation (57%). With limited opportunities, 43% of individuals with disabilities were denied a promotion.

Table 12: Limited Opportunities for Advancement and Promotion in Current or Previous Jobs, by Disability Status

	With Disability (N = 21)	Without Disability (N = 282)	Prefer Not to Say (N = 24)
Denied a promotion (N = 299)	43% (9)	26% (73)	17% (4)
Earned less than a co-worker doing the same job* (N = 301)	67% (14)	35% (100)	13% (3)
Denied a raise (N = 305)	52% (11)	29% (81)	21% (5)
Received less advice, less feedback, or fewer opportunities for performance evaluation* (N = 301)	57% (12)	29% (83)	17% (4)

Note: "Other" includes those who preferred not to report their gender, specified another gender than those listed, or left the field blank. The darker blue gradient indicates higher percentages of respondents who reported experiences in their current or previous jobs, whereas lighter blue indicates lower percentages

* Indicates where differences are statistically significant.

Though many respondents indicated experience with poor treatment and/or limited opportunities for advancement and promotion, most respondents felt that individuals in their current workplaces are treated the same, get along well with each other, and/or have supervisors/managers who work well with them, regardless of their racial or ethnic background. On average, 60% of respondents strongly agreed, agreed, or somewhat agreed with the above statements. Approximately 23% of respondents neither agreed nor disagreed with the above statements, and 14% left each sub-question blank. Fewer than 1% of respondents, on average, strongly disagreed, disagreed, or somewhat disagreed with the statements that individuals in their current workplace are treated the same, get along well with each other, and/or have supervisors/managers who work well with them, regardless of their racial or ethnic background.

- **Increasing diversity in the energy-efficiency workforce requires stakeholders to go beyond inclusion.** Four interviewees noted the lack of awareness around equity and belonging once students, trainees, and workers become employed. Training providers noted that employers do not always provide the support that workers from diverse backgrounds may need to be successful. When asked specifically about retaining diverse employees,

"You have to set up an environment that makes them feel welcome and shows that you're invested in them and happy to have them as a part of your team."
- Employer

most stakeholders steered the conversation toward the problem of hiring candidates, which suggests that they may be more focused on recruitment and are not in the best position to address retention. And yet retention models with clear opportunities for advancement and promotion are necessary, as 10% of survey respondents felt they did not have access to either. Accompanying the recruitment and retention of students, trainees, and workers from diverse backgrounds should be, for example, efforts to connect graduates with high-quality, good-paying jobs.

Finding #8: Employment practices can undermine efforts to advance equity.

Diversity and equity are important topics among stakeholders, but certain practices – both intentional and unintentional – hinder efforts to advance equity in the energy-efficiency sector in New Jersey. A notable finding consistent within the literature (e.g., Shoemaker, Ayala, & York, 2020) is that the workforce appears diverse but lacks equity. For example, Hispanic/Latino workers are often employed in low-paying jobs with few advancement opportunities. Stakeholders reported that incentives, such as funds for hiring diverse candidates that can help cover the cost of continuing on-the-job training, help employers diversify the workforce. However, several stakeholders noted that more must be done from an equity perspective to ensure that diverse workers receive high-quality education and training and become employed in good-paying jobs with clear opportunities for advancement in the sector.

Takeaways

► **Employers are less intentional about hiring diverse candidates, given the current demand for and limited supply of qualified workers in the energy-efficiency sector.**

As mentioned in previous findings in this report, some employers struggle to find workers with the knowledge, skills, and expertise necessary to work more niche occupations in the sector. When asked about hiring practices, 11 out of 36 interviewees shared that they do not have established guidelines for hiring diverse candidates. One employer explained that, because of their small size, they are not able to implement a system focused on recruiting and hiring diverse workers because they feel the sector lacks qualified candidates overall. This employer did mention, however, that they try to expand their recruiting when possible.

“The way we are trying to [increase diversity] is just to expand the funnel of candidates that we’re getting in, so that we get as many candidates from diverse backgrounds as possible.”

- Employer

Though interviewees mentioned the importance of hiring women and individuals of color, few stakeholders mentioned individuals who had been incarcerated and individuals with disabilities. Limited information exists about recruiting and hiring these disadvantaged groups. Recruiting and hiring individuals who were formerly incarcerated and persons with disabilities presents an opportunity for employers to expand the talent pool and further diversify the workforce.

► **Though Hispanic/Latino individuals are better represented in segments of the energy-efficiency workforce, stakeholders attribute this to hiring practices aimed at exploiting immigrant labor in the state.**

Ten interviewees noted that certain occupations in the workforce, such as those in construction, are diverse. Yet interviewees acknowledged that the apparent racial and ethnic diversity was borne out of hiring practices aimed at securing low-cost labor from immigrant workers rather than an intentional effort to diversify the energy-efficiency workforce. Such findings are supported by the literature, which shows that Hispanic workers are better represented in the sector, but are concentrated in low-wage positions, with less racial and ethnic diversity in higher-paying positions (Shoemaker, Ayala, & York, 2020) (see the **background** section for more information on racial and ethnic diversity in the energy-efficiency workforce).

“On paper, it may look like a diverse workforce.”

- Education and training provider

► **Incentives help employers hire diverse workers.** To increase diversity in the sector, utility companies and nonprofits are providing incentives and/or subsidizing salaries to businesses that hire students, trainees, and workers from diverse backgrounds, such as low-income individuals, women, individuals of color, individuals who were previously incarcerated, and/or individuals with disabilities. These funds help cover the costs of training and upskilling apprentices and new hires. Survey respondents frequently cited incentives as important drivers of hiring practices, and 14 interviewees shared their experiences with incentives around diversity. One employer shared, for example, that they have an incentive payment system in place that provides funding to vendors for reaching diversity goals for different racial and ethnic groups. The conditions of the incentive require vendors to collect demographic information, which can be difficult because workers can opt out of providing personal information.

“Providing stipends or incentives and subsidizing a portion of the cost is helpful [for] an employee who may not be useful for another six months to a year.”

- Employer

However, the employer provides training and support on how to collect demographic information. Additionally, an education and training provider mentioned that, depending on the terms of the grant, the organization will subsidize the worker's salary for three to six months as a hiring incentive. Another employer stated that they have received incentive payments and found them helpful in covering the cost of upskilling new hires. One employer expressed that incentive usage requirements, which mandate that funds must be used for salaries, presented additional challenges. This participant added that it would be helpful to be able to use these funds to establish formal mentorship programs and incentivize employees to participate.

Contextualizing Findings

Key trends and findings detailed in this report align with existing studies and the current landscape in New Jersey. Consistent with the findings around stakeholder partnerships is *Green Jobs for a Sustainable Future*, which states, “Engagement with green employers is important but still under development” in New Jersey (New Jersey Council on the Green Economy, 2022, p. 9). Several publications, including *Advancing Inclusion Through Clean Energy Jobs* (Muro et al., 2019); *Expanding Opportunity Through Energy Efficiency Jobs: Strategies to Ensure a More Resilient, Diverse Workforce* (Shoemaker, Ayala, & York, 2020); *Help Wanted: Diversity in Clean Energy* (E2, 2021b); and *Best Practices for an Equitable Clean Energy Transition: A Toolkit for U.S. States* (Nathan et al., 2021) highlight strategic approaches to advancing diversity and equity among workers in clean energy, including the emerging energy-efficiency sector, that are consistent with stakeholders' recommendations for New Jersey. Table 13 shows key trends, findings, consistencies, and examples. The DEI typology developed earlier in this study aligns with policy recommendations referenced in previous sections of this report, which suggest strengthening education and training programs, apprenticeships, and procurement policies, and advocate for additional participation of individuals from disadvantaged groups and underserved communities (E2, 2021a; Muro et al., 2019). This report draws on the typology to organize and present strategies, which include similar programs and initiatives, later in this publication.

Table 13: Alignment of Findings with Existing Studies

Key Theme	Finding(s)	Consistent	Example(s)
Pipeline and Career Pathways	▶ Lacking awareness and clear pipelines and career pathways	Yes	<i>The Economic Impact of the New Jersey Clean Energy Economy</i> (2014)
	▶ Education and training programs misaligned with sector needs	Yes	<i>Green Jobs for a Sustainable Future: Leveraging Our Strengths to Grow an Inclusive Green Economy</i> (2022)
	▶ Skills gaps, industry-valued credentials, and entry-level requirements pose barriers	Yes	<i>Advancing Inclusion Through Clean Energy Jobs</i> (2019)
	▶ Partnership constraints between employers and training providers	Yes	<i>Green Jobs for a Sustainable Future: Leveraging Our Strengths to Grow an Inclusive Green Economy</i> (2022)
Accessibility and Availability of Education and Training Programs	▶ Education and training program challenges limit availability (e.g., hiring qualified instructors, few content experts, rapid technological advancements)	Yes	<i>Green Jobs for a Sustainable Future: Leveraging Our Strengths to Grow an Inclusive Green Economy</i> (2022)
	▶ Participation barriers hinder accessibility	Yes	<i>Seeking Work in Southern New Jersey</i> (2022)
Equity in Workforce Development	▶ Employer practices play an important role (e.g., employers less intentional about diversification, workforce appears more diverse, etc.)	Yes	<i>Expanding Opportunity Through Energy Efficiency Jobs: Strategies to Ensure a More Resilient, Diverse Workforce</i> (2020) <i>Help Wanted: Diversity in Clean Energy</i> (2021)



Strategies for Improving Workforce Development Infrastructure

These strategies, informed by activities conducted in both phases of this study, aim to strengthen workforce development infrastructure and build the robust, skilled workforce in ways that can help New Jersey achieve its clean-energy goals. Workforce development infrastructure should leverage high-road training, which involves industry-led, worker-centered, and evidence-backed training models that use registered apprenticeships, pre-apprenticeships, sector strategies, and partnerships (U.S. Department of Labor, n.d.). Underpinning these strategies is **energy equity**: the distribution of benefits from transitioning to clean energy – especially employment opportunities – to disadvantaged groups and underserved communities most affected by carbon emissions. From building community trust to offering targeted financial support, the strategies in this report help strengthen efforts to recruit, train, hire, and retain women; individuals of color; individuals with disabilities; and individuals who were formerly incarcerated. These strategies, when implemented together, use an ecosystem approach to foster a thriving clean-energy economy in New Jersey.

Strategy #1: State agencies should create and implement an integrated career pathways tool to bridge the gap between education and training to employment.

A career pathways tool could leverage occupational data from relevant labor market sources and connect them with educational programming offered by training providers and career development agencies. The Phase I deliverables in Appendix D show preliminary efforts to build an inventory of education and training programs in the energy-efficiency sector in New Jersey. By displaying various occupations and career pathways that align with the labor market in real time, the career pathways tool would provide accessible information to students, trainees, and workers about how to connect their educational pursuits with future career aspirations. Easy access to comprehensive and up-to-date information can enhance career aspiration and enable informed decision-making regarding career pathways and corresponding education and training programs. This tool could also assist with curriculum development, a topic discussed in previous sections of this report. An example is the Minnesota Department of Employment and Economic Development's **Career**

Pathways Tool. In addition, NJDOL is currently enhancing the **New Jersey Career Network**, which provides free and interactive resources to those looking to explore a career pathway. Customizing this tool can include specific pathways outlined within the energy-efficiency sector and match to relevant training programs. Another example is New York State Energy Research and Development Authority's **Clean Energy Career Maps**. Future partnerships could inform an energy-efficiency stream of this resource.

Strategy #2: State agencies should engage relevant stakeholders to strengthen awareness of energy-efficiency careers among youth.

New Jersey should increase efforts to engage employers, training providers, CBOs, associations, and unions to create programming within the K-12 education system that introduces youth to careers in the energy-efficiency sector. Exploratory and experiential opportunities, such as age-appropriate demonstrations and hands-on learning activities, in elementary, middle, and high schools across

"We've got to get younger folks involved, so that the recruitment class is larger."

- Employer

the state would help boost exposure to potential career opportunities and, at the same time, create valuable recruitment mechanisms for the energy-efficiency sector. Stakeholders felt that, though programming at the high school level is important, the state should concentrate its efforts on increasing awareness in youth much sooner, especially in middle school. Exposing youth to opportunities in the energy-efficiency sector can help build awareness and set students on the appropriate career pathway. To achieve greater awareness among youth, the state must provide school counselors, career coaches, and career and technical education staff with additional information about the energy-efficiency sector. An example of an online guide and set of resources is the National Center for Healthy Safe Children's **Safe Schools/Healthy Students Framework Implementation Toolkit** targeted to school-based teams at the community level and providing user-friendly communication materials. Similarly, the Solar Energy's Technology Office at the Office of Energy Efficiency and Renewable Energy of the U.S. Department of Energy offers **solar training and education** for professionals in indirect and related fields to address gaps in education and training in the workforce.

Strategy #3: State agencies should develop PPPs to address workforce gaps and help facilitate feedback loops between employers and training providers to ensure curricula can better meet sector needs.

PPPs may be effective in addressing the skills gaps and the disconnect between energy-efficiency industry and education and training institutions. These partnerships can help training providers keep up to date with changing technology and industry. Specifically, PPPs can help ensure that education and training programs provide students and trainees with valuable, industry-recognized skills and credentials for in-demand technologies.

"As part of running career and technical programs, you need to have a business partner. They come in and provide background on what's going on in the industry and guidance on the curriculum. [Employers] should be partnering with school districts."

- Education and training provider

An example of an effective PPP is the Arizona Clean Energy Workforce Development Program, a collaboration between Arizona and Microsoft. The program provides vocational training and educational pathways, focusing specifically on recruiting students and trainees from disadvantaged groups and underserved communities. The program successfully connects high school students with local industry business owners, which creates a conducive environment for learning knowledge, skills, and expertise, as well as professional development related to clean energy. By collaborating with local community colleges, the program offers certifications that allow participants to pursue rewarding careers in clean energy in Arizona and elsewhere.

Establishing and strengthening feedback loops between stakeholders, especially employers and training providers and within PPPs, can reduce existing siloes and increase collaboration. This can help ensure that education and training programs provide workers with the knowledge, skills, and expertise through curricula with the most up-to-date information and technology. Feedback loops can also help address future challenges in the energy-efficiency sector.

Strategy #4: State agencies should partner with NJDOL to expand registered apprenticeship opportunities in the energy-efficiency sector and offer incentive mechanisms that encourage employers to increase participation among women, individuals of color, individuals with disabilities, and individuals who were formerly incarcerated.

In 2019, New Jersey created state-funded registered apprenticeships specifically aimed at increasing gender, racial, and ethnic diversity among apprentices. State-funded apprenticeships, though nascent, have shown promise in meeting these goals. Stakeholders could collaborate with NJDOL to establish state-funded apprenticeships for jobs specifically in the energy-efficiency sector, recruiting potential students and trainees from disadvantaged groups and underserved communities. The **New Jersey Apprenticeship Network** is a resource that stakeholders can leverage to match students, trainees, and workers with specialized training providers and employers.

Another way to increase the diversity of participants in pre-apprenticeship programs and apprenticeships in New Jersey is to provide additional incentive mechanisms for employers, helping facilitate the acquisition of practical experience for students, trainees, and workers through paid opportunities. Potential incentives could include certifications, enhanced business prospects, or tax rebates, which would engage employers to actively participate in the development of a skilled workforce. By fostering additional internship opportunities, students, trainees, and workers could gain valuable, hands-on experience required for securing entry-level jobs within this emerging sector.

Incentive mechanisms for apprenticeships should prioritize supporting small, minority, and women-owned businesses. Facilitating increased access to procurements, contracts, and incentives for small businesses, particularly those owned by women and/or individuals of color, will be crucial for promoting diversity and inclusion in the energy-efficiency sector. Providing targeted support, technical assistance, and capacity-building initiatives can help these businesses offer paid apprenticeship opportunities and contribute to local job creation.

Strategy #5: State agencies should establish or expand existing financial assistance to participants of education and training programs.

Stakeholders should provide additional financial support to help students and trainees overcome barriers associated with participating in education and training programs. Employers, training providers, CBOs, associations, and unions can, with support from the state, offer scholarships, grants, and/or subsidized training programs that can help alleviate the financial burden of tuition fees. Increased financial support should target students and trainees from disadvantaged groups and underserved communities, including women, low-income individuals, individuals of color, individuals with disabilities, and/or individuals who were formerly incarcerated. Making education and training programs more

“My license was up for renewal two or three years ago, and I get this letter from the Department of Labor, saying, ‘Hey, you can’t renew your license unless you’re part of the sponsored Department of Labor apprenticeship program and at least have one apprenticeship on your rolls’...I was annoyed by that, and I went kicking and screaming. I went through it, but I realized it’s good for us. It’s good for the employee, and it’s good for the end-user customer to put these people through these apprenticeship programs.”

- Employer

accessible and affordable can increase the number of candidates from diverse backgrounds pursuing careers in the energy-efficiency sector in New Jersey, thereby developing a highly skilled workforce that represents the communities it serves.

Paid opportunities for students and trainees represent another approach that stakeholders can consider.

This approach would reduce financial barriers, enable individuals from diverse backgrounds to participate, and enhance the overall talent pool available in the energy-efficiency sector. Paid opportunities would play an important role in urban centers where there are needs for skilled workers but significant economic challenges.

Compensating students and trainees would allow them to focus on acquiring necessary knowledge, skills, and expertise without the additional concern for lost wages and other financial obligations, as many individuals are **often unable to afford the time off from work to participate**.

Strategy #6: State agencies should require state-funded education and training programs to include externships and/or an experiential learning component.

In addition to gaining exposure to the latest information and technologies in the field, externships and/or experiential learning components provide an opportunity for students and trainees to obtain necessary credentials and/or licensing. This can help ensure that students and trainees get the knowledge, skills, and expertise required to be successfully employed in the energy-efficiency sector. Requiring externships and/or experiential learning components can also help ensure that most students and trainees will receive the same opportunities.

Strategy #7: State agencies should provide stipends, bonuses, and/or rewards to field practitioners willing to instruct classes for education and training programs.

The state and other stakeholders can offer additional financial support to incentivize qualified individuals, especially field practitioners with practical knowledge, skills, and expertise, to become instructors. Providing stipends, bonuses, and/or rewards to prospective instructors would help offset the opportunity cost of leaving high-paying jobs and/or careers in the field. This strategy is paramount to securing more qualified individuals to teach relevant, innovative knowledge, skills, and expertise to students and trainees in the energy-efficiency workforce. The Atlantic City Free Public Library (2022) used grant funding provided by NJDOL's Community Library Adult Literacy and Career Pathway Grant Program to cover the salaries of instructors provided by Atlantic Cape Community College to offer SERVSafe®, an industry-recognized food safety certification course (NJDOL, 2021). Grant funds were made available to libraries throughout the state to establish and run adult literacy and workforce development programming.

"Creating funding [for] a support framework for working women who want to go into this type of work is going to be critical."

- Employer

"Access to funding...would have made it easier [for me] to participate in my training."

- Business owner

"We pound the pavement and look for people. That's getting tougher, right? The country is at the beginning of a great teacher shortage. It's always been tough and it's getting tougher."

- Education and training provider

"Finding people who have expertise, who are current, and are interested [is a challenge] because obviously, if you're a working engineer or working technician, you're making a lot more money in the work in the workforce rather than in education."

- Education and training provider

Strategy #8: State agencies should leverage stakeholder partnerships to provide and/or connect students and trainees with wraparound services, such as transportation, counseling, and child care, to reduce participation barriers.

The state can leverage partnerships between employers, training providers, CBOs, associations, and unions to reduce participation barriers by providing and/or connecting students and trainees with wraparound services. Stakeholder partnerships, with support from the state, can pool resources to arrange transportation, counseling, and childcare services. Addressing these barriers through wraparound services is key to recruiting, training, hiring, and retaining individuals from underserved communities. Employers and training providers frequently struggle to recruit women, especially women of color, because of difficulty arranging for child care, among other reasons. Stakeholder partnerships can help provide and/or connect women with child care and other related wraparound services that will help them participate in education and training programs and later become employed in the energy-efficiency sector.

Past Trade Adjustment Assistance Community College and Career Training (TAACCCT) grantees show that partnerships between key stakeholders can connect students and trainees with necessary services that help improve outcomes. The TAACCCT grants provide funding for colleges and universities to develop education and training programs for students to obtain industry-recognized credentials, especially for unemployed individuals and other adult learners. Grant evaluation reports showed that career navigators helped students mitigate challenges they face in completing their respective programs. Career navigators better ensured participant success by connecting adult learners with resources, in addition to important advising and mentoring opportunities, which later helped them become employed or pursue further education. New Jersey can offer similar opportunities to students and trainees by leveraging stakeholder partnerships.

Strategy #9: State agencies should facilitate community partnerships that help connect graduates of education and training programs with high-quality, good-paying jobs.

Community partnerships between local employers, training providers, CBOs, associations, and unions is crucial to successfully connecting students and trainees with high-quality, good-paying jobs after graduation. These partnerships help local training providers maintain personal relationships with employers, especially local contractors, in the energy-efficiency sector through formal and informal hiring agreements. An education and training provider may have an arrangement with manufacturing vendors within the energy-efficiency sector, for example, where they provide technology that students and instructors can utilize. The intended byproduct of such an arrangement is that manufacturing vendors then have access to qualified candidates that are familiar with their technology.

“They can't afford to take time off of paid work to do trained work. We always couple very substantial stipends along with our training to make sure that people have the sort of a paid training platform.”

- Education and training provider

“[Make] programs as accessible as possible, [have] opportunities for people to come and share the problems that they may have, wraparound services to make sure that their other regular needs are taken care of, stipends to make sure that they're able to feed themselves and their families, and basic education to make sure that they understand the concepts.”

- Education and training provider

Stakeholders can achieve better community partnerships by offering **externships** to school counselors, career coaches, and career and technical education staff. Externships provide opportunities for individuals to shadow business owners in the energy-efficiency sector and gain better understanding of what the work entails and what skills are needed at present. This information can then be passed onto students and trainees, increasing the overall awareness of the pipeline and career pathways in the sector. Vocational-technical schools can form partnerships with employers to offer work-based learning opportunities for students in career and technical education programs, which enables students to apply their academic and technical skills in an authentic work setting. For example, like many vocational schools, **Morris County Vocational School** offers work-based learning opportunities for students through partnerships with local employers in a variety of sectors, including Construction Trades and Engineering.

"That's a best practice: always having an employer coalition at the end attached to training programs."

- Education and training provider

"We stay close to those employers as much as we can because it's important to know what they are looking for."

- Education and training provider

Researchers also examined the **TAACCCT grants**, whereby the U.S. Department of Labor, in partnership with the U.S. Department of Education, provided funding to community colleges and other postsecondary institutions and recommended that colleges and universities build partnerships to provide services that they may not traditionally offer to connect students with employment opportunities. Some grantees used the funds to form partnerships with employers and develop capstone projects that provided practical job experience that help students gain the knowledge, skills, and expertise that employers are seeking. Other grantees were able to form partnerships that provided guaranteed interviews and/or individual job placements (Scott et al., 2020). Both examples represent opportunities that New Jersey can explore to help facilitate, establish, and maintain community partnerships between stakeholders in the energy-efficiency sector across New Jersey.

Strategy #10: Who does recruitment and outreach matters. State agencies should build trust with communities and stakeholders by meeting them where they are.

Trust is one of the most crucial aspects of increasing awareness within specific communities. Stakeholders stress the importance of **who** the messaging comes from in terms of marketing. Efforts to increase awareness about the sector must come from those who are already trusted and embedded within the community. Training providers, at the same time, should be proactive and connect with local leaders and community members. Stakeholders can leverage organizations within communities to increase credibility and garner trust. Information about education and training programs and associated services can be better shared through these processes.

Meeting communities where they are at can also help build trust. To increase workforce equity, stakeholders must connect with students and trainees in spaces with which they are familiar and comfortable. Employers, training

"If it's coming from places that the communities don't trust, then it's just noise."

- CBO staff member

"The communities have begun to trust; they've begun to share information internally with their membership and there are more people coming as a result. We can't be a standalone brick-and-mortar and just say 'come to us' because it's not working."

- Workforce Development Board staff member

providers, CBOs, associations, and unions can achieve this by holding recruitment events and informational sessions and posting flyers where communities congregate. An education and training provider can host job fairs, for example, at faith-based institutions, community centers, and public parks. Additionally, targeted marketing would help bring awareness about career pathways and would help diversify the energy-efficiency sector. Better marketing, specifically using images that reflect individuals from diverse backgrounds, can help individuals see themselves working in the energy-efficiency sector. One marketing strategy could be to post photos of women who graduate from education and training programs on social media to encourage other women to enroll in those programs.

Strategy #11: State agencies should implement geographic-based hiring targets to ensure equitable access to employment opportunities across regions.

Geographic-based hiring targets should prioritize individuals from disadvantaged groups and underserved communities to address disparities in workforce representation. These communities, which often face higher unemployment rates and limited investment in critical infrastructure, stand to gain significantly from this approach. A comprehensive assessment should be conducted to identify the specific needs and challenges of each community, allowing for tailored strategies and targeted interventions. By incorporating community input and fostering strong partnerships between stakeholders, local and targeted job creation initiatives can align with community aspirations, resulting in sustainable economic growth and social mobility. Prioritizing local and targeted job creation will allow the state to maximize the benefits of green job growth, create opportunities for disadvantaged groups and underserved communities, and foster inclusive and sustainable economic development. Such an approach not only supports the advancement of clean energy, including the energy efficiency sector, but also contributes to a more equitable future for all residents of New Jersey.

“One area in which we really have very little diversity in our field is gender diversity. It’s almost all men who are out in the field drilling and trenching and [doing] HVAC installation. I do have a couple of women in operations, running warehouses and [in] leadership positions, but recruitment has been mostly done by word of mouth.”

- Employer

Strategy #12: State agencies should require stakeholders to better collect and track equity measures.

To improve workforce equity, the state can clarify targets and require better data collection and tracking among stakeholders. Interviews revealed that employers, training providers, CBOs, associations, and unions often lack awareness of statewide targets for increasing energy-efficient technologies in overburdened communities and diversifying the energy-efficiency workforce. The state can disseminate additional information to increase awareness about specific targets and require that employers, training providers, CBOs, associations, and unions strengthen efforts to collect and track common equity measures, such as race, ethnicity, gender, age, education, disability status, and union rate. The state should, based on activities conducted in Phases I and II of this project, compare these data with the energy-efficiency sector nationally and in New Jersey. The *U.S. Energy and Employment Jobs Report* collects and reports on these data annually. The state can

“I think that the BPU could set up key performance indicators that would help measure success. We can look at our democratic makeup and determine what success would look like. Knowing New Jersey is made up of roughly 12% of African Americans, what goal should we set?...We’ve set up some stretch goals—aggressive goals—for our energy-efficiency vendors that are part of our network. If they exceed those goals—not just meet them but exceed those stretch goals—then we allocate milestone payments for them.”

- Employer

then disaggregate data across the overburdened community maps developed in Phase I. More informed assessments of workforce diversity, however, require additional data beyond commonly used metrics. This includes new hires, recruitment sources, retention, representation across job levels and business units, promotions, compensation, and performance ratings.



Future Implications

This study has important ramifications for the energy-efficiency workforce of today and tomorrow. The barriers outlined in this report curb key stakeholders from improving workforce development infrastructure in the energy-efficiency sector in New Jersey. Addressing these barriers creates an opportunity for stakeholders to increase diversity and equity in the workforce by ramping up efforts to recruit and train women, individuals of color, and/or individuals with disabilities, and offer employment in high-quality, good-paying jobs with clear advancement opportunities in the sector. State agencies must track common equity measures and create targets to evaluate progress toward these goals. In addition, future research may help to inform the true number of energy-efficiency jobs and vacancies within the state through additional stakeholder engagement to define these jobs, and further analysis of public and proprietary data. Further research supporting clearer categorization of energy-efficiency jobs within the state and nationally can better define partners, needs, and existing or future workers and training programs that can be modified to support the needs of the sector. Strengthening partnerships between employers, training providers, nonprofits, CBOs, associations, and unions is key to moving forward with such efforts. By using an ecosystem approach whereby stakeholders focus on addressing **all** aspects, New Jersey can achieve the targets outlined in this report.



Appendix A: Technical Methodology

This study employed a mixed-methods approach to better understand community needs and areas for growth in training, recruiting, hiring, and retaining workers in the energy-efficiency and decarbonization sectors in New Jersey. The following research questions informed the study:

- ▶ To what extent is the New Jersey energy-efficiency workforce and pipeline advancing equity?
- ▶ How do training providers prepare workers and recent graduates for careers in the energy-efficiency workforce?
- ▶ How do employers in the energy-efficiency sector recruit, hire, and retain diverse candidates?
- ▶ What are the experiences of workers and recent graduates as participants in education and training programs and throughout the recruitment process?
- ▶ How do employers, training providers, and other organizations track equity?

Surveys and Interviews

The research methodology for this study encompassed a multi-faceted approach, incorporating an electronic survey, semi-structured interviews, and labor market and job posting data analyses. To address the guiding research questions, researchers conducted 36 virtual interviews via Zoom with employers, training providers, community organizations, associations, and unions. Data collection occurred between March and June 2023. In addition, researchers conducted an electronic survey that was administered via Qualtrics and sent to workers and employers in the energy-efficiency sector and students of related education and training programs. The survey was sent to over 360 organizations to distribute to their networks. The original survey was fielded from February to June 2023 at which point the Heldrich Center partnered with the Eagleton Center for Public Interest Polling at Rutgers University to improve the response rate and increase the sample size.

Researchers conducted the Qualtrics original survey from February 22 to June 28, 2023. Respondents were required to be at least 18 years old and affiliated with the energy-efficiency sector as a student, trainee, worker, or business owner. Researchers sent an initial email invitation to eligible individuals, with up to two reminders. To increase outreach, researchers asked interviewees to share the survey with their networks and listservs. Qualified respondents received \$10 gift cards upon survey completion. Researchers then used referral mechanisms, whereby respondents would be eligible to receive an additional \$10 gift card if they referred someone else to complete the survey and provided their email address, to further improve the survey response rate.

The survey was prone to fraud because of snowball sampling. Though fraud occurred, researchers removed all fraudulent responses from the dataset. Researchers validated survey responses based on at least two of the following criteria:

- ▶ One-to-one match of the Internet Protocol address between the gift card and survey response;
- ▶ Common email formatting (e.g., firstlast1234@gmail.com);
- ▶ No contradictory information;
- ▶ Relevant, non-generic answers;
- ▶ Selected state of employment; and
- ▶ Consistent language across survey responses for open-ended questions.

It should be noted, however, that artificial intelligence and bots have become increasingly sophisticated. For these reasons, Heldrich Center researchers cannot guarantee that all responses are genuine. After removing fraudulent and invalid responses, the sample size of the original survey was 69. To expand the sample size and increase the response rate, the Heldrich Center contracted the Eagleton Center for Public Interest Polling to conduct the same survey.

This survey, conducted between June 29 and September 1, 2023, used the same original survey questions. The valid sample size of 281 individuals includes adults who are at least 18 years old and affiliated with the energy-efficiency sector as a student, trainee, worker, or business owner. When the original survey and the Eagleton Center for Public Interest Polling survey were combined, the total sample size of the survey became 350, whereby all invalid responses, including fraudulent responses, were removed.

The Eagleton Center for Public Interest Polling recruited respondents via email and/or postcard and encouraged them to share the survey with their networks. Those recruited for the survey received up to four email invitations to participate in the survey – an initial invitation and up to three reminders. The initial invitation noted that qualified respondents would receive a \$10 gift card upon survey completion. The first reminder included the same information.

After persistent recruitment issues, researchers instructed the Eagleton Center for Public Interest Polling to increase the incentive. The second reminder then noted that the incentive increased to \$25, with the third reminder promising \$30 incentives for qualified respondents. Each email included two attachments: one that provided sample language for forwarding the email to others and another that provided an overview of the survey itself. If an automatic response sent from a potential respondent included contact information for other employees working at their company, these additional contacts were added into the email sample frame. The initial email invitations to individual respondents included an incentive corresponding to when they were added into the sample frame. If the respondent was added into the sample frame during the \$30 incentive, their initiation email would note that amount upon survey completion. The Eagleton Center for Public Interest Polling conducted additional outreach by sending two rounds of postcards to eligible individuals. The initial postcard invitation to participate in the survey noted that qualified respondents would receive a \$10 gift card for completing the survey and the reminder noted the incentive was increased to \$30 for qualified survey completion.

This survey was fielded by the Eagleton Center for Public Interest Polling with a sample from Dynata. This sample was appended with additional information by L2. Additional samples were provided by the Heldrich Center. Elevation Printing Services printed and disseminated postcards inviting potential respondents to take the survey. The questionnaire was developed by the Heldrich Center, with assistance from the Eagleton Center for Public Interest Polling. The Eagleton Center for Public Interest Polling, a non-partisan academic center for the study of politics and the political process, is housed at the Eagleton Institute of Politics at Rutgers University. For more information, please contact poll@eagleton.rutgers.edu.

Labor Market and Job Posting Analyses

In addition to the survey and interviews, researchers conducted labor market and job posting data analyses of the energy-efficiency workforce in New Jersey. Assessing the labor market involved analyzing employment data between 2010 and 2021 from multiple data sources, including the New Jersey Department of Labor and Workforce Development, the New Jersey Council on the Green Economy, and Lightcast. By comparison, the job posting analysis included systematically examining descriptions extracted from LinkedIn and Indeed on more than 6,635 jobs in the energy-efficiency sector in New Jersey. The web-scraping process only captured job postings that were active and open in April and May 2023, with some job postings dating back at least six months. Analyzing the job descriptions provided a broader perspective on workforce demands, required experience, and upcoming opportunities within the sector.

Typology of Diversity, Equity, and Inclusion (DEI) Practices

Researchers developed a typology of DEI practices to categorize the various initiatives, mechanisms, and approaches that energy-efficiency employers discussed during data collection. The typology identifies and categorizes DEI practices to better document and measure employers' efforts. The five categories are: recruitment and hiring practices, training and development, inclusive workplace policies and practices, employee support and well-being, and supplier diversity (see Table B-1 in Appendix B for more information about each category).

Limitations

There were several limitations to this study. Researchers originally sought to conduct focus groups with community organizations, but persistent recruitment challenges and few participants in the focus groups required researchers to convert the focus groups to interviews. As such, researchers continued recruitment for interviews only. Another limitation is the lack of generalizability from the data collected. To increase the sample size of the survey and interviews, researchers conducted additional outreach via email and telephone to relevant stakeholders. The sample size represents a smaller portion of participants in relevant training programs and workers in the energy-efficiency and decarbonization sectors in New Jersey. Additionally, researchers were not able to secure many interviews with union stakeholders due to lack of response.

All surveys are subject to sampling error. This is expected given the difference between interviewing the entire population and scientific sampling drawn from that population. Sampling error should be adjusted to recognize the effect of any weighting performed on the data to better match the population. Sampling error does not consider other sources of variation inherent in public opinion studies, such as non-response, question wording, or contextual effects.

Due to the recruitment methods used to obtain survey responses (i.e., snowball sampling), the survey was at an increased risk of fraud by artificial intelligence and bots. While all responses believed to be fraudulent by following a set criterion were removed, due to the increasing sophistication level of artificial intelligence and bots, it is possible that the dataset may contain few artificially generated responses. In addition, the recruitment methods use non-probability sampling, specifically convenience sampling, introducing the possibility of sampling bias and limiting the generalizability of the findings to a broader population. It is likely respondents of the survey were generally on the higher end of the

education and income spectrum of the workforce overall due to the recruitment strategy and who is most likely to respond. Additionally, researchers did not include information about disadvantaged groups or underserved communities and regions in New Jersey as part of the survey.

Finally, small sample sizes limit researchers' ability to conduct quantitative analyses. Statistical significance is included in the report tables to highlight differences between groups. However, such calculations depend on having a sufficiently large sample size. Thus, in this study, some differences may not reach statistical significance, not because they are not real differences, but because the study's numbers are too small. In addition, given the important focus of equity in this study, and the likelihood that subgroups of interest have the smallest sample sizes, researchers' commitment lies in acknowledging and exploring meaningful patterns and trends, even if they did not achieve statistical significance due to the inherent limitations of small sample sizes. Thus, researchers do not focus on these in their discussion and advise caution in interpreting the results.



Appendix B: Additional Tables

Table B-1: Typology of Diversity, Equity, and Inclusion Practices

Category	Relevant Practices
Recruitment and Hiring Practices	<ul style="list-style-type: none"> ▶ Targeted Recruitment: Employers actively seek diverse candidates by implementing strategies to attract individuals from underrepresented groups. This can include partnering with diverse community organizations, attending job fairs focused on diverse populations, and leveraging inclusive language in job postings. ▶ Diverse Interview Panels: Employers ensure that interview panels consist of individuals from diverse backgrounds to reduce bias and promote inclusive hiring practices. ▶ Unbiased Selection Criteria: Employers review and revise their selection criteria to ensure they are fair and do not disproportionately exclude diverse candidates.
Training and Development	<ul style="list-style-type: none"> ▶ Diversity and Inclusion Training: Employers provide training programs for employees to raise awareness about biases, foster inclusive behaviors, and create a more inclusive work environment. ▶ Leadership Development: Employers offer targeted development opportunities, mentorship, and sponsorship programs to support the advancement of underrepresented employees into leadership roles. ▶ Cultural Competency Training: Employers provide training to enhance employees' understanding of different cultures, promoting a more inclusive and respectful workplace.

Table B-1: Typology of Diversity, Equity, and Inclusion Practices (continued)

Category	Relevant Practices
Inclusive Workplace Policies and Practices	<ul style="list-style-type: none"> <li data-bbox="680 296 1463 401">▶ Flexible Work Arrangements: Employers offer flexible work arrangements, such as remote work options or flexible schedules, to accommodate diverse employee needs and promote work-life balance. <li data-bbox="680 426 1463 562">▶ Employee Resource Groups: Employers establish employee resource groups or affinity networks that provide a supportive space for employees from underrepresented groups to connect, share experiences, and advocate for their needs. <li data-bbox="680 588 1463 766">▶ Pay Equity and Transparency: Employers conduct regular pay equity analyses to ensure fair and equitable compensation across diverse groups. They also promote transparency around pay structures and provide opportunities for employees to discuss and address pay-related concerns.
Employee Support and Well-being	<ul style="list-style-type: none"> <li data-bbox="680 791 1463 928">▶ Employee Assistance Programs: Employers provide access to resources and support services that address employees' physical, mental, and emotional well-being, considering the diverse needs of the workforce. <li data-bbox="680 953 1463 1098">▶ Inclusive Benefits and Family Support: Employers offer benefits packages that cater to diverse employee needs, including parental leave policies, childcare support, eldercare resources, and other family-friendly initiatives. <li data-bbox="680 1123 1463 1228">▶ Workplace Accommodations: Employers make reasonable accommodations for employees with disabilities, ensuring an accessible and inclusive work environment.
Supplier Diversity and Community Engagement	<ul style="list-style-type: none"> <li data-bbox="680 1253 1463 1398">▶ Data Collection and Analysis: Employers collect and analyze workforce data to measure diversity metrics, identify gaps, and track progress over time. They utilize these data to inform decision-making and identify areas for improvement. <li data-bbox="680 1423 1463 1600">▶ Accountability and Transparency: Employers set goals, establish accountability mechanisms, and publicly disclose their diversity, equity, and inclusion efforts, progress, and challenges. This fosters transparency and holds organizations accountable for their commitments.

Table B-2: Occupations by Total Jobs and Hires (2020-21)

Occupation	2020 Jobs	2021 Jobs	2020 Hires	2021 Hires
Construction	46,852	48,243	20,134	26,051
Plumbing	11,338	12,048	6,092	7,210
Insulation	734	797	937	541
Roofers	2,381	2,380	1,072	1,381
Engineering	17,678	17,761	6,450	5,923
Carpentry	23,066	23,420	9,391	12,653
Boilermakers	1,800	2,038	2,086	1,110
Heating, Ventilation, and Air Conditioning	10,507	10,390	4,118	5,731
Repairs	10,183	11,200	7,592	5,472
Electricians	19,111	20,823	12,844	13,536
Sheet Metal Workers	2,984	3,028	1,445	1,852
Masons	349	352	272	245
Glaziers	875	871	672	698
Solar	846	788	1,104	667
Sales	1,415	1,618	1,262	777

Table B-3: Sampling of Clean-Energy Workforce Programs and Initiatives in New Jersey

Initiative	Description	Focus Area
New Jersey Pathways to Career Opportunities	<ul style="list-style-type: none"> ▶ Collaboration between the New Jersey Community College Consortium for Workforce and Economic Development¹⁴ and the New Jersey Business and Industry Association ▶ Aims to foster partnerships among employers, industry associations, labor unions, educational institutions, and workforce development partners ▶ Provides career pathways for students and workers to explore new opportunities ▶ Ensures employers have access to a highly skilled workforce to meet labor market needs ▶ Focuses on key industry areas, including infrastructure and renewable energy (New Jersey Pathways to Career Opportunities, 2022) 	Career Pathway and Pipeline
Clean Energy Apprenticeship Program	<ul style="list-style-type: none"> ▶ Public-private partnership between Public Service Enterprise Group (PSEG) and Real World Academy ▶ Provides training for teenagers and adults in the clean-energy sector ▶ Aims to create approximately 3,200 direct jobs through the initiative of which 2,000 will be produced directly through PSEG's Clean Energy Jobs Program ▶ Focuses on developing a skilled workforce for the clean-energy industry (Schoeck, 2022) 	Career Pathway and Pipeline
New Jersey Scholarship and Transformative Education in Prisons "Prison-to-Prosperty Pipeline" Program	<ul style="list-style-type: none"> ▶ Through Real World Academy's partnership with the New Jersey Scholarship and Transformative Education in Prisons program, previously incarcerated individuals have also been included in the New Jersey Clean Energy Program (Schoeck, 2022) 	Career Pathway and Pipeline; Pipeline Equity; Diversity, Equity, and Inclusion

¹⁴ The New Jersey Community College Consortium for Workforce and Economic Development, comprising 18 community colleges, is committed to aligning curricula, strengthening partnerships, and fostering collaborations in key industries of New Jersey. For further information, please visit: <https://www.njcommunitycolleges.org/consortium/>.

Table B-3: Sampling of Clean-Energy Workforce Programs and Initiatives in New Jersey (continued)

Initiative	Description	Focus Area
Clean Energy Jobs Program Sponsored by PSE&G	<ul style="list-style-type: none"> ▶ Public-Private Partnership between Public Service Electric and Gas Company (PSE&G) and the New Jersey Department of Labor and Workforce Development (NJDOL) ▶ Created in response to the New Jersey Clean Energy Act ▶ Aims to fill an estimated 41,500 jobs in the energy-efficiency sector over the next eight years ▶ Designed to employ 2,000 individuals, with a focus on recruiting from underrepresented communities ▶ Supports the development of a skilled workforce in the clean-energy economy 	Recruitment and Retention; Diversity, Equity, and Inclusion
New Jersey Clean Energy Training Program (PSE&G Partnership Grant)	<ul style="list-style-type: none"> ▶ Collaboration between NJDOL and PSE&G ▶ Aims to create a skilled workforce for energy-efficiency projects in PSE&G's service areas and focuses on underserved communities ▶ NJDOL, PSE&G, and community-based organizations plan to recruit, train, and employ over 2,000 residents from PSE&G's service areas over the next three years ▶ Offers workforce readiness and financial literacy education ▶ Provides wraparound supportive services, job coaching, and job placement assistance to facilitate the successful transition from training to employment with PSE&G's contracted suppliers and employers ▶ Focuses on grants in the service areas of Camden, Elizabeth, Newark, New Brunswick, Paterson, and Trenton 	Career Pathway and Pipeline; Pipeline Equity

Table B-3: Sampling of Clean-Energy Workforce Programs and Initiatives in New Jersey (continued)

Initiative	Description	Focus Area
Clean Energy Employment and Training Program Grant	<ul style="list-style-type: none"> ▶ Developed by NJDOL ▶ Designed to recruit eligible participants from New Jersey's overburdened communities interested in clean-energy careers ▶ Supports employment and training services for participants, facilitating job placements in the clean-energy workforce ▶ Aims to assist overburdened communities and provide equal access to clean-energy resources and energy efficiency ▶ Offers core employment and training services, including workforce readiness, financial literacy instruction, and supportive services ▶ Provides intensive employment and training opportunities, such as occupational skills training and industry-recognized credentials ▶ Includes needs-based, on-the-job training placements to transition participants into sustainable, unsubsidized employment 	Recruitment and Retention; Diversity, Equity, and Inclusion
New Jersey Innovation Fellows	<ul style="list-style-type: none"> ▶ Provides support to aspiring entrepreneurs, with a focus on promoting diversity ▶ Offers income replacement grants to entrepreneurs during the two-year ideation and formation period of their businesses ▶ Provides initial grant funding security for entrepreneurs to pursue unique start-up ventures ▶ Approved teams receive a base award of \$200,000, with the total potential for the award being \$400,000 ▶ Open to eligible entrepreneurs in various industries, including clean energy and clean technology 	Career Pathway and Pipeline

Note: This table is not an exhaustive list but rather provides select examples of clean-energy workforce programs and initiatives in New Jersey.



Appendix C: Survey Topline

Q1. Are you currently employed?

N = 350

Missing = 0

Yes	319 (91%)
No	31 (9%)
Total Percent	100%

Q4. How did you find your job?

Ask if Q1 = Yes

N = 319

Missing = 0

Advertisement	52 (16%)
Community organization	13 (4%)
Education and training program	28 (9%)
Networking	95 (30%)
Job board	29 (9%)
Other	102 (32%)
Total Percent	100%

Q5. How familiar are you with energy efficiency?

N = 350

Missing = 0

Very familiar	226 (65%)
Somewhat familiar	102 (29%)
Not very familiar	17 (5%)
Not at all familiar	5 (1%)
Total Percent	100%

Q6. We define the energy-efficiency sector as covering both the production and installation of energy-saving products and the provision of services that reduce end-use energy consumption. Do you work in the energy-efficiency sector?

Ask if Q1 = Yes

N = 319

Missing = 0

Yes	272 (85%)
No	47 (15%)
Total Percent	100%

Q7. How familiar are you with decarbonization?

N = 350

Missing = 0

Very familiar	152 (43%)
Somewhat familiar	96 (27%)
Not very familiar	63 (18%)
Not at all familiar	39 (11%)
Total Percent	99%

Note: Does not total to 100% due to rounding.

Q8. We define decarbonization as the transition to more energy-efficient heating and cooling technologies to reduce carbon emissions. This can include weatherization, electrification, installing electric heat pumps, and adding solar. Do you work in a decarbonization-related job?

Ask if Q1 = Yes

N = 319

Missing = 0

Yes	236 (74%)
No	83 (26%)
Total Percent	100%

Q9. Overall, how satisfied or dissatisfied are you with your current job?

Ask if Q1 = Yes

N = 319

Missing = 0

Very satisfied	205 (64%)
Somewhat satisfied	85 (27%)
Neither satisfied nor dissatisfied	18 (6%)
Somewhat dissatisfied	7 (2%)
Very dissatisfied	4 (1%)
Total Percent	100%

Q10. How would you rate your hiring experience?

N = 319

Missing = 0

Excellent	162 (51%)
Good	92 (29%)
Average	59 (19%)
Poor	4 (1%)
Very poor	1 (>1%)
Total Percent	100%

Q13. Do you agree or disagree with the following statement: "I have opportunities for advancement or promotion at my current job"?

Ask if Q1 = Yes

N = 316

Missing = 3

Strongly agree	138 (44%)
Agree	73 (23%)
Neither agree nor disagree	73 (23%)
Disagree	22 (7%)
Strongly disagree	10 (3%)
Total Percent	100%

Q14a-n. Here are a few things that some people have experienced in their workplace. Have the following ever happened to you in your current job, in a previous job, or hasn't happened to you?

Ask if Q1 = Yes

a. Where I work, people are treated the same, regardless of their racial or ethnic background.

N = 307

Missing = 12

Current job	37 (12%)
Previous job	87 (28%)
Hasn't happened to me	183 (60%)
Total Percent	100%

b. Were denied a promotion.

N = 299

Missing = 20

Current job	13 (4%)
Previous job	79 (26%)
Hasn't happened to me	207 (69%)
Total Percent	99%

Note: Does not total to 100% due to rounding.

c. Earned less than a co-worker who was doing the same job.

N = 301
Missing = 18

Current job	29 (10%)
Previous job	96 (32%)
Hasn't happened to me	176 (58%)
Total Percent	100%

d. Had someone treat you as if you were less competent or valuable.

N = 307
Missing = 12

Current job	37 (12%)
Previous job	87 (28%)
Hasn't happened to me	183 (60%)
Total Percent	100%

e. Were passed over for the most important projects and assignments.

N = 303
Missing = 16

Current job	33 (11%)
Previous job	59 (19%)
Hasn't happened to me	211 (70%)
Total Percent	100%

f. Heard or read comments, insults, or slurs (directed at you) by a manager or supervisor.

N = 298
Missing = 21

Current job	10 (3%)
Previous job	47 (16%)
Hasn't happened to me	241 (81%)
Total Percent	100%

g. Heard or read comments, insults, or slurs (directed at you) by a co-worker.

N = 299

Missing = 20

Current job	20 (7%)
Previous job	48 (16%)
Hasn't happened to me	231 (77%)
Total Percent	100%

h. Heard or read comments, insults, or slurs (directed at a co-worker) by a manager or supervisor.

N = 302

Missing = 17

Current job	20 (7%)
Previous job	59 (19%)
Hasn't happened to me	223 (74%)
Total Percent	100%

i. Heard or read comments, insults, or slurs (directed at a co-worker) by another co-worker.

N = 301

Missing = 18

Current job	25 (8%)
Previous job	68 (23%)
Hasn't happened to me	208 (69%)
Total Percent	100%

j. Received a threat of physical violence.

N = 295

Missing = 24

Current job	4 (1%)
Previous job	22 (7%)
Hasn't happened to me	269 (91%)
Total Percent	99%

Note: Does not total to 100% due to rounding.

k. Were assigned tasks that were undesirable or unwanted by others.

N = 312

Missing = 7

Current job	55 (18%)
Previous job	93 (30%)
Hasn't happened to me	164 (52%)
Total Percent	100%

l. Were denied a raise.

N = 305

Missing = 14

Current job	25 (8%)
Previous job	78 (26%)
Hasn't happened to me	202 (66%)
Total Percent	100%

m. Received less advice, less feedback, or fewer opportunities for performance evaluation.

N = 301

Missing = 18

Current job	30 (10%)
Previous job	76 (25%)
Hasn't happened to me	195 (65%)
Total Percent	100%

n. Experienced slights about your language or appearance.

N = 299

Missing = 20

Current job	10 (3%)
Previous job	45 (15%)
Hasn't happened to me	244 (82%)
Total Percent	100%

Q15a-c. Please indicate how much you agree or disagree with the following statements about your workplace.

Ask if Q1 = Yes

a. Where I work, people are treated the same, regardless of their racial or ethnic background.

N = 319

Missing = 0

Strongly agree	124 (39%)
Agree	67 (21%)
Somewhat agree	19 (6%)
Neither agree nor disagree	80 (25%)
Somewhat disagree	5 (1%)
Disagree	25 (8%)
Strongly disagree	0 (0%)
Total Percent	100%

b. Where I work, people of different races and ethnicities get along well with each other.

N = 302

Missing = 17

Strongly agree	128 (42%)
Agree	65 (22%)
Somewhat agree	19 (6%)
Neither agree nor disagree	81 (27%)
Somewhat disagree	5 (2%)
Disagree	0 (0%)
Strongly disagree	4 (1%)
Total Percent	100%

c. Where I work, managers/supervisors work well with employees of different ethnic backgrounds.

Strongly agree	128 (42%)
Agree	67 (22%)
Somewhat agree	14 (5%)
Neither agree nor disagree	85 (28%)
Somewhat disagree	3 (1%)
Disagree	1 (>1%)
Strongly disagree	4 (1%)
Total Percent	100%

Q16. Did you participate in any education and training programs after high school?

N = 345

Missing = 5

Yes	203 (59%)
No	142 (41%)
Total Percent	100%

Q18. Was that training program related to energy efficiency or decarbonization?

Ask if Q16 = Yes

N = 201

Missing = 2

Yes, energy efficiency	56 (28%)
Yes, decarbonization	3 (1%)
Yes, both	72 (36%)
Neither	63 (31%)
Unsure	7 (3%)
Total Percent	99%

Note: Does not total to 100% due to rounding.

Q19. Who offered the education and training program(s) that you participated in?

Ask if Q16 - Yes

Check all that apply.

Selected Choice - Employer/Community Organization/Trade Association/Union/Other

N = 200

Missing = 3

Employer	92 (46%)
Community organization	35 (18%)
Trade association	68 (34%)
Union	9 (5%)
Other, specify	71 (36%)

Q20. How did you find out about the education or training program?

Check all that apply.

Selected Choice - Online/Employer/Community College/Community Organization/ Advertisement/ Friend, Family/Other

Ask if Q16 = Yes

N = 198

Missing = 5

Online	61 (31%)
Employer	74 (37%)
Community college	23 (12%)
Community organization	17 (8.5%)
Advertisement	27 (14%)
Friend/Family	33 (17%)
Other, specify	30 (15%)

Q21. How would you rate your experience in your education or training program?

Ask if Q16 = Yes

N = 200

Missing = 3

Very satisfied	93 (46%)
Somewhat satisfied	80 (40%)
Neither satisfied nor dissatisfied	22 (11%)
Somewhat dissatisfied	3 (2%)
Very dissatisfied	2 (1%)
Total Percent	100%

Q24. Did you experience any barriers to participating in the education or training program? These may include cost, child care, or transportation.

N = 199

Missing = 4

Yes	37 (19%)
No	162 (81%)
Total Percent	100%

Q27. What is your race? Select all that apply.

N = 32

Note: 12 respondents (4%) identify as two or more races.

Missing = 21

American Indian or Alaska Native	5 (1.5%)
Asian	45 (14%)
Black or African American	41 (12%)
Native Hawaiian or Pacific Islander	2 (>0%)
Other	18 (5%)
Prefer not to say	23 (7%)
White	212 (64%)

28. What is your ethnicity?

N = 335

Missing = 15

Hispanic	34 (10%)
Non-Hispanic	264 (79%)
Prefer not to say	37 (11%)
Total Percent	100%

Q29. What is your gender identity?

N = 331

Missing = 19

Woman	65 (20%)
Man	239 (72%)
Prefer to self-disclose	6 (2%)
Prefer not to say	21 (6%)
Total Percent	100%

Q30. What is your age?

18 to 19	16 (5%)
20 to 24	24 (7%)
25 to 34	56 (17%)
35 to 44	58 (17%)
45 to 54	66 (20%)
55 to 64	76 (23%)
65+	41 (12%)
Total Percent	101%

Note: Does not total to 100% due to rounding.

Q31. What is your highest level of education?

N = 332

Missing = 13

Less than a high school diploma	3 (1%)
High school diploma	51 (15%)
GED or alternative credential	7 (2%)
Some college	72 (22%)
Associate degree	29 (9%)
Bachelor's degree	108 (32%)
Graduate degree (Master's, Ph.D., JD, etc.)	62 (19%)
Total Percent	100%

Q32. Have you ever served on active duty in the U.S. Armed Forces, Military Reserves, or National Guard?

N = 331

Missing = 19

Yes	13 (4%)
No	318 (96%)
Prefer not to say	0 (0%)
Total Percent	100%

Q33. Do you have one or more of the following disabilities?

Deafness or serious difficulty hearing; blindness or a serious difficulty seeing even when wearing glasses; and physical, mental, or emotional condition(s) such as difficulty concentrating, remembering or making decisions, serious difficulty walking or climbing stairs, difficulty dressing or bathing, difficulty doing errands alone such as visiting a doctor's office, or shopping.

N = 327

Missing = 23

Yes	21 (6%)
No	282 (86%)
Prefer not to say	24 (7%)
Total Percent	99%

Note: Does not total to 100% due to rounding.



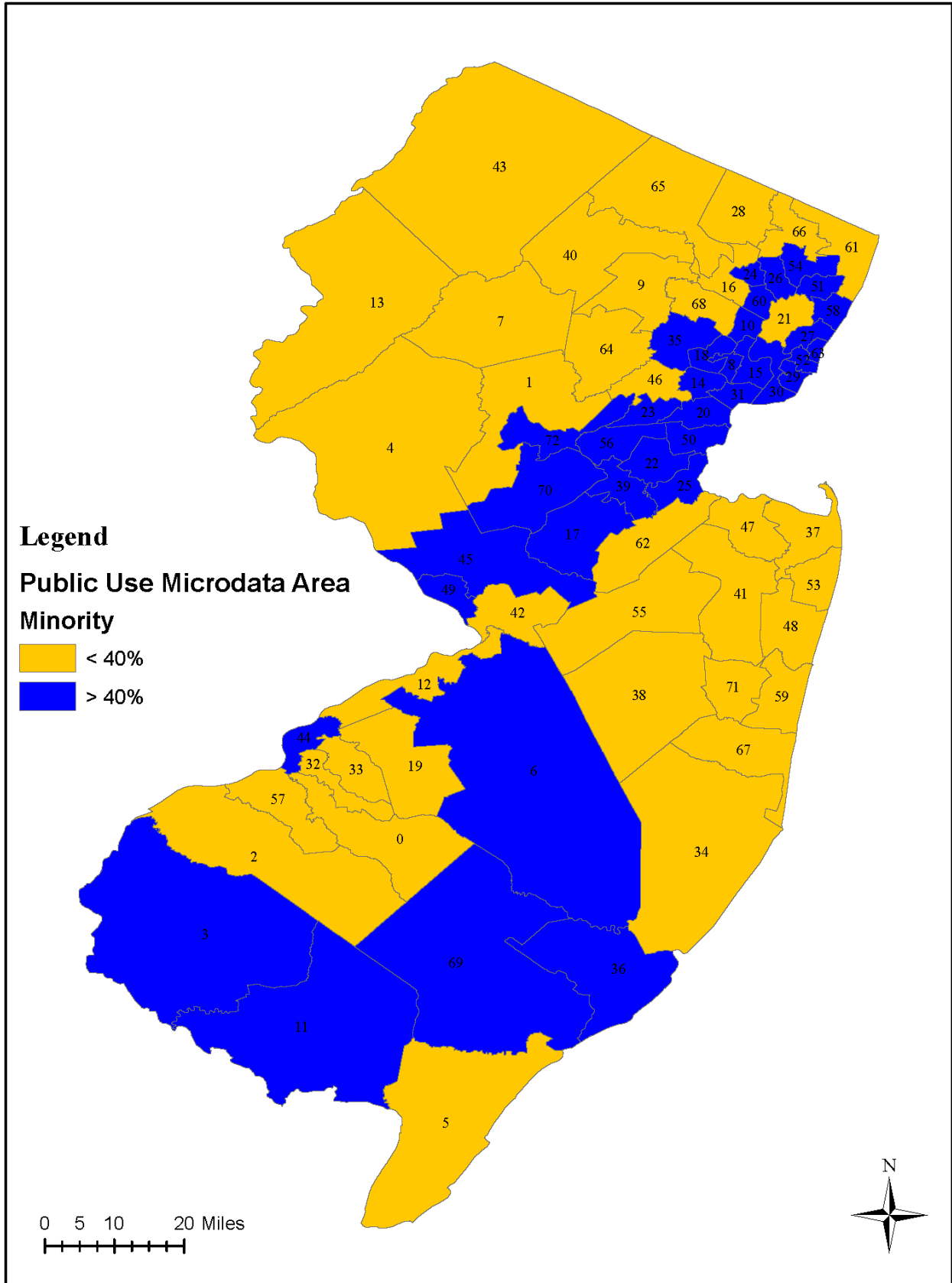
Appendix D: Phase I Deliverables

- ▶ *Literature Review of the Energy Efficiency Sector and Workforce*
- ▶ *National Scan of Decarbonization Initiatives*
- ▶ *Equity in New Jersey's Energy Efficiency Occupations: A PUMA-level Examination* (readers should note that the maps in this deliverable were created to be viewed visually and may be challenging for individuals with visual impairments)

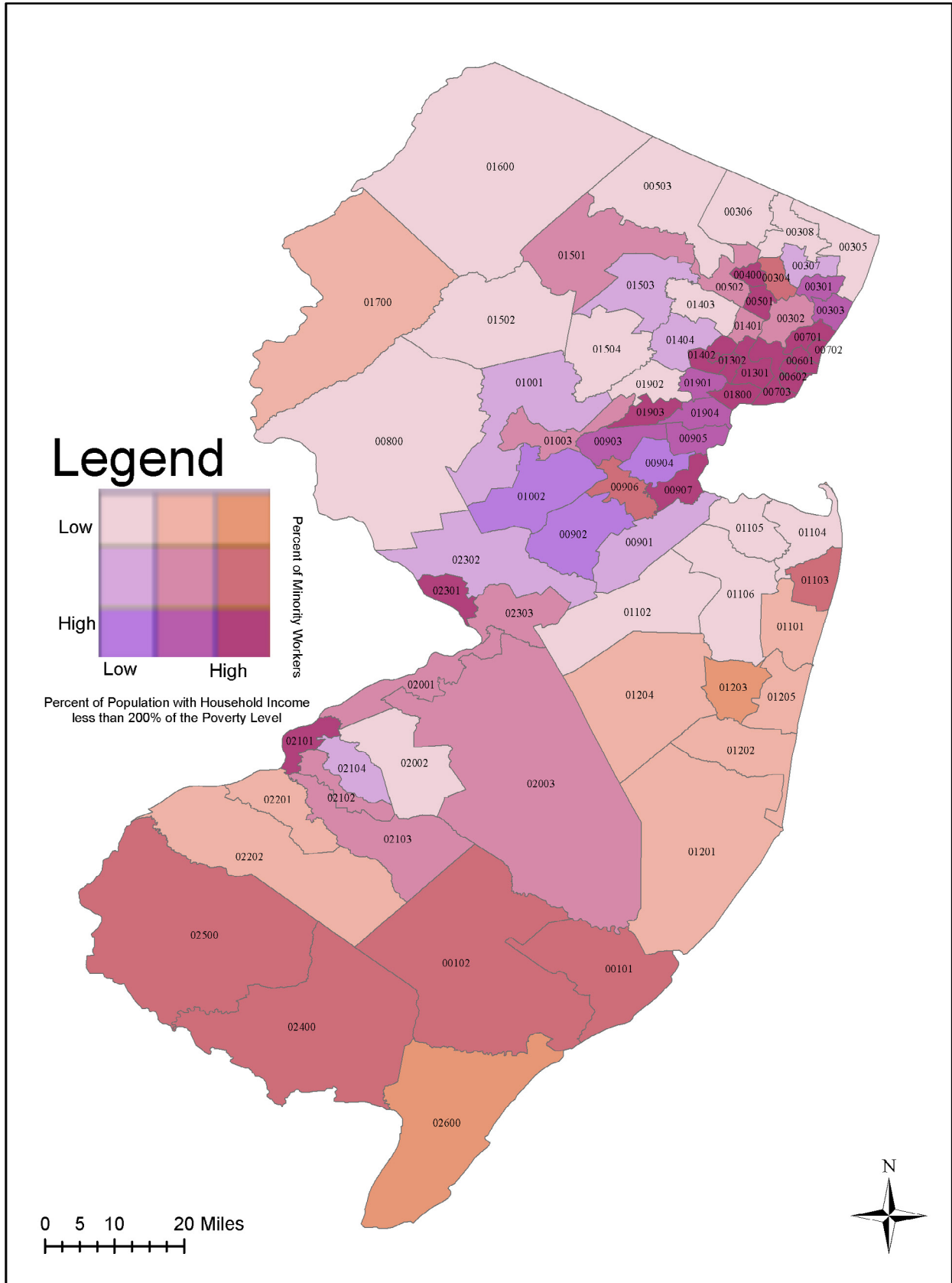


Appendix E: Additional Maps

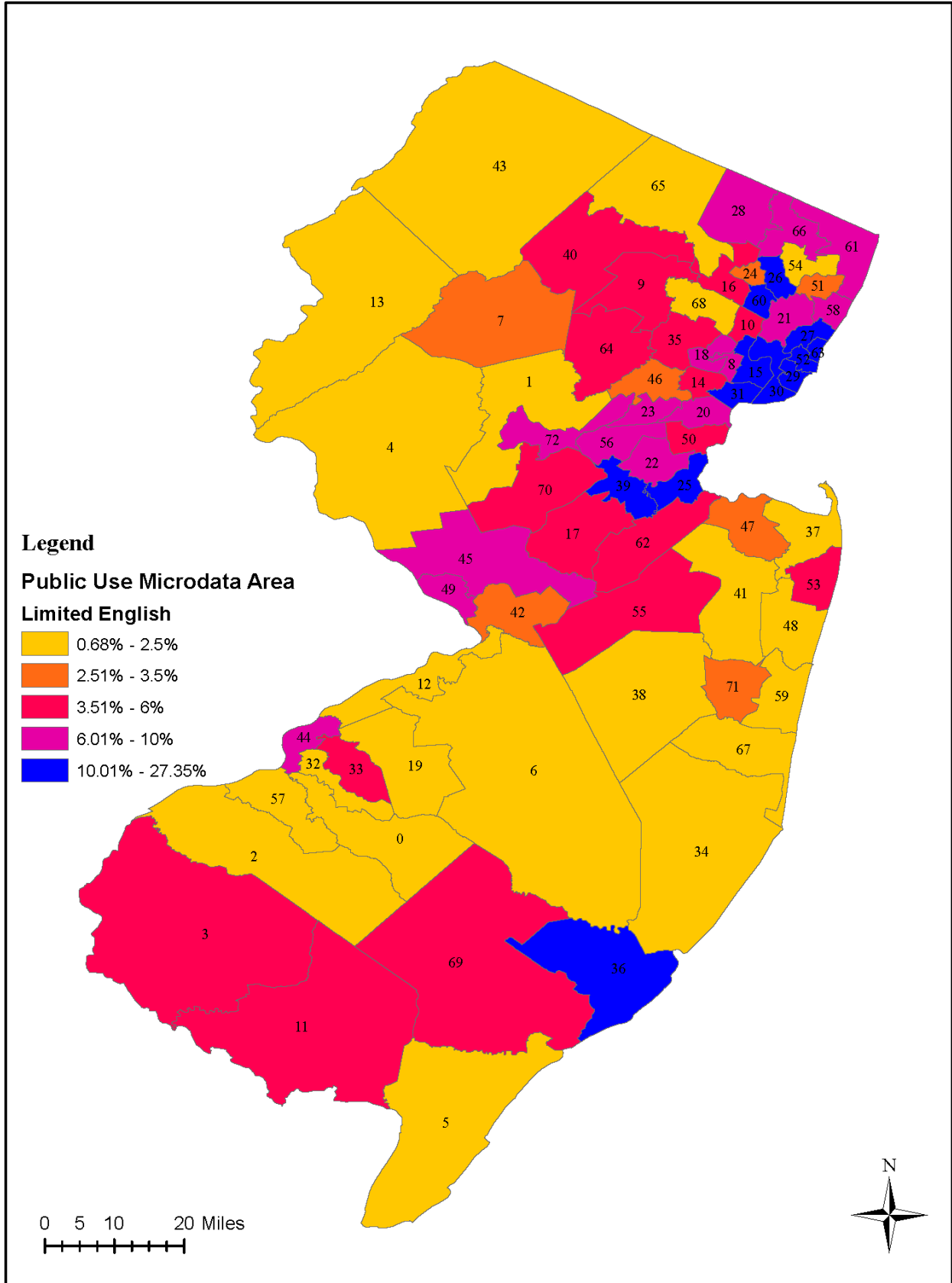
Map of New Jersey, Overburdened Community Minority



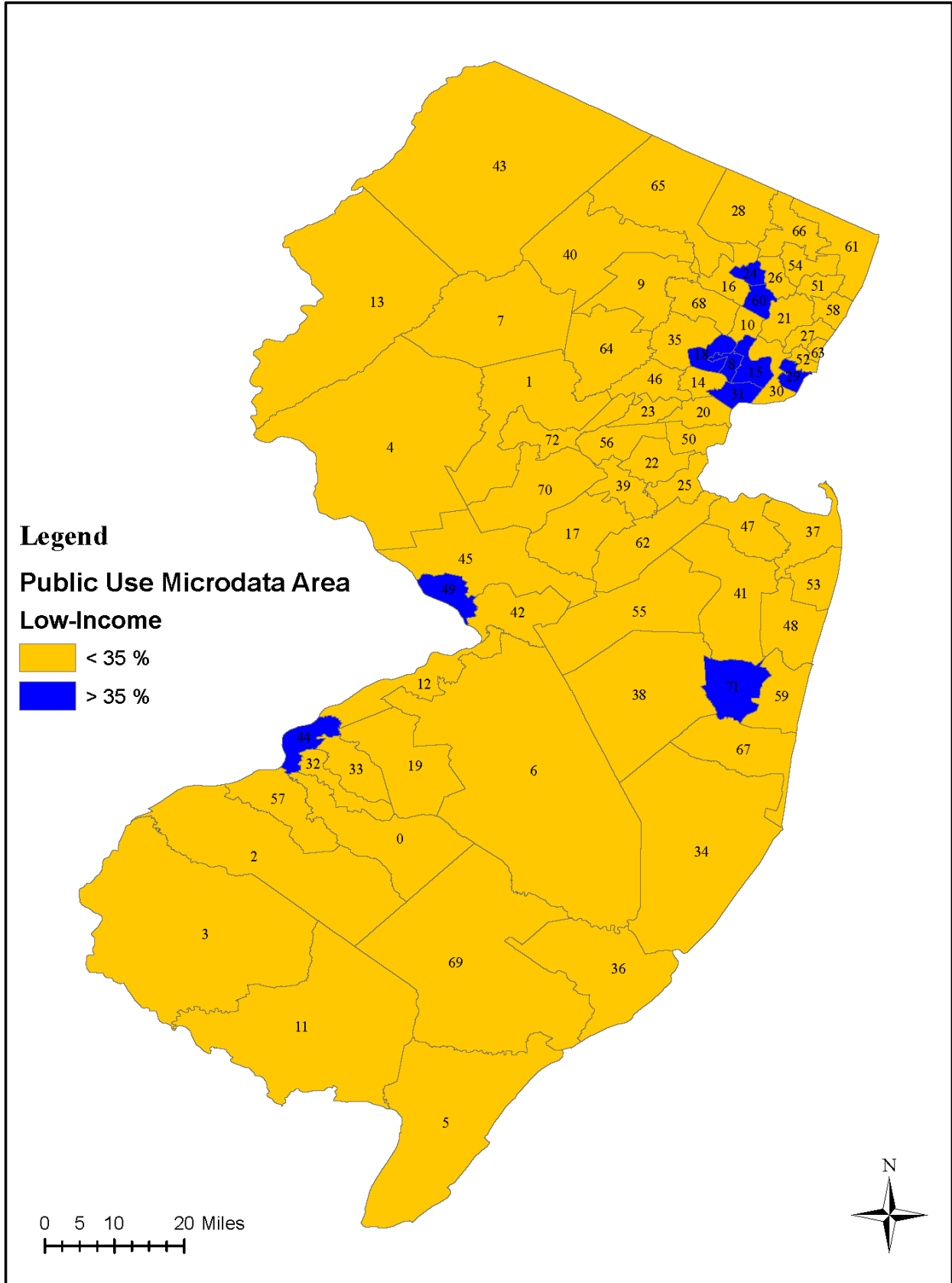
Map of New Jersey, Bivariate Minority and Limited Income



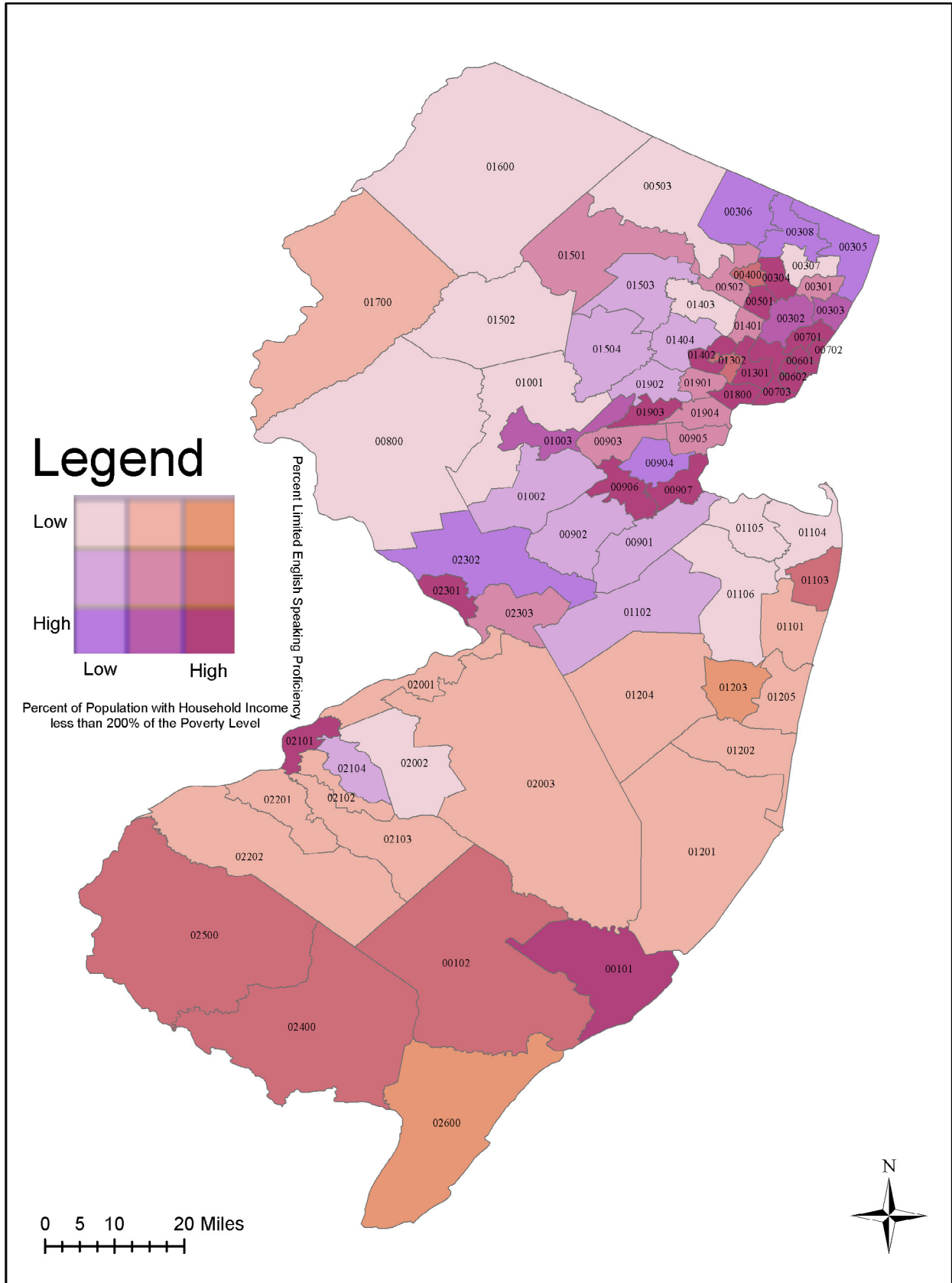
Map of New Jersey, Overburdened Community, Limited English



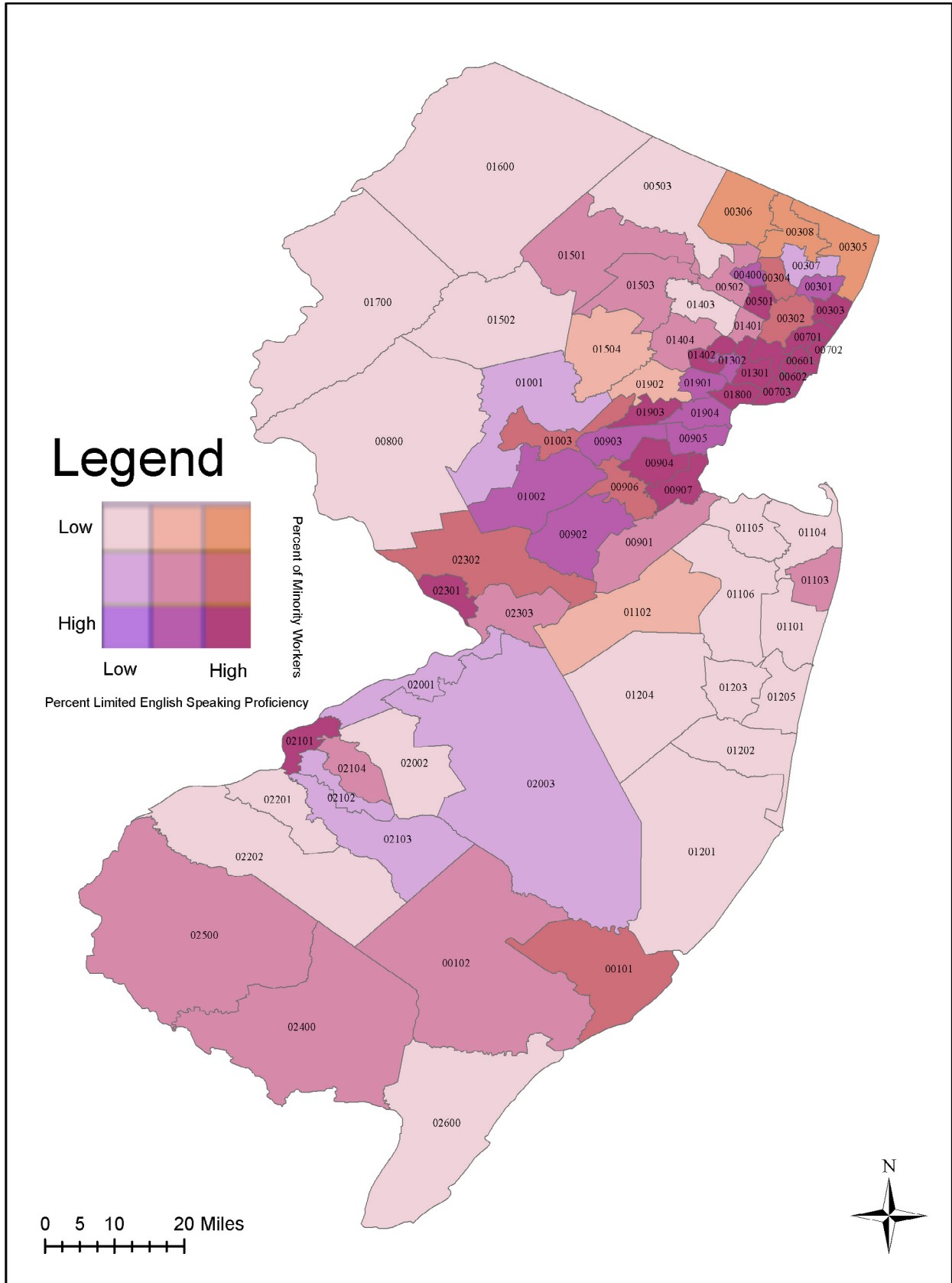
Map of New Jersey, Overburdened Community, Low Income



Map of New Jersey, Bivariate Limited English and Limited Income



Map of New Jersey, Bivariate Minority and Limited English





Appendix F: Glossary of Terms

Decarbonization involves broadly reducing the intensity of carbon emissions through electrification by replacing fossil fuel with renewable energy sources, such as solar, wind, hydro, and geothermal (Cohn & Wang Esram, 2022).

Disadvantaged groups/communities, as defined by the U.S. Department of Energy, are groups or communities that are marginalized, underserved, and overburdened by pollution. According to the Climate and Economic Justice Screening Tool, disadvantaged communities are those that live in areas that experience and meet set threshold burdens falling into the categories of climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development, or are on land within the boundaries of Federally Recognized Tribes (Office of Energy Justice and Equity, n.d.).

Employer incentive mechanisms, such as certifications, enhanced business prospects, or tax rebates, help employers achieve certain goals like diversification.

The **energy-efficiency sector** encompasses industries, such as construction, manufacturing, professional and business services, wholesale trade, and other services. Each industry includes numerous occupations.

Energy equity is the fair distribution of benefits from transitioning to clean energy – especially employment opportunities – to disadvantaged groups and historically underserved communities.

Job pathways are documented series of education and training steps toward industry-recognized credentials and skills to help job seekers prepare for and connect to jobs.

Overburdened communities, as defined by the U.S. Environmental Protection Agency (2023), are “minority, low-income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. The increased vulnerability may be attributable to an accumulation of negative and lack of positive environmental, health, economic, or social conditions within these populations or communities.”

Public-private partnerships are agreements between public-serving state or federal agencies and private organizations to address workforce gaps in an effective way throughout the entire project life cycle.

Underserved communities refer to communities that have environmental justice concerns and/or vulnerable populations such as low-income, rural, tribal, indigenous, and homeless populations (U.S. Environmental Protection Agency, 2019).



Appendix G: References

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About the Heldrich Center

The **Heldrich Center for Workforce Development** at Rutgers University is devoted to transforming the workforce development system at the local, state, and federal levels. The center, located within the Bloustein School of Planning and Public Policy, provides an independent source of analysis for reform and innovation in policymaking and employs cutting-edge research and evaluation methods to identify best practices in workforce development, education, and employment policy. It is also engaged in significant partnerships with the private sector, workforce organizations, and educational institutions to design effective education and training programs. It is deeply committed to assisting job seekers and workers attain the information, education, and skills training they need to move up the economic ladder.

As captured in its slogan, “Solutions at Work,” the Heldrich Center is guided by a commitment to translate the strongest research and analysis into practices and programs that companies, community-based organizations, philanthropy, and government officials can use to strengthen their workforce and workforce readiness programs, create jobs, and remain competitive. The center’s work strives to build an efficient labor market that matches workers’ skills and knowledge with the evolving demands of employers.

About the Center for Urban Policy Research - The Built Environment and Green Building Group

The Rutgers University Center for Urban Policy Research (CUPR) at the Edward J. Bloustein School of Planning and Public Policy is recognized nationally for its research on the most critical issues facing communities today. With a staff strength of 25 and growing, the **Built Environment and Green Building Group**, formerly Rutgers Center for Green Building, promotes green building and healthy communities through research, education and training, and partnerships with industry, government, and not-for-profit organizations.

CUPR works to make human settlements more equitable, sustainable, resilient, and healthy through research, public engagement, education, and other forms of capacity building. CUPR is an umbrella center that combines the former Bloustein standalone CUPR with the former Rutgers Center for Green Building, Environmental Analysis and Communication Group, Center for Energy Environmental and Economic Policy, and Bloustein Center for Local Government Research.