New York State Energy Research and Development Authority

Making the Right Connections: Ways to Improve Workforce Training to Better Meet Employer Needs in the Green Jobs-Green New York Program

Final Report

August 2013

No. 13-17

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Our Vision: Serve as a catalyst—advancing energy innovation and technology, transforming New York's economy, empowering people to choose clean and efficient energy as part of their everyday lives.

Our Core Values: Objectivity, integrity, public service, partnership and innovation.

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MAKING THE RIGHT CONNECTIONS: WAYS TO IMPROVE WORKFORCE TRAINING TO BETTER MEET EMPLOYER NEEDS IN THE GREEN JOBS–GREEN NEW YORK PROGRAM

Final Report

Prepared for
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SUMMARY

Making The Right Connections: Ways To Improve Workforce Training To Better Meet Employer Needs In The Green Jobs–Green New York Program

A New Report by Researchers led by the Pace Energy and Climate Center for the New York State Energy Research and Development Authority (NYSERDA)

NEW YORK is among the leading states in the green economy.[1] New York can strengthen its position by working with training providers to improve worker training and better match the needs of employers, enhance access to training for workers who are unable to pay, and better connect trained workers with employers who need them. Accomplishing these goals will require better connections between employers and training providers to ensure that training imparts skills that employers need. The findings of new research, summarized here, helps point the way.

There are gaps between the skills that clean energy employers operating in the Green Jobs—Green New York (GJGNY) program need and the skills possessed by jobseekers.[2] Filling these gaps should help make New York an even stronger engine for the green economy. This summary describes the key findings of this research along with a brief set of concrete action items to facilitate growth of the green economy through workforce readiness.

Employers surveyed overwhelmingly reported problems hiring adequately skilled workers (Figure S-1). A large majority of employers (86%) report that training programs are available in their region of the state. Employers also report using a wide array of methods to attract skilled workers.

If training is available to the vast majority of employers and there is reason to believe employers are looking in the right places for skilled workers, then why are employers having difficulty finding adequately trained workers? What are employers looking for in new hires?

When asked what qualities they seek in new employees, more than 90 percent of all employers said they prize interpersonal skills in new hires, reflecting the need for these workers to interact directly with home and business owners, and also perhaps learn on the job (Figure S-2).

The other four key qualities can be seen as a proxy for good training—experience or on-the-job training (81%), formal training (67%), education (57%) and certifications (57%). Not surprisingly, for employers working in multilingual settings, language abilities are important (33%).

KEY TAKEAWAYS FROM THIS RESEARCH

- New York State should continue to support clean energy worker training so that employers can grow their businesses and drive growth of the green economy.
- The cost of training keeps some would-be workers out of training classes and contributes to an undersupply of well-trained workers. New York should consider ways to reduce this cost to increase access by the disadvantaged, underemployed and unemployed in the State—a key goal of the Green Jobs-Green New York Act of 2009.
- Apprenticeships and on-the-job training programs that lower the cost of training workers would make it more likely for employers to invest in untrained or undertrained workers.
- Communication between employers and training providers is essential and must be improved. Training providers need to hear what employers need from new hires, and better connect employers to newly-trained workers.
- A more integrated network among employers, job-seekers, training providers and consituency-based organizations will result in better trained workers landing jobs with employers who need them. Such a network would also make apprenticeships and on-the-job training programs easier to manage.
- State program planners at NYSERDA and the Department of Labor should develop mechanisms for regular communication among the clean energy jobs community to provide ongoing training improvement and stronger opportunities for new entrants to transition into clean energy jobs.

Where do employers hear about training? Most hear from NYSERDA directly (76%), others from training websites and web-based advertisements (38%) or by word-of-mouth (24%).

When asked what training-related problems prevent them from hiring new workers or retaining existing workers, employers once again emphasized the lack of soft skills (85%; Figure S-3). Other "deal breakers" according to at least half of the employers responding include a lack of hands-on experience (65%), sufficient reading and writing skills (60%), ability to stay up-to-date on changing regulations (55%) and oral language skills (50%). Cost of training also prevents hires and retention of untrained workers (50%). Some employers (30%) indicated that the availability of "appropriate" training is a barrier to hiring or retaining employees even though the vast majority (86%) indicated that some kind of training is available in their region. What training did employers wish were available but is not?

When asked what specific types of training they wish they could find for their workers, more than half of the employers surveyed indicated training on energy-specific finance (67%) is needed (Figure S-4). A review of current training curricula revealed a general lack of courses to train workers on ways property owners can finance energy efficiency measures and also a lack of on-the-job training. In New York, many options for financing exist, including on-bill cost recovery, NYSERDA loan products and private loan products.

FIGURE S-1

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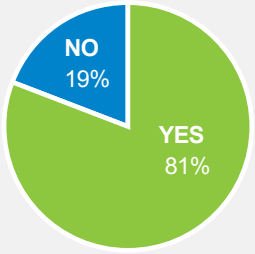


FIGURE S-2

Employers, what are the most important qualities that lead to hiring an employee?

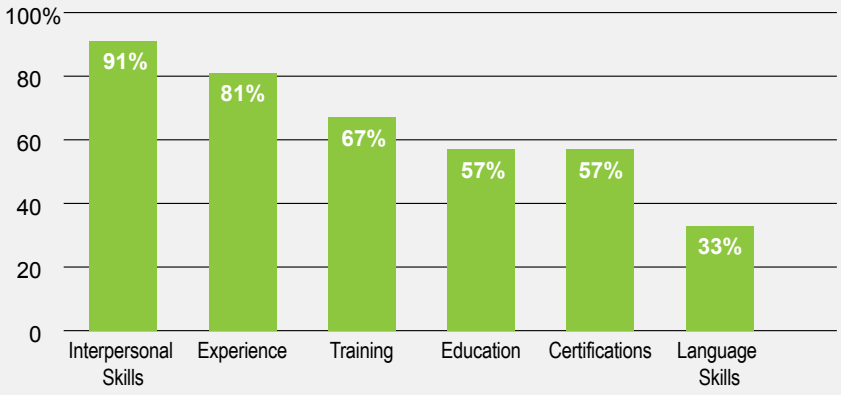
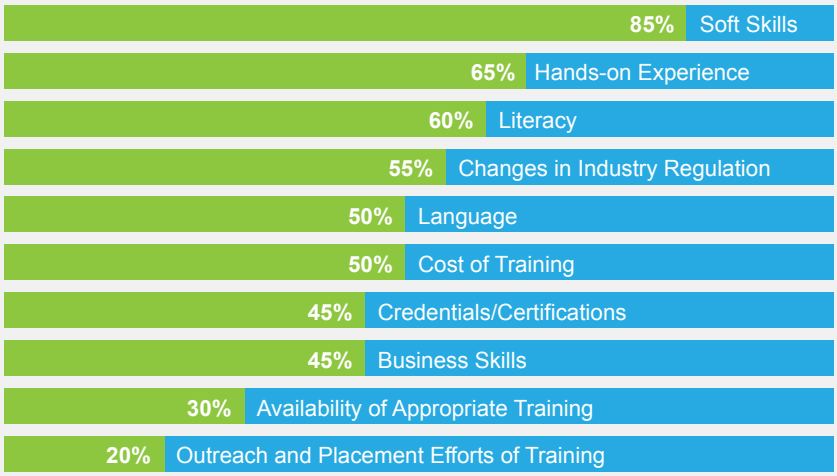


FIGURE S-3

Employers, do any of the following training-related issues prevent you from hiring or retaining employees?



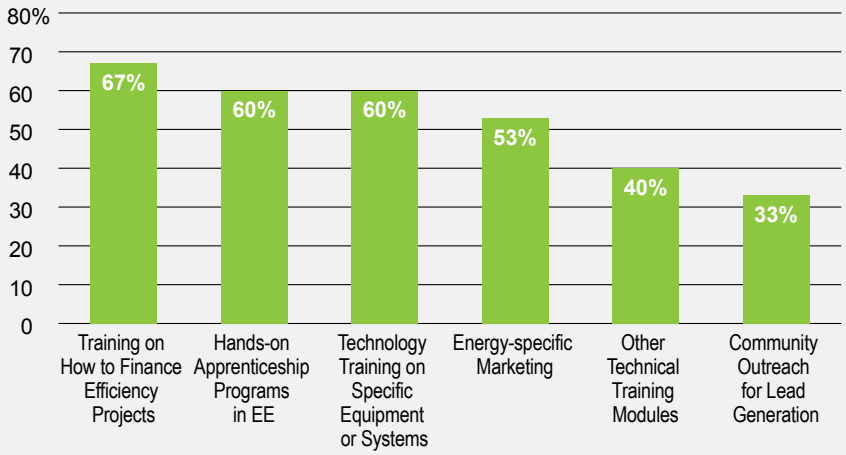
Aside from how to finance projects, employers would like to see hands-on apprenticeships (60%) and technology training on specific equipment or systems (60%; Figure S-4). Others indicated a need for energy-specific marketing (53%). These answers reflect the multi-faceted nature of these clean energy jobs, where a contractor must, for example, conduct an energy audit and identify potential improvements, and then counsel decision makers on what fits their property best and how to finance the work.

When asked which training formats work best for them, all employers (100%) indicated that in-house, on-the-job training is their preferred training method, while a smaller number also chose classroom training (45%) and formal in-house training through a provider (25%). These training preferences are consistent with the 50% of employers indicating cost of training is a barrier to hiring untrained workers (Figure S-4). While 86% of employers surveyed said energy-related training is available in their region of the State, just over half (52%) of the employers indicated that training programs do not adequately prepare workers for jobs with them (Figure S-5).

If more than half of employers surveyed feel training is inadequate, how are training programs designed? Are employers' needs taken into account? When training providers were asked how they develop their course offerings, a large majority (85%) said they consult with contractors (Figure S-6). Other important factors in deciding on courses include institutional decision-making (80%), NYSERDA program requirements (75%),[3] what other training providers offer (70%) and what students demand (70%).

FIGURE S-4

Employers, what types of training do you wish were available but have been unable to find?



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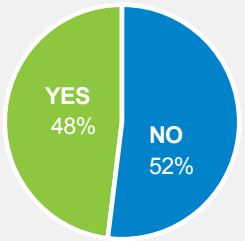
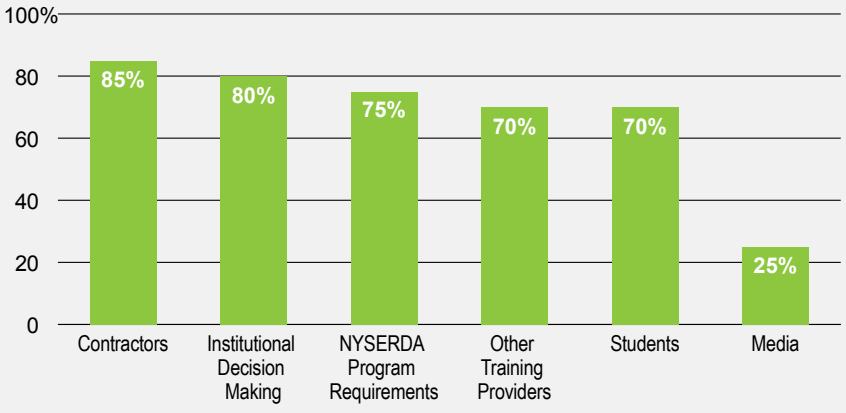


FIGURE S-6

Training providers, how do you decide what training programs and/or courses to offer?



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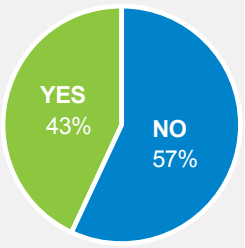
Employers, do you communicate with training providers about the training you think workers need?



Although training providers overwhelmingly stated that they consult contractors in deciding what courses to offer, the fact that the resulting training programs satisfy less than half of the surveyed employers (48%) suggests some failure in communication (Figure S-5). Training providers and employers do not communicate enough to give training providers a full sense of employer needs. Additional survey results bear this out, as the majority of employers (57%) surveyed responded that they do not communicate with training providers about the skills they need to see in workers (Figure S-7). This could also mean that adequate training may not be possible solely through classroom teaching. It may be that course offerings must move in the direction of more on-the-job training and hands-on training.

This communication problem extends to connecting jobseekers with employers. Nearly two-thirds of employers (65%) report a lack of connection between training providers and employers when it comes to connecting potential new hires to employers. Communication between employers and training providers must be improved if training providers are to offer the right courses, teach the skills needed by employers, and connect employers to the newly trained.

Improved communication, however, will not be enough. Cost plays a big role in whether training providers are used by employers and whether would-be workers seek training in the first place. Indeed, half of the employers surveyed said the cost of training prevents them from hiring and retaining workers that need training (Figure S-4). When training providers were asked what prevents students from seeking training, a large majority (80%) reported cost as a principal barrier. Thus, the cost issue must also be addressed if the gaps between employer needs and training are to be closed.

This report was prepared by Pace Energy and Climate Center for the New York State Energy Research and Development Authority (NYSERDA). The opinions expressed do not necessarily reflect those of NYSERDA or the State of New York, and references do not constitute an implied or expressed recommendation or endorsement.

ENDNOTES

1. Muro, Mark, Jonathan Rothwell, and Devashree Saha. "Sizing the Clean Economy: A National and Regional Green Jobs Assessment," Brookings Institution, 2011, at pp. 25-26, http://www.brookings.edu/~/media/Series/resources/0713_clean_economy.pdf. As the Brookings authors recognize, defining the terms "green" and "clean" is important and difficult given the varied use of the terms in the literature and public discourse. The Brookings authors chose a definition of "green economy" that is broadly defined to include economic activities well outside the scope of the GJGNY programs focused on in this report.
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3. As a State authority, NYSERDA takes stakeholder input into account in deciding on its requirements, including input from employers and training providers.

For more detailed findings from this research, please consult the full report on NYSERDA's website, **www.nyserda.ny.gov**

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Abstract

Employers working in the Green Jobs-Green New York (GJGNY) Program report difficulty finding adequately trained workers. This study aims to better understand employer needs and the gaps that exist between employer needs and worker training. Through research, data analysis, new surveys and focus groups, the research team determined that employers seek workers with both general and green-job-specific skills. Employers prefer on-the-job training—an instructional method not much used across training providers surveyed. Communication between employers and training providers has been inadequate to ensure training courses adequately train workers to meet employer needs. An employer needs assessment was conducted to determine what skills, occupations and training are required by employers throughout the state. Through focus groups and a telephone survey with industry and educational professionals and stakeholders, including trade unions and constituency-based organizations, additional information was assembled about employer needs as they relate to GJGNY. Through data collection and analysis, the research team identified gaps in the state's workforce training infrastructure, and developed recommendations to provide decision makers with targets for improvement.

Keywords

Contractor/Employer

Energy efficiency

Focus groups

Green Jobs-Green New York

Renewable energy

Solar thermal energy

Training provider

Workforce training

Acknowledgements

The research team thanks NYSERDA for supporting this important work to better understand the needs of GJGNY employers and the gaps in training workers for these green jobs. In particular, the research team expresses its sincere thanks and appreciation to **Rebecca Sterling**, NYSERDA project manager, for valuable guidance, insightful suggestions, meaningful direction, thoughtful comments and overall support throughout the term of the project. The research team also recognizes with gratitude the time and effort given to this project by **focus group attendees** and **survey participants**. Without their opinions, observations and assessments, we would not have been able to assemble the material presented in this report. The research team also acknowledges the guidance and review provided by the **project reviewers and advisors**, including Tina Carton at the Conservation Services Group; Lesley Hirsch and Ronnie Kauder at the Center for Urban Planning at the City University of New York Graduate Center; Susan Andrews, Adele Ferranti and Karen Hamilton at NYSERDA, Kevin Hannel and Frank Surdney at the New York Department of Labor, and Thomas Sahagian, an independent industry expert.

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Summary

New York is among the leading states in the green economy.[1] New York can strengthen its position by working with training providers to improve worker training and better match the needs of employers, enhance access to training for workers who are unable to pay, and better connect trained workers with employers who need them. Accomplishing these goals will require better connections between employers and training providers to ensure that training imparts skills that employers need. This report helps point the way.

There are gaps between the skills that clean energy employers operating in the GJGNY program need and the skills possessed by jobseekers.[2] Filling these gaps should help make New York an even stronger engine for the green economy. This summary describes the key findings of this research along with a brief set of concrete action items to facilitate growth of the green economy through workforce readiness. More detailed findings are set out in the main body of the report.

Employers surveyed overwhelmingly reported problems hiring adequately skilled workers (Figure S-1). A large majority of employers (86%) report that training programs are available in their region of the state. Employers also report using a wide array of methods to attract skilled workers.

KEY TAKEAWAYS FROM THIS RESEARCH

- New York State should continue to support clean energy worker training so that employers can grow their businesses and drive growth of the green economy.
- The cost of training keeps some would-be workers out of training classes and contributes to an undersupply of well-trained workers. New York should consider ways to reduce this cost to increase access by the disadvantaged, underemployed and unemployed in the State—a key goal of the Green Jobs-Green New York Act of 2009.
- Apprenticeships and on-the-job training programs that lower the cost of training workers would make it more likely for employers to invest in untrained or undertrained workers.
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- State program planners at NYSERDA and the Department of Labor should develop mechanisms for regular communication among the green jobs community to provide ongoing training improvement and stronger opportunities for new entrants to transition into clean energy jobs.

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[2] For purposes of this report, "clean energy jobs" means jobs that implement GJGNY programs. In enacting GJGNY , the New York State Legislature was focused on making buildings more efficient. Specifically, GJGNY targets buildings used by small businesses, not-for-profit corporations, single families and multiple families.

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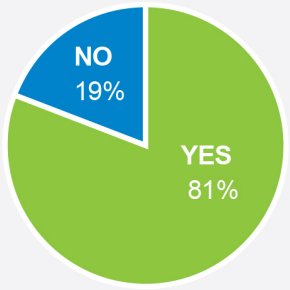

If training is available to the vast majority of employers and there is reason to believe employers are looking in the right places for skilled workers, then why are employers having difficulty finding adequately trained workers? What are employers looking for in new hires?

When asked what qualities they seek in new employees, more than 90 percent of all employers said they prize interpersonal skills in new hires, reflecting the need for these workers to interact directly with home and business owners, and also perhaps learn on the job (Figure S-2).

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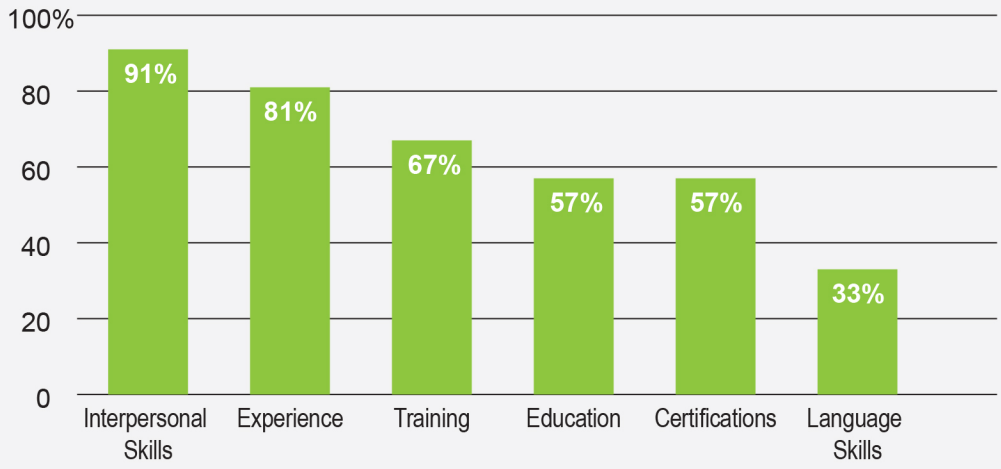

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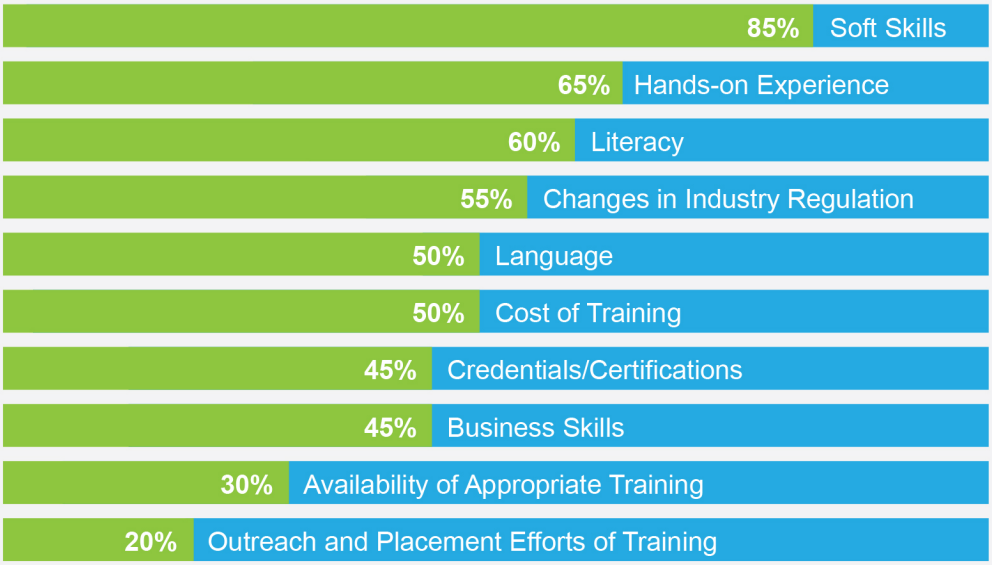

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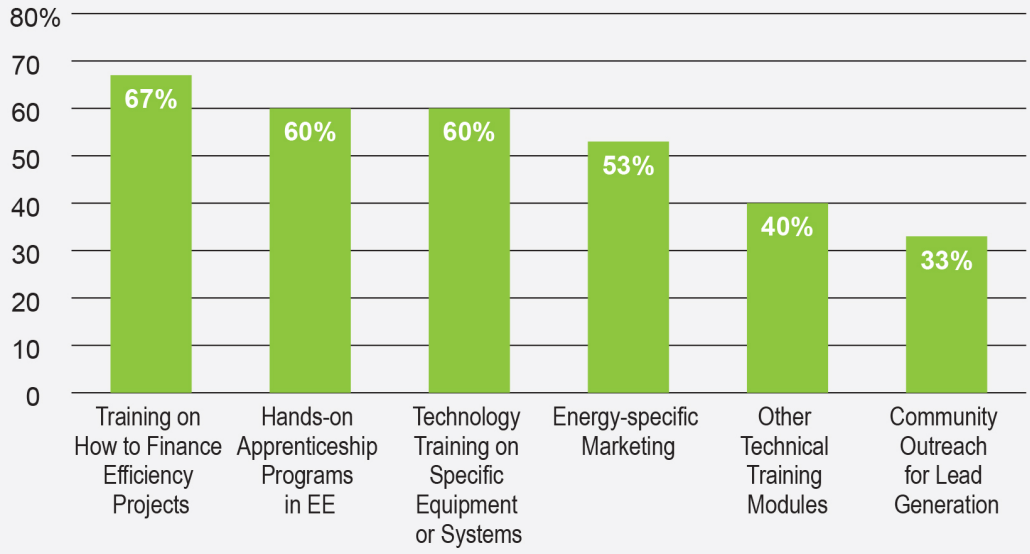

owners can finance energy efficiency measures and also a lack of on-the-job training. In New York, many options for financing exist, including on-bill cost recovery, NYSERDA loan products and private loan products. Aside from how to finance projects, employers would like to see hands-on apprenticeships (60%) and technology training on specific equipment or systems (60%; Figure S-4). Others indicated a need for energy-specific marketing (53%). These answers reflect the multi-faceted nature of these clean energy jobs, where a contractor must, for example, conduct an energy audit and identify potential improvements, and then counsel decision makers on what fits their property best and how to finance the work.

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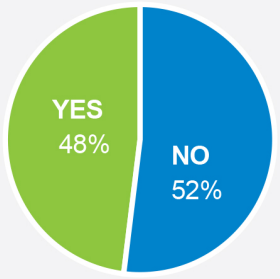

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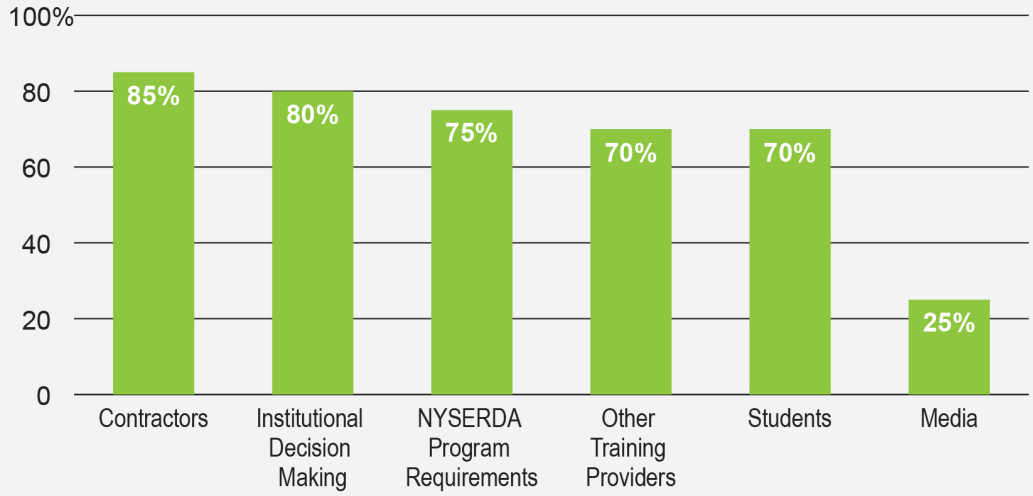

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Although training providers overwhelmingly stated that they consult contractors in deciding what courses to offer, the fact that the resulting training programs satisfy less than half of the surveyed employers (48%) suggests some failure in communication (Figure S-5). Training providers and employers do not communicate enough to give training providers a full sense of employer needs. Additional survey results bear this out, as the majority of employers (57%) surveyed responded that they do not communicate with training providers about the skills they need to see in workers (Figure S-7). This could also mean that adequate training may not be possible solely through classroom teaching. It may be that course offerings must move in the direction of more on-the-job training and hands-on training.

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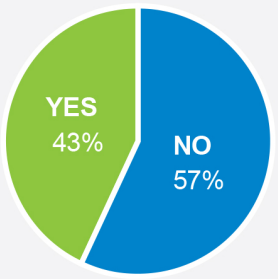

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1. Introduction

New York State has emerged as one of the leading states in the nation's clean energy economy, and in green jobs.[4] To realize continued growth in this area, however, state policy makers must ensure that worker training programs meet the needs of employers, are accessible to persons in need of training and do a good job of connecting employers to the newly trained. The research contained in this report helps to point the way.

According to a Brookings Institution report that surveyed the clean economy nationwide, the New York City metropolitan area has the largest number of clean economy jobs among the nation's 100 largest metro regions. New York State is also reported as having the second largest number of clean economy jobs, second only to California. There are good reasons to believe that green jobs will remain a large and growing part of New York's economy.

According to NYSERDA, residential and commercial buildings account for 55% of New York's net energy consumption and 89% of all electricity.[5] On the national level, in contrast, buildings consume slightly more than a third of all energy and 65% of all electricity.[6] In New York, therefore, buildings are an essential target for reducing energy consumption.

Significant opportunities remain to improve energy performance in both commercial buildings and residential homes.[7] These opportunities are certain to increase demand for building performance improvements and that increased demand will drive growth in green construction and building retrofit industries. This expansion, in turn, will require an available, skilled green workforce capable of responding to demand for energy performance improvements.

New York has steadily supported the growth of the green economy through policies to drive increased energy efficiency in buildings and the savings that accrue from efficiency improvements. The programmatic goals of Green Jobs-Green New York (GJGNY) focus mainly on assessing the energy use of existing buildings, and offering information and financial incentives to assist building owners in improving building efficiency. As opportunities for the green economy expand across the state, green jobs will be created.

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[4] Muro, Mark, and Jonathan Rothwell, Devashree Saha. 2011. "Sizing the Clean Economy," 25-26, www.brookings.edu/research/reports/2011/07/13-clean-economy

[5] NYSERDA, Patterns and Trends – New York State Energy Profiles: 1997-2011. June 2013.

[6] EPA Green Buildings. http://www.epa.gov/oaintrnt/projects/.

[7] See for example: U.S. Department of Energy Building Technologies Office. 2012. "Energy Savings Potential and Research, Development, & Demonstration Opportunities for Residential Building Heating, Ventilation, and Air Conditioning Systems." http://www1.eere.energy.gov/buildings/pdfs/residential_hvac_research_opportunities.pdf.

Overall, green occupations pay higher wages than those of comparable occupations and economic growth in green N has shown to be faster than the economy as a whole.[8] As a result, a growing green economy can be expected to deliver additional, secure jobs with competitive wages, in addition to economic benefits associated with energy cost savings.

It follows that effectively training green workers is an important part of any strategy to support and grow New York's green economy. To support future expansion of the green economy and the creation of green jobs, it is important that New York State continue to support green job worker training programs.

The clean energy workforce plays a vital role in improving the energy efficiency of New York buildings.[9] Workers are on the front lines, assessing the energy efficiency potential of buildings and communicating directly with building owners, who in turn make decisions about whether to make private investments and take advantage of government incentives. Well-prepared and well-informed workers are essential if New York is to seize the many opportunities for energy efficiency investments and drive further growth in New York's clean energy economy.

The State's GJGNY Act of 2009 is expressly intended to "create green job opportunities, including opportunities for new entrants into the State's workforce, the long-term unemployed and displaced workers." The Act also seeks to stimulate investments in energy efficiency and clean energy technologies by offering free or reduced-cost energy audits, and making it easier for property owners to obtain financing to make energy efficient improvements to their single family homes, multifamily residences, small businesses and non-profits. The research described in this report is designed to help NYSERDA and New York's green jobs community better understand any gaps that exist between GJGNY employers and training in the State.

What Drives New York's Clean Energy Economy?

A suite of clean energy policies drive New York's clean energy economy, including a strong Energy Efficiency Portfolio Standard and Systems Benefit Charge to support energy efficiency investments, emerging technologies and clean energy development, a robust Renewable Portfolio Standard to drive development of renewable electricity generation, and the Regional Greenhouse Gas Initiative (RGGI), the nation's first mandatory program to reduce carbon pollution from power plants. Together with statewide goals to drive progress on energy efficiency and renewable energy, these policies create jobs. It is essential that public policy also prepare New York's workforce to fill jobs in a growing clean energy economy.

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[8] Muro, Rothwell and Saha, 2011, "Sizing the Clean Economy," 26, www.brookings.edu/research/reports/2011/07/13-clean-economy.

[9] "A Green Economy can be thought of as an alternative vision for growth and development; one that can generate growth and improvements in people's lives in ways consistent with sustainable development. A Green Economy promotes a triple bottom line: sustaining and advancing economic, environmental and social well-being." Bapna, Manish and John Talberth. 2011. "Q & A: What is a green economy?" World Resources Institute. http://www.wri.org/stories/2011/04/qa-what-green-economy.

This report is organized as follows: a brief summary of the research methodology, including an explanation of why NYSERDA sought this research to build on the efforts of the New York State Department of Labor, an understanding of employer needs related to training and approaches used by the training provider approaches, a discussion of the findings follows, and conclusions.

2. Approach to the Research

NYSERDA sought this research to build on and delve more deeply into the important work done by the New York State Department of Labor (NYSDOL) to understand the workforce serving New York's clean energy economy. NYSERDA's GJGNY programs rely on a subset of the larger workforce studied by NYSDOL. This research aims to better understand any gaps that exist between employers and workers in that smaller frame, but go beyond the data gathered by NYSDOL through focus groups and surveys.

2.1 Research Methodology

This report describes research assessing GJGNY employer needs and the extent to which existing training programs and training infrastructure meet those needs. The research identifies and addresses gaps between employer needs and workforce training. Specifically, the research team sought to assess:

- Employee recruitment, hiring and retention as it relates to training status.
- Employer perspectives on the adequacy of workforce training.
- Availability of desired credentials and certifications.
- Communications among employers, training providers and other members of the green jobs community.
- Geographical gaps or differences.

To conduct the research, the research team took the following steps:

(1) Examined the goals and activities of each of the GJGNY programs in order to ensure that the research effort serves NYSERDA's

Acknowledging the Key Contributions of New York's Department of Labor

Studies conducted over the past several years form the background for the study captured in this report. The research contained in this report relied heavily on the New York State Department of Labor's (NYSDOL's) 2009 labor market study entitled, *New York State's Clean Energy Industry: Labor Market and Workforce Intelligence Study*, and NYSDOL's 2010 *New York State Green Jobs Survey*. For a more detailed description of these studies and the role they played in this research, see Appendix B.

objectives.[10]

(2) Reviewed and analyzed the data from the New York Department of Labor's 2010 Green Jobs Survey to identify data gaps and to link the GJGNY program activities to occupational and employer data with the GJGNY program goals and activities in mind.

(3) Analyzed the NYSDOL training provider database through a GJGNY lens to better understand the current relevant training programs in the state.

(4) Executed additional fact-finding via questionnaires, focus groups and telephone surveys.

(5) Incorporated the findings of the study in this peer-reviewed report.

Detailed descriptions of these steps are included in Appendix A. Project reviewers and advisors were consulted at various steps along the way, though the findings, conclusions and recommendations contained in this report are solely those of the research team.

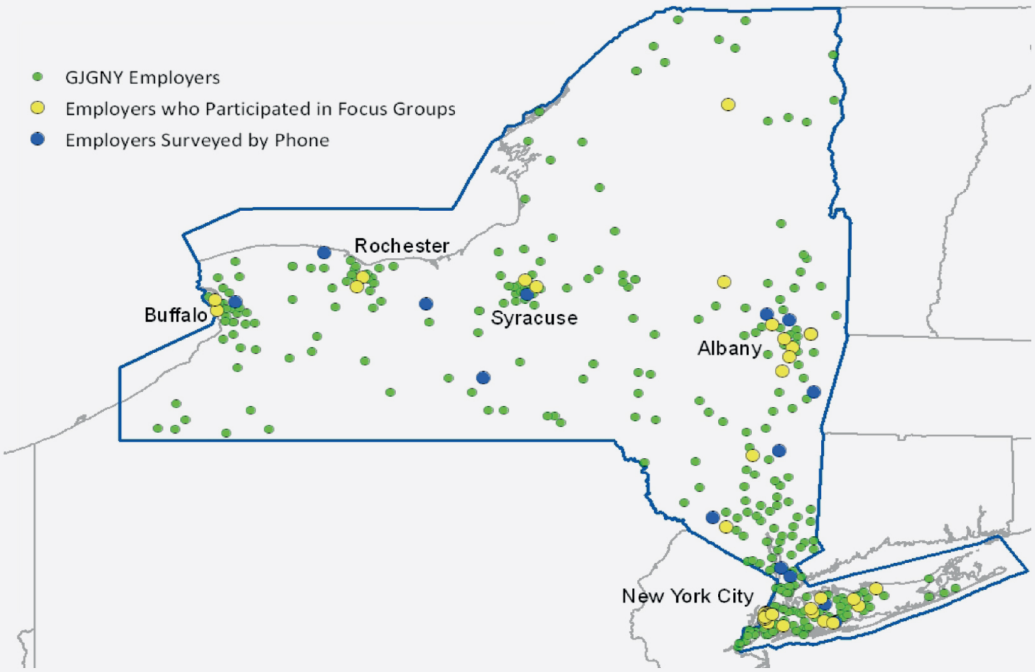
[10] Members of the research team were very closely involved with discussions that led to the adoption of the Green Jobs - Green New York Act of 2009, and one member of the team has served on the GJGNY Advisory Council throughout the implementation phase of the program.

2.2 Employers Surveyed

Figure 2-1 depicts the locations of employers participating in one or more program supporting GJGNY, including Home Performance with ENERGY STAR®, the Multifamily Performance Program, and the Small Commercial Energy Assessments program. The research team surveyed employers from diverse regions of the state. Figure 2-1 also shows the places of business for employers surveyed and those who participated in focus groups.

FIGURE 2-1

The Employers Surveyed Work in Diverse Areas of the State

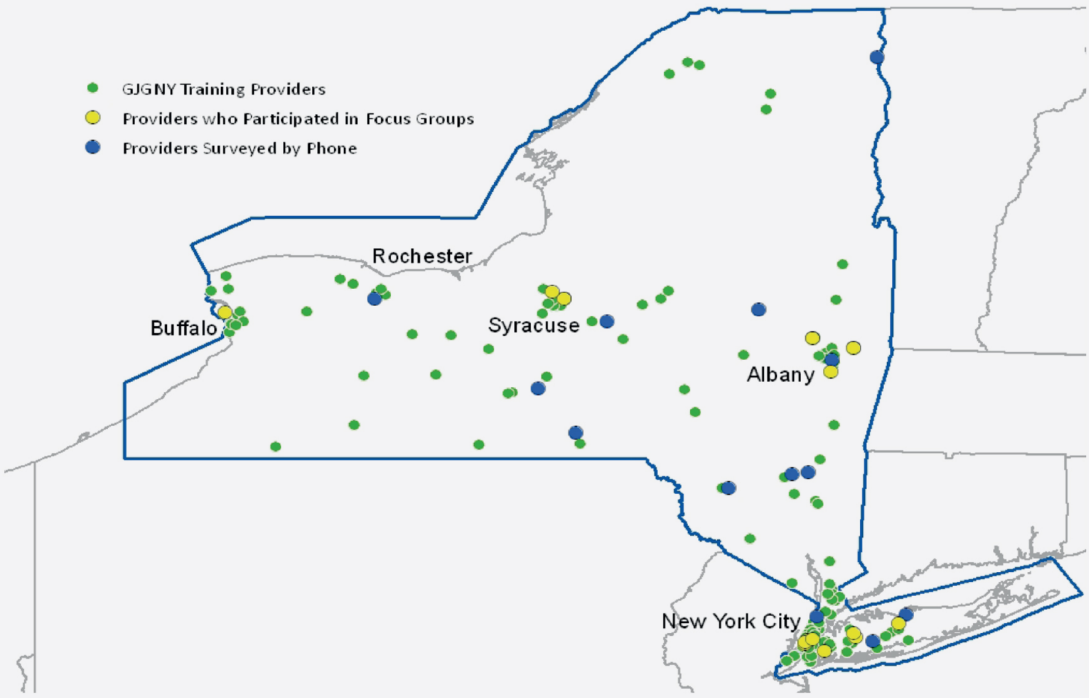


2.3 Training Providers Surveyed

Figure 2-2 depicts the locations of training providers that train workers for clean energy jobs in the GJGNY programs. Because training providers target their programs more broadly than the GJGNY programs, the research team had to derive the group of providers from a larger set of clean energy training providers. The research team chose to survey providers from diverse areas of the state. Figure 2-2 also shows training provider locations for providers who participated in surveys and focus groups.

FIGURE 2-2

Training Providers Surveyed Work in Diverse Areas of the State



3. Understanding Employer Needs

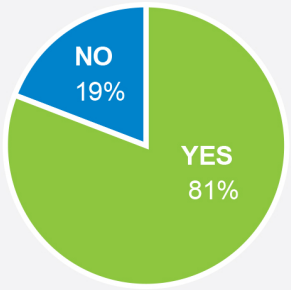
To be successful, workforce training must be responsive to employer needs, among other factors, including changes in technology, regulations and financing options.[11] This is especially true in the rapidly evolving field of energy efficiency and green technology installation,[12] where training programs developed in the past might fall short of addressing current needs if training providers do not keep pace. Indeed, any failure to tailor training programs to employer and industry needs risks investing scarce resources in worker training without producing qualified workers.[13] The results of this research suggest adjustments to clean energy job training are needed if it is to meet employer needs.

3.1 Employer Perspectives on Recruitment, Hiring and Retention

Understanding employer experiences in recruiting, hiring and retaining skilled workers doing GJGNY work will in turn assist in identifying any gaps that exist between employer needs generally and training in the state. In this area, the research indicates that employers are finding it hard to find adequately skilled workers, despite what appear to be broad-based recruitment efforts.

FIGURE 3-1

Employers, do you experience any difficulty hiring adequately skilled applicants?



As Figure 3-1 illustrates, employers are having trouble finding skilled workers to join their companies. Twenty-one participants were asked if they had hired any new staff and if they had experienced any trouble in hiring in the past year (2011). Seventeen of the 21 employers surveyed indicated that they had hired new staff. Of these 17 employers who had hired, 15 (88%) indicated that they experienced trouble with recruiting. Of the four employers that did not

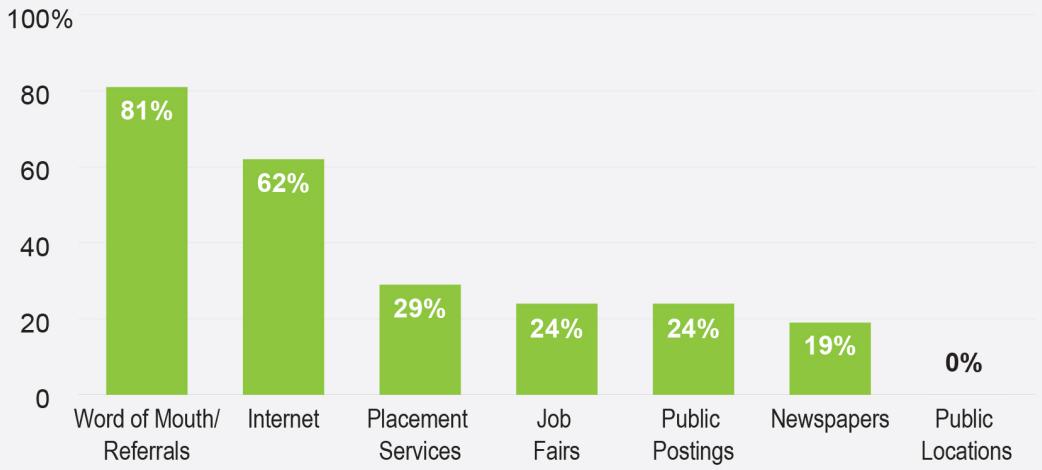
[11] White, Sarah, with Laura Dresser and Joel Rogers. 2012. *Greener Reality*, University of Wisconsin Center on Wisconsin Strategy,www.cows.org/_data/documents/1306.pdf.
[12] As previously noted, the GJGNY program concerns itself with building efficiency, and as such references to energy efficiency here relate to weatherization, building science and technology and solar thermal. Green technologies can include heat pumps, solar hot water or photovoltaic systems, wind generation, geothermal systems and others.
[13] Other researchers have noted this problem. White, Dresser and Rogers, 2012. *Greener Reality*, 4. www.cows.org/_data/documents/1306.pdf.

hire, two indicated that they experienced trouble with recruiting; the other two employers did not. It is not clear whether the two employers who did not hire attempted to hire. If one assumes that those two employers did not attempt to hire, then 100% of all employers who sought to hire had difficulty finding adequately skilled workers. The New York State Department of Labor (NYSDOL) made a similar finding in its 2009 labor and workforce study, noting that workers in both weatherization and engineering fields were hard to find.[14]

Based on the surveys conducted for this report, difficulty in finding skilled workers does not appear to be the result of poor recruitment by employers. Indeed, as Figure 3-2 shows, employers are using a wide range of methods to get the word out about job openings.

FIGURE 3-2

Employers, how do you find applicants to fill open positions in your company?



When asked how employers find applicants to fill open positions in their organizations, 81% indicated "by word-of-mouth or referrals from employees," whereas 62% said they posted openings using Internet-based services. Other methods used by employers included placement services such as headhunters (29%), job fairs, which are typically held at colleges and universities for graduating students (24%), public postings (24%), and newspaper want-ads (19%). Additional responses to the question included universities, veterans associations, local workforce investment boards (NYSDOL), New York City small business programs, and other types of associations, recruiters, and internships.

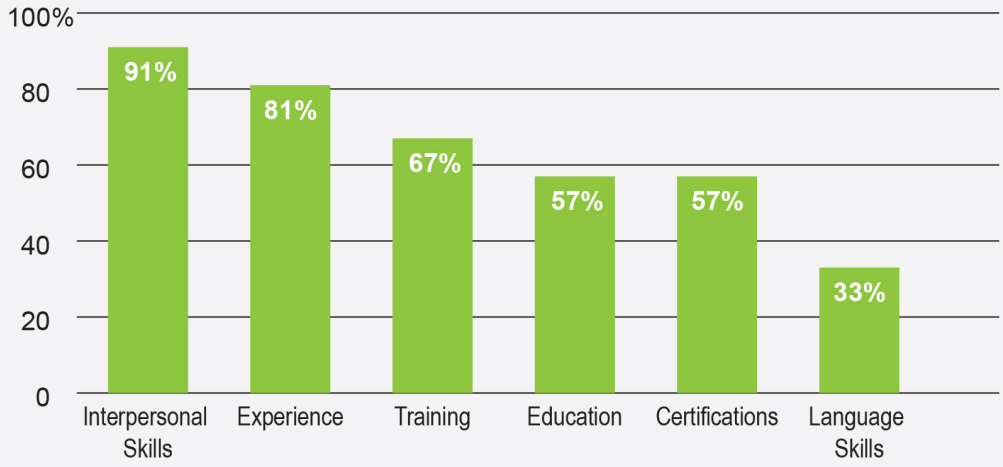
[14] New York State Department of Labor. 2009. *New York State's Clean Energy Industry: Labor Market and Workforce Intelligence*, 84.

By hiring through word of mouth referrals, the employer is able to vet candidates through the attestation of current staff who understand the business. Where interpersonal skills, experience and training are key attributes for hiring, current workers are often in a good position to identify good recruits.

To better understand the difficulties employers are having finding skilled workers, it is important to know what they are looking for in potential employees. As Figure 3-3 shows and previous research validates, employers think of workers in green jobs as needing more than just green job skills.

FIGURE 3-3

Employers, what are the most important qualities that lead to hiring an employee?



When asked what qualities or qualifications are most important in hiring employees, 91% of employers said interpersonal skills and personal qualities were most important,[15] while 81% consider experience to be among the most important in hiring. More than half of employers indicated training (67%) and education and certifications (57%) are important.[16] Language was selected by 33% of respondents as the most important quality leading to hiring an employee, reflecting input from those employers who work in areas of the state where multiple languages are spoken. Additional responses from survey respondents and focus group participants included the following quotes:

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[15] The definition for interpersonal skills/personal qualities used in asking the question includes basic work reliability, communication skills, knowing to show up at work on time, and knowing how to dress properly for work. These skills are sometimes describes as "soft skills" and are not traditionally taught in green workforce training programs that include math, sciences or languages.

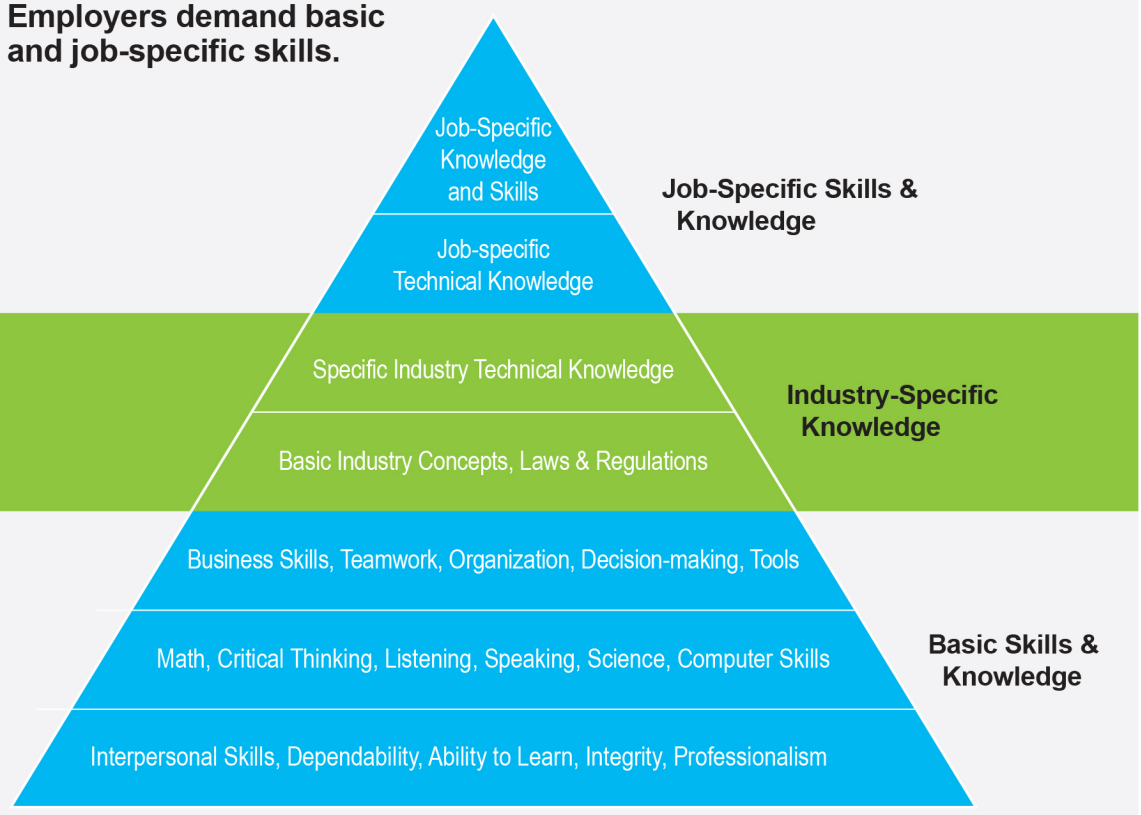
[16] Training is defined as additional schooling to obtain vocational skills, while education is the basic schooling one receives, such as a high school diploma or college degree.

- Showing up for work.
- Motivation, passion, work ethic, drive.
- Curiosity, willingness to stay engaged.
- Open mindedness about diverse culture.
- Core communication skills/timeliness.
- Standard of excellence, competency.
- Personal attributes.
- Willingness to work.
- Enthusiasm.
- Good referrals.

These characteristics all fall in the interpersonal skills/personal qualities category of the survey, confirming the findings of previous studies.

FIGURE 3-4

Employers demand basic and job-specific skills.

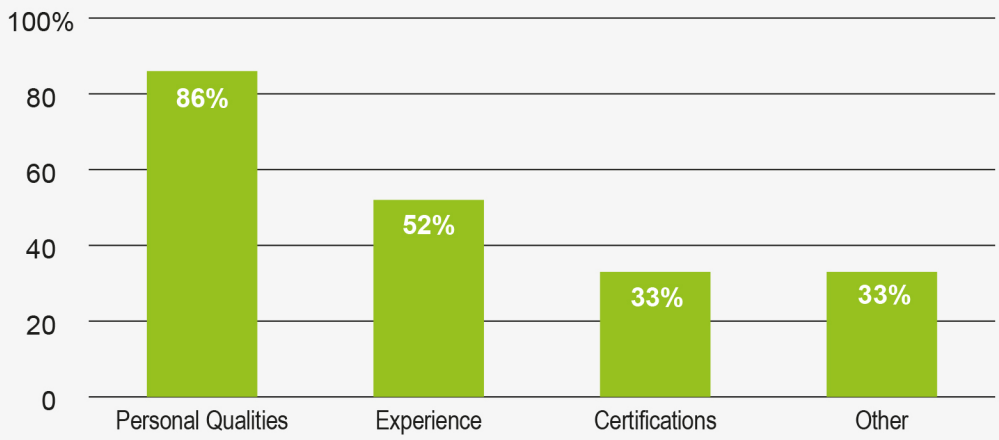


Interpersonal skills/personal qualities and experience are highly prized by employers in part because these skills make it easier for on-the-job training. Training is also highly prized, but given that employers reported difficulty in finding skilled workers generally, employers may be looking for interpersonal skills and personal qualities as a proxy for finding workers who are easily trained on the job. In other words, if employers had better access to trained workers, they might value training more than they do in an environment where the majority of workers start without all of the skills needed.

The emphasis on non-green-job-specific skills is also consistent with research suggesting clean energy job training must be part of training for a larger set of skills.[17] This emphasis has sometimes been depicted as a skills pyramid such as Figure 3-4.[18] As the pyramid shows, workers in green jobs need basic skills training and knowledge. This knowledge includes mathematics, computer skills, ability to do basic research and writing, and similar skills. Any green job training curriculum, therefore, must either provide these basic skills and knowledge to be successful, or require these basic skills and knowledge as a prerequisite to training.

FIGURE 3-5

Employers, what qualifications do you weigh most heavily when deciding whether or not to retain an employee?



The need for basic and job-specific skills was further evident when employers were asked about the qualities that are most important for employee retention. As shown in Figure 3-5, employers consider personal qualities most important to their decision to retain an employee once hired.

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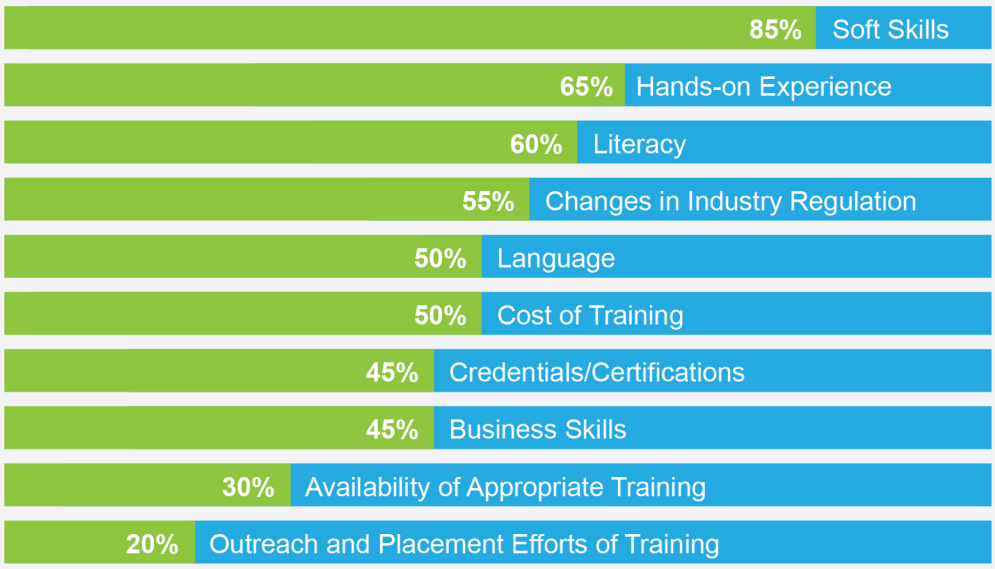
[17] White, Dresser and Rogers, 2012. *Greener Reality*, 64. www.cows.org/_data/documents/1306.pdf. The Center for Energy Workforce Development has developed an 8-tier skills pyramid, which is adapted for Figure 3-4.
[18] Ibid.

When considering an employee's qualities in deciding whether to retain an employee after hiring, 86% of employers identify personal qualities as most valuable, 52% consider experience most valuable, whereas only 33% determine certifications as most valuable in producing quality work leading to employee retention, once hired. More specific qualities noted in the survey comments included: "work ethic," "communication skills, knowledge," "motivation," "passion" and "reliability and dependability."

This finding further emphasizes employer appreciation for personal qualities and supports the notion that green workers must possess basic skills and knowledge in addition to green-job-specific skills and knowledge. When considering that the same group of employers overwhelmingly indicated that skilled workers are difficult to find, we might also infer that the ability of workers to adapt and learn on the job has become very important in the absence of workers well trained before they start the job. This backdrop may also have influenced what employers consider most important about their current workforce.

FIGURE 3-6

Employers, do any of the following training-related issues prevent you from hiring or retaining employees?



When asked what training-related problems prevent them from hiring new workers or retaining existing workers, employers once-again emphasized the lack of soft skills (85%; Figure 3-6). Other "deal breakers" according to at least half of the employers responding include a lack of: hands-on experience (65%), literacy (60%), understanding of changes in regulation (55%), and language skills (50%). Cost of training also prevents hires and retention of

untrained workers (50%). These results are consistent with the most important skills needed to hire and retain employees, as identified by employers and shown in Figures 3-3 and 3-5.

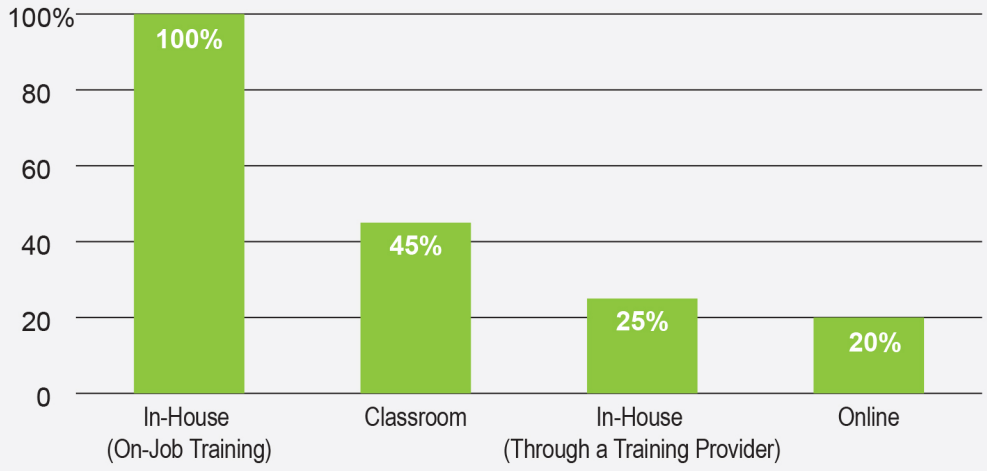
Some employers (30%) indicated that the availability of appropriate training is a barrier to hiring or retaining employees. The next section of the report explores employer perspectives on training.

3.2 Employer Perspectives on Workforce Training

In determining what improvements might be made to New York's green job worker training infrastructure, it is important to understand employer perspectives on worker training. All employers surveyed indicated that they provide some form of energy efficiency or energy-related workforce training for themselves or their staff. Perhaps not surprisingly, most indicated that they provide on-the-job training while delivering services to customers, as shown in Figure 3-7.

FIGURE 3-7

Employers, what training formats work best for your organization?



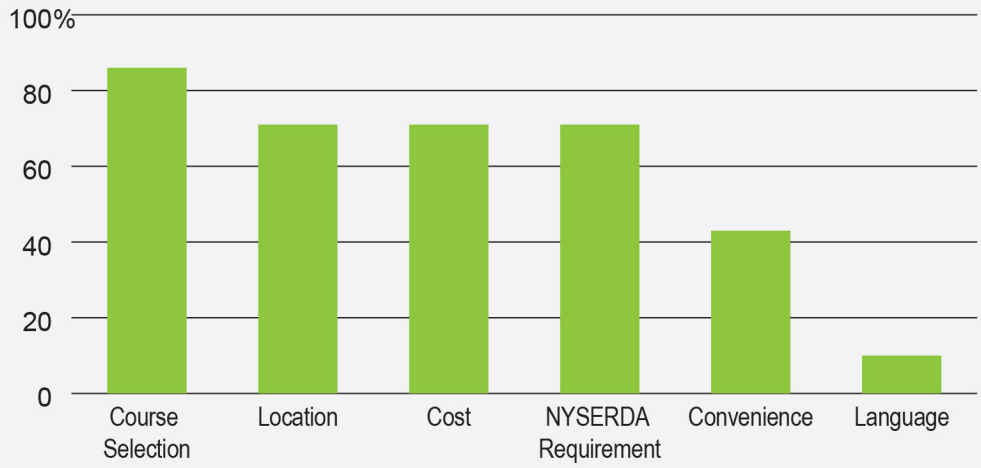
Employers' preference for on-the-job training is consistent with the employers' response that it is difficult to recruit workers already skilled in the field. On-the-job training involves training at the workplace, in the course of performing regular job responsibilities. Although training providers offer many different types of classroom settings, only 45% of employers said they utilize classroom training in their businesses, whereas 25% bring formal in-house training to workers. On-line training was chosen by the fewest (20%) as working best for their organizations.

It is likely that cost considerations come into play for employers who choose on-the-job training over more formal training options. Indeed, half of the employers surveyed indicated that cost of training is a barrier to retaining

unskilled workers (Figure 3-6). It should be noted that even on-the job-training carries a cost for employers, as senior workers must take the time to instruct junior workers at the job site. Economic considerations would also favor workers who are adaptable and learn quickly on the job because those workers will gain the experience necessary to perform the job independently more quickly. This reasoning may explain why employers value soft skills so highly (Figures 3-3, 3-5 and 3-6). Among those employers who do select formal training programs for their employees, a number of factors come into play in the selection of course. When asked about their priorities for selecting training or certification programs for their employees, the results are fairly evenly distributed as shown in Figure 3-8. Course selection is the factor most driving employers (86%), and location (71%), cost (71%), and NYSERDA requirements (71%) were the next highest drivers for selecting training program.[19] The convenience of the class was cited by 43% of those surveyed, and the language availability of the class (for non-English speakers) was chosen by fewer than 10% of respondents.

FIGURE 3-8

Employers, what are your top priorities when selecting employee training courses?



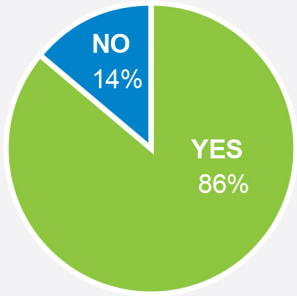
Employers overwhelmingly indicated (76%) that they hear about available training courses through NYSERDA. Others (38%) learn of training courses from websites, while some (24%) found out through word-of-mouth, and few (5%) heard from a teacher or instructor. None of the participants in the survey identified radio, newspaper, or former students as sources of information about training opportunities in energy efficiency and renewable energy. Some

[19] NYSERDA requires Building Performance Institute (BPI) accreditation for those working in its programs. For example, the Building Analyst (BA) certification is required for the Home Performance program and the Multifamily Building Analyst (MFBA) certification is needed for the Multi-family program.

respondents mentioned professional societies and trade associations as sources of information about training courses.

FIGURE 3-9

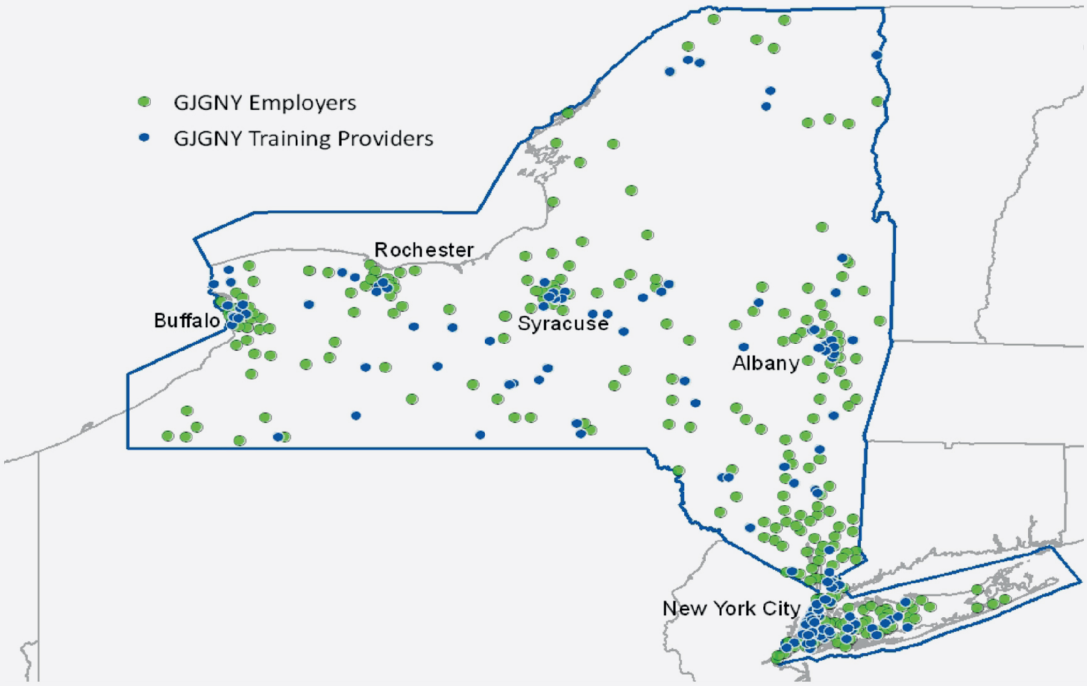
Employers, is energy-related training readily available in your region?



Most employers (86%) indicated that energy-related training is available in their regions, while some (14%) said training is not readily available nearby (Figure 3-9). Many employers who indicated that the training was not readily available nearby had sought out specialized training, such as training on specific equipment or financing options, which is not widely offered. In other cases, training was just not conveniently located for the particular firm. Not all training is available within New York State, because most equipment manufacturers train at their manufacturing sites out of state. For example, a plumbing and heating contractor located in western New York regularly sends its employees for sales training to Connecticut. Nevertheless, a careful look at the map of GJGNY training providers in Figure 3-10 suggests there may be a geographic issue. Gaps appear in the North Country north of Syracuse as well as the western part of the Southern Tier south of Buffalo.

FIGURE 3-10

Most areas of state well served by training providers.

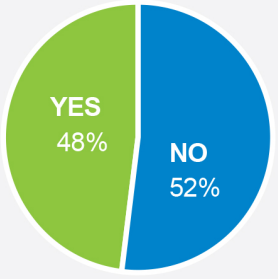


More than half of the employers surveyed (52%) indicated that available training programs do not adequately prepare employees for positions at their firms (Figure 3-11). These survey results were reflected in focus group discussions. One focus group participant observed, "there is a gap in what they're learning and what they need."

Some participants noted that college does not prepare workers for these green collar jobs. In general, other comments supported the opinion that field experience is most important to learn required skills adequately, that it "is essential" and that "hands-on training is important, whether in the office or off-site." This view reiterates what the

FIGURE 3-11

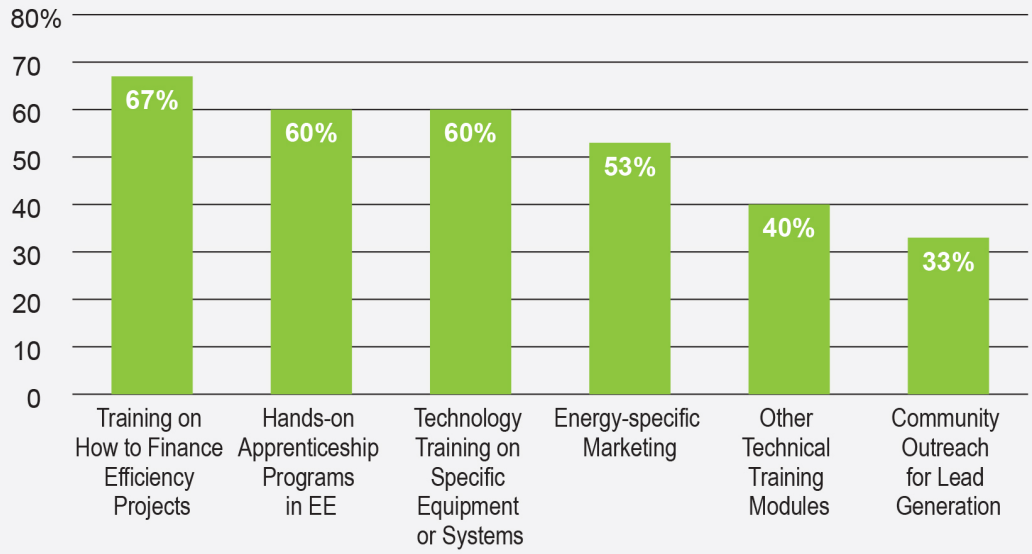
Employers, do training programs adequately prepare workers for positions at your company?



NYS Department of Labor Green Jobs Survey concluded about the construction trades, namely that employers want more hands-on practical training for would-be workers, such as work-study, internships, and co-op programs. Professional services sector employers, including architectural and engineering firms, also want training that offers more practical experience, and emphasizes teamwork and interpersonal skills.[20]

FIGURE 3-12

Employers, what types of training do you wish were available but have been unable to find?



Employers identified additional types of training programs they wish were available, but have not been able to find, as depicted in Figure 3-12. A high percentage of employers (67%) indicated they sought training on the financing options available to property owners who wish to implement energy efficiency measures, such as on-bill financing, NYSERDA loan products and private loan products. Focus group participants articulated the need for staff to be able to explain financing options to property owners in order for property owners to be comfortable moving forward with energy efficiency work. For example, when technical information about energy efficiency measures is provided by an energy auditor to the customer, the financial aspects and opportunities for homeowners is not explained clearly enough. How can the homeowner afford this work? How should the recommended measures be prioritized, and why? What incentives are available and how should the homeowner go about getting that financial assistance?

[20] New York State Department of Labor Division of Research and Statistics. 2010. New York State Green Jobs Survey, RS-GR11, 12.

In addition to training on financing, many employers (60%) believe hands-on apprenticeship programs in energy efficiency and technology-specific training related to specific technologies are needed. Many other employers (53%) feel energy-specific sales and marketing training is needed because people in the field must know how to explain the benefits of making energy improvements, not only how much it will cost and how to pay for it. Many employers (40%) want technical training modules and some (33%) want training on outreach to generate leads on new customers in the community.[21]

A number of other requests were mentioned in addition to the training choices provided in the survey. These requests include Microsoft Excel, general energy conservation, career paths and requirements, co-operatives for interns, holistic teaching of building systems and energy efficiency, software modeling and TREAT modeling. Specialized training such as modeling and training on specific types of equipment such as blower doors or advanced air sealing was suggested as lacking in the marketplace.

Workforce training and training needs was widely discussed at the focus groups. There was general consensus that hands-on, in-house or on-the-job training is necessary. There was praise for NYSERDA PON 2033 entitled, "GJGNY NYS Registered Apprenticeship and Building Trades and On-the-Job Training."[22] The topic of sales training was debated and whether it makes more sense to teach a technical person about sales, or train a sales person about the technical aspects of the work. One employer noted that, "it's a lot easier to get a salesperson who knows how to sell and give them technical training…as opposed to getting a technical guy [and] give them sales training." Whatever the approach, there was consensus that more outreach needs to take place in educating the public about the benefits and activities of NYSERDA's GJGNY programs, especially in the single-family home area. Respondents noted that "homeowners are disconnected from energy efficiency – [they] don't know what can be done," and "homeowners don't know about the incentives; get informed homeowners…to create more jobs." This discussion was a recurring theme in other questions posed in the survey and in the focus groups.

3.3 Employer Perspectives on Credentials and Certifications

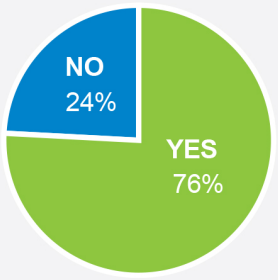
The survey and focus groups explored employer opinions on the value of certifications to clean energy job success. While three-fourths of employers surveyed (76%) preferred to have employees with certification, focus group

[21] The need was expressed repeatedly in focus groups that someone or some entity must be able to convince the customer to conduct energy efficiency services or energy improvements. These "leads" are essential for contractors to continue to operate their businesses.

[22] NYSERDA issued this program opportunity notice (PON) in June 2011, seeking proposals from eligible training and apprenticeship providers to modify existing training curricula on energy efficiency, weatherization, green building principles, and solar thermal installation. The PON also offered assistance to employers who provide on-the-job training to workers.

FIGURE 3-13

Employers, do you require or prefer your employees to have credentials or certifications?



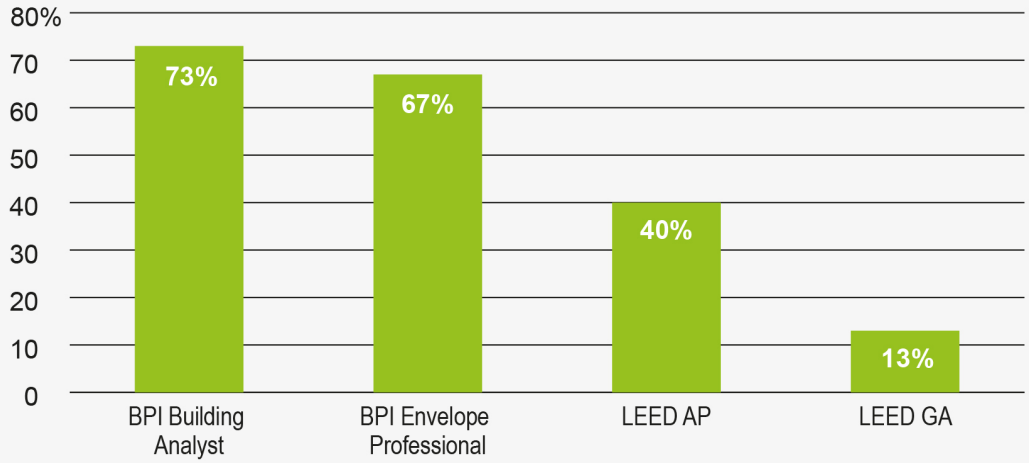
responses indicate that certifications do not necessarily translate to overall on-the-job success (Figure 3-13). Nationally recognized credentials do, however, ensure needed skills on the job as well as a higher quality work product. Sometime certifications are required for company accreditation and this can be a selling point to the employer's potential customers.

Not requiring certifications in one organization was related to the expense and distance to training programs. Another organization found that certifications were not adequate for the training level required by the job. In both cases, on-the-job training was recognized as the substitute for certification. Some focus group participants felt that certification training was just "training for the test [and] without the field experience, the utility is limited." According to another focus group participant, "Certification is not the most critical factor; if the lead engineer has LEED®, for example, then the crew need not have LEED." Other employers indicated that sometimes certification can be used as a marketing tool to communicate a company's mission or qualifications to potential customers.

When employers were asked whether certain training or credentials are more useful than others or which certifications most directly translate to success on the job, Building Performance Institute (BPI) certifications were selected as most useful for occupations related to GJGNY, as shown in Figure 3-14. LEED certifications were noted less frequently. A number of other certifications were identified: Association of Energy Engineers' (AEE) Certified Energy Manager (CEM), BPI's Multifamily Building Analyst (MFBA), other BPI certifications, Professional Engineer (PE), North American Board of Certified Energy Practitioners (NABCEP), a variety of manufacturers' training programs on specific equipment or systems, and software and modeling training programs.

FIGURE 3-14

Employers, what training or credentials have you found translate most directly to success on the job?



One focus group participant noted that "there are multiple and redundant certifications," diluting the value and confusing the marketplace. Very few survey respondents indicated that they do not use training or certification programs. These few small firms indicated that training is a barrier. "We simply cannot afford the time or expense to send our people to train…it's a geographical and financial burden," said one employer. The geographical burden was measured in terms of time required for travel. Another opinion heard from several focus group participants, stated in various ways, was that "there are not enough job-seekers and there seems to be poaching of experienced employees." This poaching serves as a deterrent for some employers to train their employees, only to have those well-trained and experienced employees go to another firm.

Focus group participants acknowledged that certifications were important, such as BPI, LEED and AEE, but there was a repeated call for internships and positions that would transition students from training opportunities to jobs in the field. Some employers highlighted successful examples of these types of short term programs as being very productive and very successful.

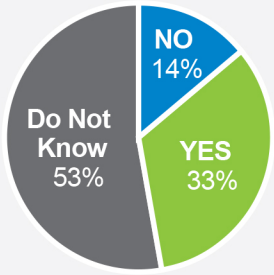
3.4 Employer Perspectives on Connections to the Broader Green Jobs Community

The clean energy jobs literature suggests that the most effective training programs are those that are closely connected to employers and their sometimes-changing demands on workers.[23] Training programs that respond to employer demands are most likely to produce workers prepared for actual jobs. Because of that tendency, this study sought to test employer connections with the larger green jobs community including training providers. Results of surveys and focus groups suggest a general failure in New York State to meaningfully connect employers with training programs.

In general, the findings reveal that only a limited amount of communication occurs between employers and training providers. Among participants in the focus groups, there was general agreement that better communication between employers and training providers is needed. Among the most necessary lines of communication identified are: (1) between the well-trained job candidate and employers with job opportunities; and (2) between and among various participants in the green job market to minimize gaps in training and reduce barriers to training.

FIGURE 3-15

Employers, do you feel that outreach efforts of training providers are reaching those companies/individuals who could hire students trained by these programs?

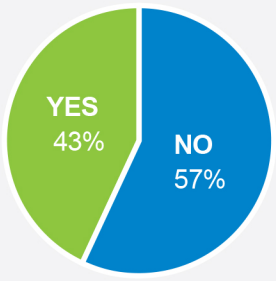


Employers were asked whether they felt outreach efforts by training providers were adequate to alert employers of recently trained students, and only one-third of the respondents said that training provider outreach efforts are reaching potential employers, as shown in Figure 3-15. Although some employers (14%) said that these efforts are not reaching employers, a majority (52%) stated that they do not know. Statements of "No" or "Do not know" likely indicate that outreach efforts by training providers are inadequate. One focus group participant stated it this way: "there is a problem: training all of these people is great, but how about finding jobs for them?" Another participant noted that, "there seems to be no coordination among the trainers, and there seems to be a lot more funding for training and a lot less for incentives to hire an employee or help in finding that person a job."

[23] White, Dresser and Rogers, *Greener Reality*, p. 4; White, Sarah, *Pathways to Competitiveness: Some Guidelines for Successful Workforce Investments in Wisconsin,* Center for Wisconsin Strategy, April 2013, p 5. Employer demands are often a proxy for what customers demand, what financing options exist, and what technological advances take place.

FIGURE 3-16

Employers, do you communicate with training providers about the training you think workers need?



When employers were asked if they have any direct contact with training providers as they develop training courses, a good majority (57%) said they had no contact[24] (Figure 3-16). One focus group member commented that training providers must maintain flexibility in their course offerings, while another indicated, "Customer demand must be coordinated with workforce development." Another focus group participant said that he regularly communicates with colleagues at training institutions. But this interaction was not the norm, and not part of any regular or organized effort for both sides to inform each other on these issues or on trends in the marketplace.

This lack of connectivity among stakeholders in the New York green jobs community is a problem if experts are correct that the most successful training programs are those with strong ties to employers demanding new workers. Indeed, when employers were surveyed on the question of whether there is adequate communication among stakeholders in the green jobs community, more than two-thirds of them answered "no" (40%) or "do not know" (30%). Only 30% of employers feel there is adequate communication among stakeholders in the green jobs community. (See Figure 3-17).

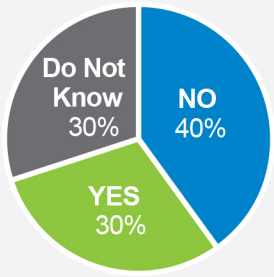
During a focus group, one participant asked, "there is too much overlap of training, but no one seems to be working together…is anyone getting the jobs?" During another focus group, conversation on this topic transitioned to constituency-based organizations (CBOs) and how best to work with these groups. One participant noted that their organization has good relations with CBOs, and that the staff at CBOs are "enthusiastic and energetic," while another person responded, "I don't quite understand what CBOs do." Another suggested that CBOs are the missing

[24] It should be emphasized that although employers are a key source of information for training providers seeking to design and implement adequate training programs, training providers need to respond to numerous other factors, including technological change, financing availability and regulatory policies, among others. In this study, employers serve as a proxy for many of these other factors insofar as employers know whether training graduates understand current technology, financing options and regulatory policies.

link, because they could provide the education needed to homeowners, while someone else offered the idea that, "maybe the CBOs could relieve the contractors from some of the sales work; they give assurance and comfort to consumers and homeowners."

FIGURE 3-17

Employers, do you feel there is adequate communication among employers, training providers, and community organizations?



A more systematic and sales team approach was also discussed. One person described it as a 4-by-1 relay team: some people do the homeowner education, some do the advertising, and others do the audits and installation. Alternatively, better business skills in specialized courses could be taught to the workers. In summary, there was definite consensus on the need for all stakeholders involved in GJGNY and workforce training efforts to communicate more and be more connected.

4. Understanding the Approaches of Training Providers

Based on the findings presented above for employers in the GJGNY program, one can conclude improvements are needed to the training infrastructure for energy efficiency in New York State. To better understand the gaps between training and employer needs for skilled workers, it is necessary to gauge the approach of training providers. Below training provider approaches are examined, including approaches to placing trainees, designing and executing training courses, and communicating with employers and other green jobs stakeholders. Several areas for improvement are identified.

4.1 Training Provider Approaches to Job Placement

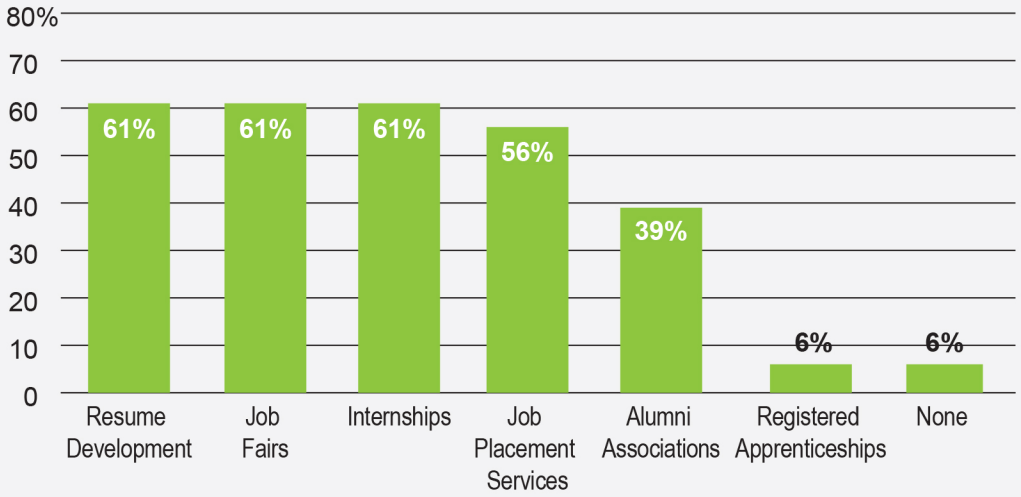
The link between training providers and would-be employers is a crucial training juncture because it determines whether new trainees have a clear pathway to a job. The survey and focus group results reveal several areas for improvement in training provider placement. Three such improvements are that training providers should: (1) be registered with the NYSDOL's searchable database of training providers; (2) improve communications with all GJGNY employers; and (3) strive to provide on-the-job internships or apprenticeships to expose trainees to potential employers under real job-like conditions. Each of these improvements are explored in this section with reference to the research findings.

Half of the individual training providers surveyed do not know if they are registered on the NYSDOL Eligible Training Provider List (ETPL), which offers a searchable catalogue of available training programs and course offerings. The EPTL list can be used by employers seeking recent trainees for employment or training for current employees, as well as by those seeking training opportunities. The list appears to be an underutilized resource for training providers to place training graduates. All training providers should be required to register with the EPTL list as a condition to receiving State funding.

When training providers were surveyed on the ways they assist with placing training graduates in jobs, a good majority (61%) indicated they provide resume development, hold job fairs and secure internships for students (Figure 4-1). More than half of the training providers (56%) offer job placement services, while some providers (39%) offer networking through alumni associations. Six percent offer registered apprenticeships and six percent of the training providers state they offer no job placement assistance.

FIGURE 4-1

Training providers, what tools do you provide to help students transition from school to job placement?

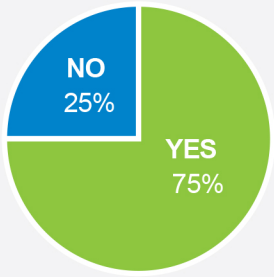


A large majority of the training providers surveyed (67%) provided additional examples of tools and resources they provide to assist students in securing jobs. Examples include soft skills and job readiness training, case management, transportation assistance, professional networks and networking events, web portals with job openings, mentoring programs and workforce boards.

Figure 4-1 and the write-in responses from training providers on the surveys reveals a job placement model with only minimal connection between training providers and employers—one in which training largely occurs in a separate phase from employment and training graduates are largely on their own to connect with employers. Employers surveyed, meanwhile, are looking for more apprenticeship and other on-the-job training arrangements for trainees (Figure 3-12). On-the-job training opportunities could act as bridges for trainees into actual jobs without the uncertainties associated with more traditional job placement techniques depicted in Figure 4-1.

FIGURE 4-2

Training providers, are you affiliated with any organizations that could potentially hire your trainees or provide internship opportunities to help bridge the gap between training and employment?



The great majority of training providers (75%) report affiliations with employers or other organizations that help trainees bridge the gap between training and employment (Figure 4-2). Similarly, nearly all training providers (90%) say they have communications with employers in connection with placement of trainees (Figure 4-3). Yet a majority of employers surveyed indicated no connection to a training provider, suggesting that training providers are reaching less than half of employers, and, conversely most employers do not reach out to training providers (Figure 3-16).

Comparing the survey findings from training providers suggests that training providers have some connections with employers, but that a large number of employers have no connection with training providers. Given the answers to the job placement questions, furthermore, it appears the connection that training providers have with many employers amounts to simple attempts to place trainee graduates with employers after the trainees graduate. The connections achieved between employers and trainee graduates in such a model are far less substantial than the connections forged through internship, apprenticeship and other on-the-job training placements. Such on-the job training placements may also provide the added benefit of tailoring training to employer needs on the spot. In the next section, how training providers report carrying out their training is explored.

FIGURE 4-3

Training providers, do you have any direct communication with employers as they seek to find appropriate training for their staff or new hires?

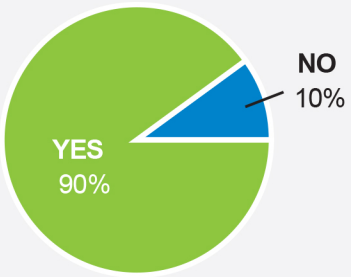
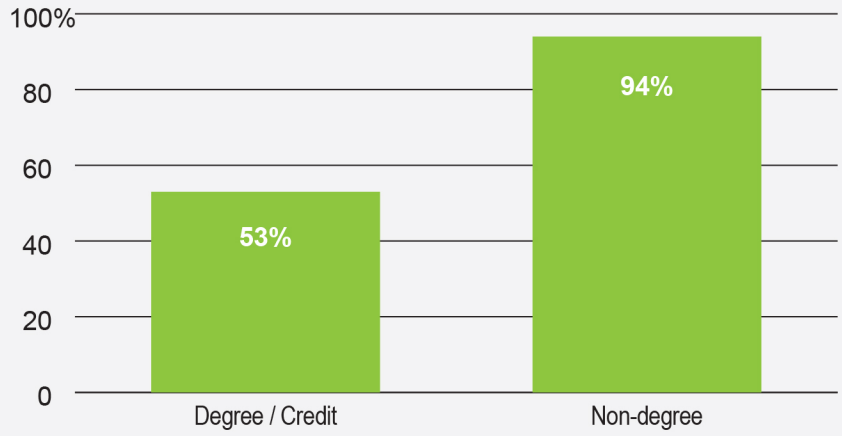


FIGURE 4-4

Training providers, what type of training do you offer?



4.2 Training Provider Approaches to Training

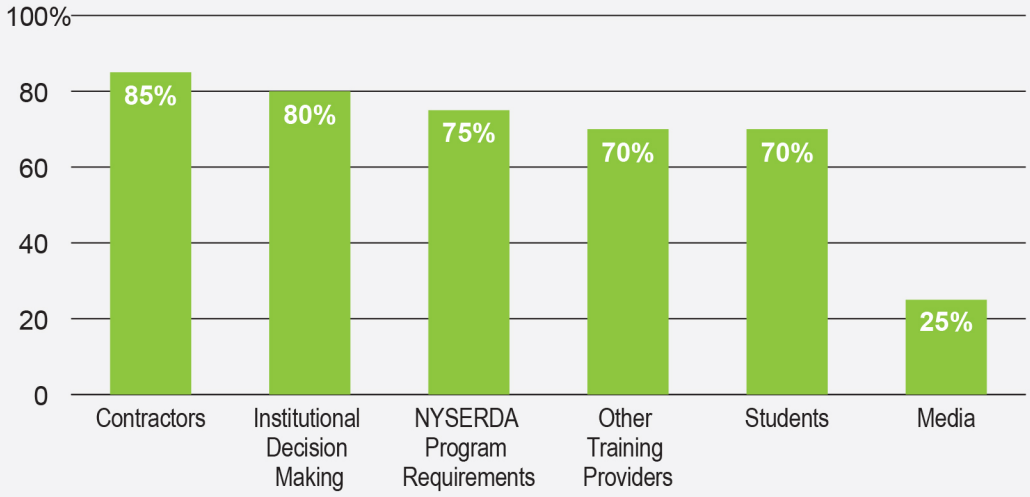
Given the gaps in training perceived by employers, it is important to understand how existing training offerings fail to incorporate employer needs. To that end, training providers were surveyed on the types of training they offer, how courses are planned, how instruction is administered and—importantly—how success is evaluated across programs. The results of the survey are strong clues about why training programs are falling short of employer expectations.

Nearly all training providers surveyed (94%) offer non-degree and non-credit training programs, whereas just over half (53%) offer degree programs (Figure 4-4). Some training providers (41%) indicated that they offer other types of programs, such as transitional stackable credit courses that can apply to either program, credits that can be applied to degree programs, certificate programs, or apprenticeship credit.

A large majority of training providers surveyed (80%) indicated that they offer energy efficiency and weatherization courses. A slightly smaller majority (63%) offer renewable energy training courses. Training providers were asked how they determine what courses to offer. As shown in Figure 4-5, great majorities of providers indicated they consult with employers (85%); use institutional decision-making (80%); consult NYSERDA requirements, which are established only after stakeholder input (75%); observe other training providers (70%); and react to student demand (70%).

FIGURE 4-5

Training providers, how do you decide what training programs and/or courses to offer?



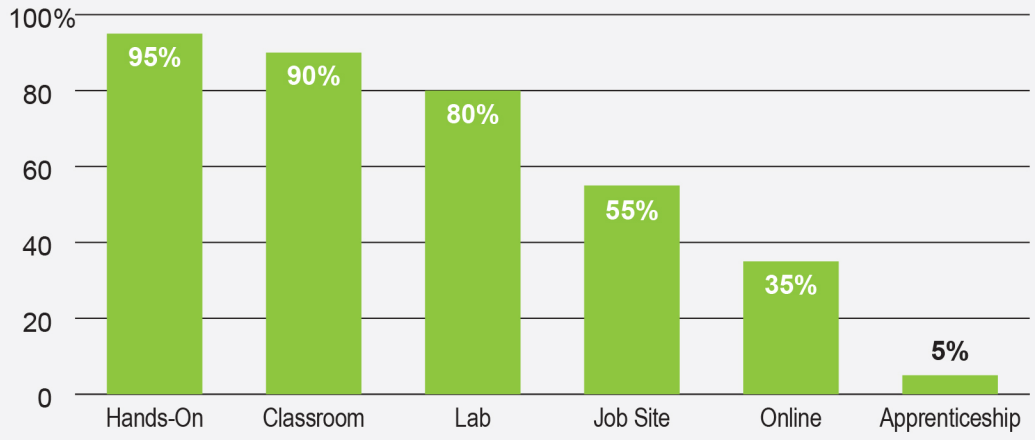
Other sources relied upon to make a determination on curriculum development include North American Board of Certified Energy Practitioners (NABCEP), U.S. Occupational Safety and Health Administration (OSHA), Weatherization Assistance Program (WAP), and U.S. Department of Labor requirements.

A great majority (70%) of training providers indicated they partner with other training providers to enhance their course offerings. Providers identified a number of partner organizations, including the Board of Cooperative Educational Services (BOCES), local high schools and community colleges, and the not-for-profit Habitat for Humanity. All of these organizations provide hands-on experience, as well as use of facilities for this type of training.

Training providers also indicate that they contract directly with employers to offer training. This type of direct arrangement with employers can entail custom course offerings designed to meet a specific employers needs. Sixty-eight percent of surveyed training providers indicate they have at least one direct agreement with an employer to provide training services. Agreements have been established with the New York City Department of Environmental Protection, consulting engineers and local businesses.

FIGURE 4-6

Training providers, what kind of instruction do you offer?



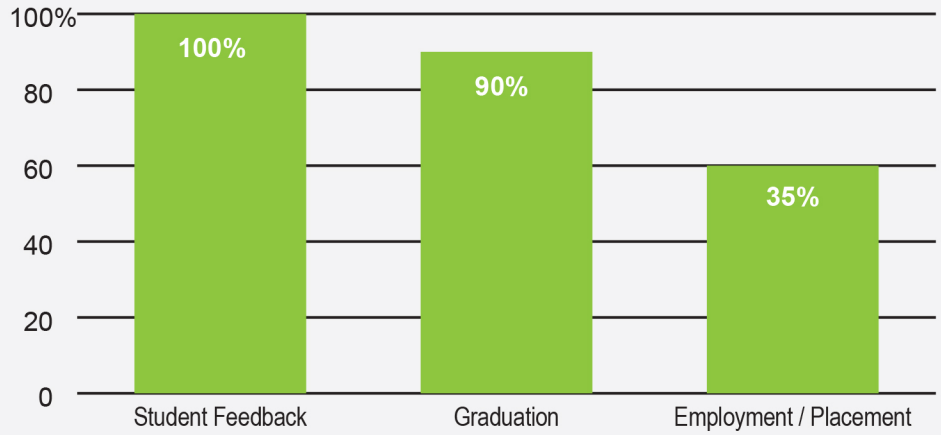
Training providers surveyed report offering several types of instruction, as depicted in Figure 4-6. Just over half (55%) of training providers offer training at job sites and only a small number (5%) offer apprenticeships. Indeed, the bulk of the training offered is classroom or laboratory-sited training. These locations stand in stark contrast with responses from employers seeking more on-the-job training (Figure 3-12). On-the-job training assistance is available to employers and workers outside of training provider offerings, however.[25]

Training providers surveyed report using student feedback and graduation rates as the primary measure of success of course offerings, as shown in Figure 4-7. Only 60% of training providers consider job placement as a measure of success, perhaps reflecting the reality that job placement is not the objective of some training. More than half of the training providers surveyed provided additional comments on measuring success, including noting processes for evaluating program success specific to individual training programs.

[25] Through NYSERDA PON 2033, on-the-job training assistance was made available directly to employers.

FIGURE 4-7

Training providers, what are your methods for evaluating the course and/or tracking success?

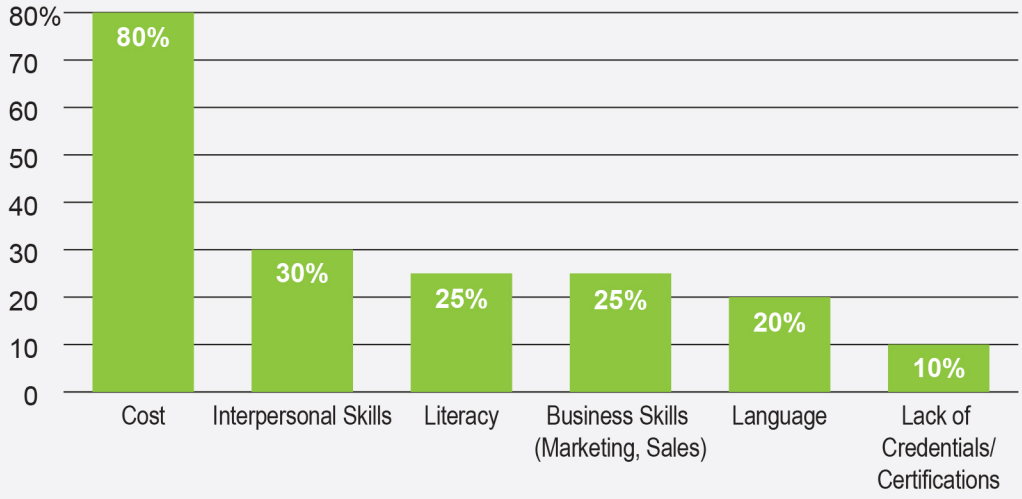


Training providers indicated that cost is the principal challenge faced by would-be students prior to enrolling in a training course, as shown in Figure 4-8. Although 88% of the training providers surveyed reported that a portion of the training program costs was reimbursable or subsidized by other agencies,[26] reimbursement rates must not fully offset the financial challenge for students. The NYSDOL Green Jobs Survey also identified cost as a significant barrier in terms of accessibility to training.[27] These findings predate NYSERDA's on-the-job training assistance granted through PON 2033, which speaks directly to employer and training provider concerns about costs.

[26] Agencies or sources providing subsidies or reimbursements to students for training: NYSERDA, Long Island Power Authority, ACCes VR (formerly Vesid), corporations, NYSDOL, private consulting firms, and the New York City Department of Environmental Protection.
[27] NYS Department of Labor, 2010, *New York State Green Jobs Survey*, 12.

FIGURE 4-8

Training providers, what are the main challenges your students face to enrolling in your training classes?



Other barriers identified by training providers included interpersonal skills (30%), literacy and business skills (25%), language[28] (20%), or insufficient credentials (10%). Some trainers also mentioned entrance requirements for math, time management challenges, lac

k of transportation, scheduling conflicts, and perceived value, as barriers to enrollment.

Barriers to learning, once in the classroom, included literacy (44%), language and interpersonal skills (38%), business skills (31%), and insufficient credentials (25%). A small number of training providers did not identify any learning barriers (6%). Trainers also identified math skills; scheduling or finding time to study; lack of construction skills, building techniques "need better screening," and "education not up to level" as barriers to learning once enrolled.

4.3 Training Provider Communications

Training providers were surveyed on their communications within the GJGNY community. Providers were asked whether they believe there are sufficient connections between employers, training providers and other green jobs

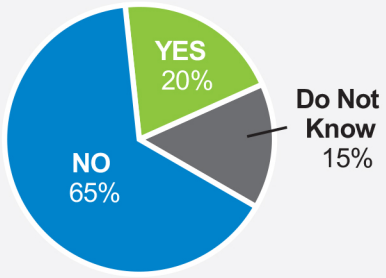
[28] Language is defined as proficiency in speaking, reading and writing the English language, as relates to persons for whom English is a second language. Literacy is general language proficiency, including ability to communicate orally and in writing. Similar but different, these two skills can hold a person back from benefiting from basic training, even in a technical field.

community stakeholders as employers observed. Training providers observed a similar lack of connections across key green jobs stakeholders, further suggesting action is needed to better connect key actors.

Nearly two-thirds of training providers surveyed (65%) stated that there is inadequate communication among contractors (65%), training providers (including unions), and other stakeholders, as shown in Figure 4-9. Only 20% of providers thought that there is adequate communication between stakeholders, and 15% responded that they didn't know. These results are even more dramatic than those given by the employer-contractors when posed the same question. (See Figure 3-15). It bears noting that the constituency-based organization contracts under the GJGNY program were awarded in early 2012, meaning the timing of this survey may have been too early to gauge the success of those contracts. In any event, the findings here support the work being done under those contracts even if they do not assess the effectiveness of that work.

FIGURE 4-9

Training providers, do you feel there is adequate connectivity between contractors, training providers and other stakeholders?



5. Discussion

New York is a leading state when it comes to creating and maintaining clean energy jobs.[29] Through GJGNY and related clean energy training efforts, New York aims to maintain and strengthen its position. The research and survey results presented in this report suggest some needed areas of focus in this effort.[30]

New York's clean energy employers report trouble finding adequately trained workers. Employers reported that training programs do not adequately prepare workers for jobs implementing GJGNY programs. Employers indicated a strong desire for more on-the-job training and difficulty around the cost of training. Survey results further revealed insufficient communication among key players in the clean energy jobs community in the State.

Stronger connections between training providers and employers will bolster the effectiveness of the current training framework in the state. With robust connections between training providers and employers, training is more likely to be well tailored to the needs of employers and clear career pathways will emerge for trainees that bridge the gap between training and employment. Given the cost considerations that both employers and training providers recognize as limitations, stronger connection among stakeholders will better utilize scarce training resources.

5.1 The Need for Trained Workers Remains

The responses of employers surveyed indicate that current training programs do not adequately prepare workers for green jobs. This issue has led to a general lack of adequately skilled workers and the need for employers to train on the job. The costs associated with this on-the-job training are generally considered a barrier to hiring and retaining workers.

Employer responses to survey questions generally confirm the opinion of experts in the jobs literature who suggest green job training must build on or include general skills training.[31] Green workers need basic knowledge in relevant subject areas, such as mathematics, science and energy. The skills pyramid developed by the Center for Energy Workforce Development, an industry cooperative, provides a helpful guide for the foundational learning necessary for workers (Figure 3-4). Soft skills and work-readiness skills, which include interpersonal skills, effective communication skills and personal qualities, are consistently identified by employers as important in hiring and in

[29] Muro, Rothwell and Saha. 2011. "Sizing the Clean Economy", 25-26.
[30] The research conducted for this study was complete in 2012 before recent and ongoing measures have been taken by NYSERDA and implemented in the states that address some of the issues uncovered here. As a result, we attempt to note recent activities without being able to assess employer and training provider assessments of these actions.
[31] White, Dresser and Rogers, 2012 *Greener Reality*, 4.

retaining employees.[32] Although these skills are not high on the list of training programs among GJGNY training providers, these types of classes have been offered with NYSERDA's help.

Employers surveyed strongly suggest that training programs should incorporate on-the-job training through internships or apprenticeships. The curriculum inventory and responses of training providers indicate that on-the-job training is not currently a central component of most training programs. On-the-job training accomplished through cooperative relationships between training providers and employers would alleviate concerns that training is not well tailored to necessary job skills, as well as employer concerns about the cost of training. Indeed, it appears that some training graduates emerge from training programs only to require additional on-the-job training, raising questions about whether scarce training resources are being wisely spent.

It should be noted that while this study was underway, NYSERDA was actively working to fill the demand for on-the-job training through direct grants to employers. Early indicators suggest that employers have greeted these on-the-job training efforts with enthusiasm. The success of these direct-to-employer programs suggest that gaps identified in formal training programs can be filled directly by helping to defer an employer's costs to train on the job.

In addition to on-the-job training, employers identified the need for training on how property owners can finance projects to improve energy efficiency, and other general marketing skills to encourage building owners to take advantage of energy efficiency opportunities. Addressing these training needs is essential to capturing energy efficiency opportunities and realizing the investments made through energy audits. Indeed, unless property owners decide to act on energy efficiency assessments, subsidized energy audits fail to produce desired benefits. Property owners, in turn, are unlikely to invest in energy efficiency if they do not understand the benefits of these investments as well as the best ways to finance the investments.

In addition to training on how to market services and finance energy efficiency work, employers identified the need for technology-specific training. This need suggests that the current training infrastructure may be ill-equipped to respond to changes in technologies installed and/or used on the job, or that there is not enough training for specific technologies, or that training providers are not doing enough to promote training opportunities. Adjustments to training programs that allow for greater adaptability will help training providers stay up on the latest technology applications in the field.

---

[32] The 2009 LMI study pointed out that basic job skills are essential and that they can present barriers to certain segments of the under and unemployed population: "employment barriers confronting economically disadvantaged individuals include but are not limited to: criminal records; probation requirements; drug use; work-readiness skill deficiency; English deficiency; reading, math and science deficiency; basic mechanical and technical skill deficiency; lack of transportation; lack of child care; and domestic violence."

It is worth noting that adding on-the-job training components to training programs would provide trainees with exposure to the areas employers have identified as missing or inadequate in existing training programs. For example, trainees on-the-job will gain exposure to the latest technologies as well as gain practice in marketing energy efficiency services and explaining financing options to property owners. At the very least, on-the-job training would help make up for the currently inadequate connections between employers and training providers.

5.2 The Need for Robust Connections between Employers and Training Providers

Although most training providers surveyed indicated that they consult with employers as they develop course offerings and seek to place training graduates in jobs, overall the results of this study demonstrate insufficient connections between training providers and employers. Connections between employers, training providers and constituency-based organizations are necessary to ensure that training programs are not only initially designed to meet employers needs, but are able to adapt over time to changes in government incentives and policies, financing environments and technology. Ideally, connections between employers and training providers should include clear career pathways that provide a bridge from training into jobs. In addition, relationships between employers and training providers should maximize use of scarce resources for training.

Employers' calls for more on-the-job training, internships and apprenticeships provide an opening to create robust new connections between training providers and employers with the potential to benefit trainees and maximize use of training resources. On-the-job training opportunities benefit employers economically while giving trainees hands-on experience and connecting training graduates to potential employers. Such experiences would entail training in areas where contractors are working using current technology in up-to-date financing and policy environments. Of course, these on-the-job opportunities can also effectively be offered directly from NYSERDA.

Finding the right individuals or populations and connecting them to the appropriate training within the GJGNY sector is equally challenging. Knowing what is available with respect to jobs and training, and where to turn for assistance, is a gap that may be filled by organizations such as the network of constituency-based organizations newly funded through NYSERDA. Constituency-based organizations can assist with bringing training providers and employers together with would-be workers.

According to the GJGNY findings, the NYSDOL as a resource seems to be underutilized, where it should be a greater resource to employers, students, and trainers. Many employers who are recruiting do not use NYSDOL One-Stop Centers. Training providers, even when registered on the NYSDOL's employer training provider list (ETPL), indicate that they do not use the NYSDOL to market their offerings as much as other avenues.

6. Conclusions and Recommendations

New York State is a leading state at the forefront of a growing green economy in the United States, thanks to a suite of State policies that drive investments in energy efficiency and clean energy. Employers and workers are on the leading edge of implementing these policies. As a result, well-prepared and well-informed workers will play a significant part in any strategy to maintain and strengthen the green economy in New York. The conclusions and recommendations below focus on how New York can improve its GJGNY-related training based on the findings of this research.

While the conclusions and recommendations below focus on where improvements are needed, it should be emphasized at the outset that a great deal of New York's workforce development for energy efficiency is functioning well. There are a large number of training providers serving nearly every part of the state with a great variety of courses. NYSERDA provides on-the-job, marketing and soft-skills training assistance, and does a consistently strong job listening to the needs of employers and training providers. The research contained in this report is certainly evidence of NYSERDA's commitment to assess the gaps between employer needs and training programs. The conclusions and recommendations below should be read with this great progress to date in mind.

6.1. GJGNY Programs Need Well-trained Workers

New York's GJGNY employers continue to encounter difficulties finding adequately trained workers. As a result, employers report that they provide most training on the job, while also indicating that access to more formal training and apprenticeships would help them.

6.2. Training Providers Should Offer More On-the-Job Training Programs

Employers surveyed want more on-the-job training programs. Internships and apprenticeships would reduce the costs to employers of training workers on the job while at the same time opening up job sites to training providers and trainees. This strategy will almost certainly lead to better-trained workers, clearer pathways from training to employment and more effective use of training resources.

6.3. Strengthen Connections Between Employers, Training Providers, Constituency-Based Organizations and Training Students

Connections between and among employers active in the GJGNY programs, training providers, trainees and constituency-based organizations (CBOs) should be strengthened to: (1) provide appropriate and relevant training; (2) make training students and employers aware of training; (3) connect training graduates to employers; and (4) avoid misallocation of scarce training resources while connecting employers to well-trained workers.

6.4. Green Job Training Must Be About More than Green Job Skills

Employers surveyed report that they seek out individuals with good communication skills and other "soft skills" that enable them to interact with building owners and others and learn quickly on the job. Training for soft skills and basic knowledge is necessary in addition to green-job-specific skills.[33] This issue can be accomplished by effective screening of training applicants.

6.5. Training Must Better Reflect Employer Demands

Whatever the mechanism to achieve the goal, training programs must better prepare training students with the skills employers demand. Among the gaps identified at the time of the surveys are: lack of training in financing options for property owners to implement energy efficiency measures and lack of understanding of certain technologies. These gaps are the result of failed connections between employers and training providers.

6.6. Better Utilize Workforce Investment Boards and DOL One-Stop Career Centers

New York State is served by a network of 32 Local Workforce Investment Boards (WIBs) and related DOL One-Stop Career Centers. A WIB's mission is workforce development: to identify and fund training needs, match workers with opportunities, and provide services and information to regional businesses. WIB boards are comprised of business, education and union representatives. A more intensive effort to continue, strengthen, and develop these one-stop-type programs is essential to increased employee hiring in the GJGNY sectors.

6.7 State Planners Should Ensure Green Jobs Community Communicates Regularly

Mechanisms for regular communication between stakeholders can provide ongoing training improvement and stronger opportunities for new entrants to transition into green jobs. State program planners might provide opportunities for contractors, employers, training providers, CBOs, and trade associations, and state agencies to come together on a regional and regular basis.

Improved worker training in New York State will help meet existing employer demand. It is likely that better prepared and better informed workers will also improve the effectiveness of programs by helping building owners get the information necessary to make sound energy efficiency investment decisions.

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[33] Worker Readiness funds have been targeted by NYSERDA to support career pathways for disadvantaged workers. This population, the socioeconomically disadvantaged, is a priority population on several GJGNY workforce development projects. For example, under PON 2033 (on-the-job training) NYSERDA requires that individuals hired are registered with their local NYSDOL One Career Center. Coordination with NYSDOL allows NYSERDA to better target the unemployed and underemployed.

Appendices

Appendix A Research Methodology

Appendix B New York State Green Jobs Landscape

Appendix C Survey and Focus Group Forms

Appendix D Survey responses

Appendix E List of consolidated job titles from GJGNY programs

Appendix F Training providers and Curriculum Inventory

Appendix G Glossary

Appendix H Relevant findings of NYSDOL study

Appendix A Research Methodology

The research team worked closely with the Department of Labor's Green Jobs Survey team, relying not only on their data but also their considerable experience. The Green Jobs Survey team was able to provide insight from lessons learned during their larger-scale research effort. This feedback was instrumental in informing the early stages of the GJGNY research reported herein.

While the Green Jobs Survey provided a good foundation for the GJGNY research, the breadth and scope of that study's supply- and demand-side quantitative efforts made it difficult to draw one-to-one connections. The research team, with a smaller, finite GJGNY scope, was able to address the issues of connectivity between employer demand and the training provider supply chain through focus groups and telephone interviews. In an unprecedented and groundbreaking effort, the research team brought together contractors, training providers, and constituency-based organizations (CBOs) to collaboratively explore issues and think about how to bridge the gaps that exist between training and employment. In addition, through a survey instrument that sought to draw parallel data from each party, the groups were able to explore the strengths or limitations in existing communications, as well as the challenges that exist in developing training programs that respond directly to employer needs.

The methodology used in drawing data from earlier studies, applying it to the GJGNY study, and relating it to the goals of GJGNY through specific approaches and procedures, is described in the following sections.

Program – Occupation Database

As a starting point, the research team examined the GJGNY program goals and activities very closely in order to review and analyze data with those goals and activities in mind. The research team developed a database tool that incorporates GJGNY's programmatic goals, relevant occupations, associated professional certifications, and baseline data from the Green Jobs Survey. Occupations were paired with appropriate Occupational Information Network (O*NET), Standard Occupational Classification (SOC) and North American Industry Classification System (NAICS) codes, where possible.[34] The resulting database tool was used to understand where data and information gaps existed, as well as to frame the research team's understanding of key relationships between occupations and GJGNY programs.

[34] O*Net is the replacement for the SOC system and provides the most specific data on the energy efficiency field. O*Net is also preferred when compared to other classification systems as "*neither SOC or NAICS codes identify green or environmental groupings of industries or occupations.*" Muro, Rothwell and Saha, "Sizing the Clean Economy", p 26.

With the database tool in hand, the research team moved forward with qualitative research that includes stakeholder focus groups and quantitative survey instruments to gather data around gaps in training curricula and needs of employer-contractors throughout the state. The information from this database tool was also plotted on maps to provide geographic representation of employer-contractors and training providers throughout the state.[35]

The research team looked for gaps in the Green Jobs Survey and the identified gaps evolved into key topics of exploration for subsequent focus groups and surveys. The first approach to the employer survey in the Green Jobs Survey involved direct analysis of the response data. In order to leverage the value of the survey, the research team examined the 1) individual item responses, 2) distribution of responses across industries, and the 3) distribution of responses across regions.[36] An additional layer of analysis involved the creation of links between employer responses, GJGNY programs, and training providers using SOCs from the United States Department of Labor Bureau of Labor Statistics and O*Net classifications where possible.[37] This allowed the research team to consider potential differences across NYSERDA programs. This matrix was used internally as a research tool to guide the research design.

Supply-Side Methodology

After doing considerable work with the Green Jobs Survey data, the research team utilized the training provider database developed for the NYSDOL Survey to better understand the training program context for the GJGNY study. More than 900 training programs were reviewed with NYSERDA and reduced to a more select group of programs, using the following parameters:

- Energy efficiency programs and training, including training that is inclusive of energy conservation measures identified in the (EEPS) program and which provides training or supports knowledge of equipment used under these programs.
- Programs that support skill sets and occupations in the HPwES®, MFP, and SCEA.
- Renewable energy training in solar thermal programs.
- Certification programs leading to a nationally recognized credential.
- Certificate programs with energy efficiency or a solar thermal component.
- Credit-bearing courses that are part of a degree program.
- Degree programs that provide the background for careers in the GJGNY industry sectors.

[35] An overview of the findings of the Green Jobs Study that the research team considered potentially useful for the GJGNY study, and a description of the approach used to analyze these elements are included in Appendix H.
[36] All data received from the NYSDOL study were either in aggregated form, or otherwise provided to the research team so as to not reveal any information that was to be kept confidential.
[37] http://www.bls.gov/soc/socguide.htm.

The information assembled from this analysis provided insights as to the distribution of programs throughout the state, the types of programs offered, and assisted in an analysis conducted to compare existing training with GJGNY employer-contractor needs. These data also served to inform next steps in the research.

Demand-Side Methodology

In order to construct the employer-side methodology, the research team used the contractors included in NYSERDA databases listed to serve the needs of the three GJGNY programs: the HPwES®, the MPP and the SCEA programs. By compiling the current lists of contractors or firms that are included in the NYSERDA databases for these programs and drawing from these lists to select participants in regional focus groups and a state-wide telephone survey (described in full in the sections, below), the research team was able to map the distribution of this group and capture the views of the most active members of these programs. Through these findings, the research team was able to draw conclusions about the trends, gaps, and positions on training and hiring/recruitment within this industry sector in New York State.

Focus Group Methodology

After reviewing the Program-Occupation Database and results from the Green Jobs Survey and executing the supply-side methodology, the research team identified key topical questions that required further exploration through focus groups and surveys. The research team conducted four focus groups in different regions of the State to explore topical and geographical gaps identified from analysis of existing data. The purpose of the focus groups was to identify training gaps within energy efficiency and energy-related training programs that support GJGNY initiatives, and to encourage feedback from these groups of stakeholders regarding the effectiveness, relevance and availability of these programs. It is important to note that this approach differed from previous studies: by assembling the contractors with the training providers, the research team was able to examine issues not previously explored in earlier studies, such as which particular skill sets were most desirable to employers active in the GJGNY programs, or which training programs were not available in the marketplace.

As demographics vary widely in New York State regarding energy efficiency and energy-related services, and businesses and training, focus groups were conducted in various regions throughout the state:

- Buffalo/Rochester (includes Syracuse and surrounding area).
- Albany (includes the Hudson Valley, Capital Region, and the North Country).
- New York City and the five boroughs (includes Manhattan, Brooklyn, Queens, Bronx and Staten Island; also includes White Plains and Westchester area).
- Long Island (includes Nassau and Suffolk counties).

In order to comprehensively assess potential gaps in existing training programs, multiple stakeholder groups participated in each of the focus groups. By considering the collective perspectives of these individual groups the research team was able to effectively identify and better understand gaps between green skills that training programs provide and competencies that contractors and green firms in New York seek. Notably, this study represents the first time these stakeholder groups were brought together, and this approach represents a unique effort to promote connectivity between key stakeholder groups in the "green" industry.

Identifying Stakeholder Groups

Each regional focus group included between 8 and 11 participants, and included representation from each of the four stakeholder groups described below. This focus group effort contrasts with the NYSDOL Survey and is a first for NYSERDA and NYSDOL by bringing these different groups together, face-to-face for the first time (see below). In this way the research team was able to address in-depth issues related to whether and how these groups connect to, interact with, and understand each other. Participants for each group were selected as follows:

- *Contractors* – For contractor participants, the research team selected contractors from NYSERDA's HPwES (1 - 2 participants), MPP (one participant), and SCEA (one participant) programs. Contractors participating in NYSERDA's programs offer significant insight into the green skills, occupations, and/or certifications needed to perform the jobs to satisfy energy efficiency goals in residential, multi-family, and commercial applications. As the primary driver of demand for green labor, their perspective is integral to understanding skills needs as they pertain to green training throughout the state. Participants of the focus groups were affiliated with all organizational sizes: sole proprietors, small firms, and large engineering or construction companies. As such, bringing these companies together with providers of green training, courses or credentialing programs, and degree programs specifically related to GJGNY initiatives in order to identify and understand skills and training gaps was a critical goal of this study.

- *Training Providers* – For training providers, the research team selected providers (1-2 participants) funded by NYSERDA and one or two other participants from the newly restructured training provider inventory. These training providers were from degree-program institutions, non-degree, certification, or vocational schools. Because these were already pre-selected in the inventory, each of these training programs was known to include energy efficiency training or renewable energy training at various levels, from basic skills training, to graduate-level courses.

- *Labor Organizations* – For organized labor (one participant), the research team selected a significant member organization for the construction trades in New York that is developing and implementing "green" training for their apprenticeship programs. The organization offers both a unique perspective and a training

model that may provide valuable lessons for non-labor training providers, credentialing bodies, and contractors alike. In addition, these organizations are closest to their members – they know best what employment needs exist, where employment gaps occur in their communities, and what their membership requires for professional development.

- *Constituency-Based Organizations (CBOs)* –The research team selected CBOs under contract to NYSERDA (1-2 participants) that provide outreach, skills development and placement services; contracting services; and/or "green" training as it relates to GJGNY initiatives. Each CBO is unique in its role in the NYSERDA program. CBOs recruit homeowners to perform energy audits, educate their community about energy efficiency and the opportunities that the GJGNY program provides, conduct workforce training, provide support to GJGNY-related job-seekers, assist a particular neighborhood or ethnic group in energy topics, or any combination of the above. These organizations were selected to participate in the focus groups because of their unique role in potentially connecting contractors and training providers under the GJGNY program. In many instances, CBO efforts are directed toward underprivileged, minority, youth and/or previously incarcerated populations. These organizations may be an integral component of assisting underserved entry-level "green" job trainees to enter the "green" jobs workforce for the first time.

Questionnaire Development for Focus Groups

In addition to identifying participants in the focus groups, the research team compiled topic areas and questions for the focus groups for contractor and provider (including labor organizations and CBOs) questionnaires. CBOs were also encouraged to provide input on the contractor questions when appropriate, as some CBOs perform multiple functions, including homeowner and business outreach and workforce development outreach.

The focus groups were designed to obtain qualitative information in four overarching areas pertinent to the study. These themes were presented at the outset of each focus group meeting:

- Identify opportunities to improve GJGNY-related training programs to minimize possible gaps.
- Connect employers to potential employees, and job candidates to available jobs.
- Communicate of needs and interests between stakeholders (i.e. contractors, training providers, unions, CBOs).
- Identify and overcome barriers to hiring.

Specific questions relating to each group were developed for contractors, training providers and other participants in the areas of hiring and job retention. These questions addressed experience with energy efficiency or energy related training, outreach, placement, barriers to hiring and retention (for contractors) and barriers to learning and employment of students (for training providers). Prior to conducting the regional focus groups, subject matter areas

and questions were pre-screened for relevance, accuracy, and comprehensiveness with the Pace Team and selected advisors.

Focus Group Pre-Participation Forms

Prior to hosting each of the four focus groups, participants were asked to fill out a simple questionnaire. The questionnaire captured information such as the name, location, the size of the participant's employer, the role of the employer as it related to the green jobs market, the role of the employer as it relates to GJGNY, and the hiring activities of the employer in the last 12 months. A copy of the questionnaire can be found in Appendix B.

Telephone Survey Methodology

A survey was developed to provide quantitative data to confirm or supplement information obtained from the focus groups, and was designed to parallel the focus group questions as closely as possible. Two electronic surveys, administered by telephone with approximately 25 questions each, were developed and customized for contractors and training providers and include questions covering the same topic areas as the focus groups, namely hiring and retention, experience with energy efficiency or energy-related training, outreach, employee placement, and barriers to employment. Prior to implementation, surveys were reviewed and tested for relevancy, accuracy and time factors by the research team, and through a few initial telephone surveys. Copies of these surveys are found in Appendix B.

Respondent Selection

Participants in the telephone survey were selected using similar stakeholder group associations as used to form the focus groups, but telephone survey participants were selected to achieve better geographical and industry coverage. Twenty NYSERDA contractors, including contractors participating in NYSERDA's HPwES program, MPP, and/or the SCEA program, and 20 training providers providing energy efficiency, energy-related and/or solar thermal training programs throughout New York State were contacted. Some NYSERDA contractors and training providers were selected at random from the database developed for this study.

Survey Administration

Using Survey Monkey as the instrument, selected participants were contacted by telephone and were read a series of questions and provided with potential answers over the phone by an interviewer from the research team. Participants were assigned unique identifiers and all answers were entered into the on-line Survey Monkey instrument by the interviewer. Participants provided feedback with a guarantee of anonymity.

Appendix B New York State Green Jobs Landscape

The Green Jobs-Green New York Act of 2009

The Green Jobs Green New York Act of 2009,[38] which was signed into law on October 9, 2009, directs NYSERDA to manage and operate programs designed to achieve the goals set out in the Act. The rationale behind GJGNY was that offering free and reduced-cost residential and commercial energy audits would lead to a greater demand for energy audits. Energy and cost-saving recommendations resulting from the audits, coupled with access to financing, would lead to investments in energy efficiency upgrades. Greater demand for energy efficiency projects would require a well-trained green workforce and would result in a range of benefits including the expansion of a competitive, green job-creating industry; increased energy savings; fewer energy-associated emissions; and healthier and safer homes, multi-family buildings, and offices throughout the state. The GJGNY program is funded through a one-time legislative allocation of $112 million in proceeds from allowance auctions under RGGI.[39]

The GJGNY program supports sustainable community development by creating green job opportunities, including opportunities for new entrants into the state's workforce, such as unemployed and displaced workers. By making financing available to homeowners and businesses for energy efficiency improvements and renewable energy installations (solar thermal),[40] the programs reduce up-front financial burdens of equipment installation or weatherization that might otherwise prevent home or business owners from making energy efficiency investments. The GJGNY program is further strengthened with financial support for training programs and curriculum development, which are integral to the development of a green collar workforce in New York State.
Energy efficiency services provided through GJGNY are offered by sector: one-to-four Family, multifamily, and small business or non-profit. The one-to-four family sector services are delivered through NYSERDA's existing program, Home Performance with ENERGY STAR® (HPwES®). Services for the multifamily sector are primarily delivered through NYSERDA's Multifamily Performance Program (MP), but may be supplemented by other NYSERDA programs, such as the low-rise multi-unit component of HPwES, or NYSERDA's commercial programs if only limited common-area energy efficiency work is to be accomplished. The Small Commercial Energy Assessments program (SCEA) is served by two existing NYSERDA programs, the FlexTech Program and the

[38] http://www.nyserda.ny.gov/en/Program-Areas/Energy-Efficiency-and-Renewable-Programs/~/media/Files/EDPPP/Planning/GJGNY/Green%20Jobs%20GreenNY%20Legislation/gjgnylaw_palsection1890-1899-A.ashx
[39] http://www.nyserda.ny.gov/Program-Areas/Energy-Efficiency-and-Renewable-Programs/Green-Jobs-Green-New-York.aspx
[40] http://www.nyserda.ny.gov/en/Program-Areas/Energy-Efficiency-and-Renewable-Programs/~/media/Files/EDPPP/Planning/GJGNY/Green%20Jobs%20GreenNY%20Legislation/gjgnylaw_palsection1890-1899-A.ashx

Business Partners Program.[41] The overall goal of each of these programs is to promote operational energy efficiency within each of the target building sectors through:

- installation of clean energy technologies;
- reduction of energy consumption, energy costs, and greenhouse gas emissions;
- support for economic development; and
- creation of green job opportunities.

Each of the programs are described in more detail below.

The HPwES® program targets one- to four-family homes and provides comprehensive energy performance assessments (energy audits) by certified energy auditors. Home energy assessments include an inspection of a home's insulation, heating and cooling systems, and energy use, and identification of cost-effective energy savings opportunities for the homeowner. In addition, the HPwES® program identifies available incentives and offers low-interest financing options and on-bill recovery to assist homeowners with managing the cost of energy efficiency investments. Additional incentives may be offered to households that qualify through the Assisted HPwES®[42] or EmPower[43] programs, for moderate- and low-income households, respectively. The HPwES® program relies on a diverse network of independent contractors certified by the national credentialing organization, the Building Performance Institute (BPI), to perform the work.

The goal of the MPP is to improve energy efficiency, health, safety, and security in the residential multi-unit or multifamily building sector, provide affordable options to finance building upgrades, and support green jobs associated with performing energy efficiency audits and upgrades in the multifamily building sector. Similar to the HPwES® program, the MPP begins with benchmarking activities to identify "relative" energy efficiency followed by a comprehensive energy audit. Audit findings are used to establish building energy performance targets and develop Energy Reduction Plans for achieving targets. Program requirements specify that projects eligible for financing through the MPP must be shown to be cost effective over the lifetime of the project. The MPP relies on a network of "Partners", professionals experienced in providing energy performance services to the multifamily building sector.

The SCEA program is designed to promote energy efficiency and installation of clean energy technologies in the small business and not-for-profit sectors. In addition, the SCEA program aims to reduce greenhouse gas emissions, support economic development, and foster green job opportunities in the small business building sectors. Two NYSERDA commercial sector programs support the SCEA program, the FlexTech Program and the Business

[41] Flex-Tech contractors were not interviewed as part of this study.

[42] Assisted HPwES provides income-eligible New Yorkers with subsidies and low-interest financing.

[43] Empower New York provides no-cost energy efficiency solutions for income-eligible New Yorkers. See http://www.nyserda.ny.gov/Page-Sections/Residential/Programs/Low-Income-Assistance/EmPower-Overview.aspx.

Partners Program. Together these programs achieve the SCEA programmatic goals by offering services such as commercial energy audits, technical energy analyses, retro-commissioning studies, and education and training around proper installation of heating, ventilation and air conditioning systems (HVAC), commercial lighting, and electric motor systems. The SCEA program offers options for financing projects aimed at increasing energy efficiency and lowering energy bills. Low interest loans are offered through partner lenders or through on-bill recovery programs through partner utilities.

An essential ingredient for GJGNY success is an available, knowledgeable workforce that can effectively conduct energy audits, educate building owners about audit findings, recommend energy improvements, and perform appropriate upgrades. Quality training programs that meet national credentialing standards result in a workforce that can consistently install and maintain systems in such a way that the industry benefits from a uniform standard of work. In this way, green job training programs and professional development opportunities are necessary to support the careers required to deliver programmatic goals under GJGNY. Therefore, it is important to understand the extent to which green job training programs are effectively teaching skills and certifications for which there is a demand in the green labor market of New York. Any gaps identified between content presented in training programs and competencies that contractors and green firms are seeking will help inform policies to improve state training programs.

New York State's Clean Energy Industry: Labor Market and Workforce Intelligence Study

In 2009, the NYSDOL completed a Labor Market and Workforce Intelligence study (LMI Study)[44] that characterized the clean energy labor market in the state and began to inventory workforce development and training programs. The report looked at six clean energy sectors: solar installation, solar manufacturing, wind installation, wind manufacturing, weatherization, and the energy service company sector. Characterization data were summarized for each of these clean energy sectors, including wage data, education and training requirements, and education clusters. Of these sectors, the weatherization sector is most closely aligned with GJGNY program activities.

Job titles were compiled for all industry sectors and all education clusters. Of the entire list of 20 weatherization-related job titles examined, 18 of the education clusters that pertain to weatherization careers require high school or some college for persons pursuing those careers. Typical education and training requirements for weatherization jobs also require various levels of on-the-job training. Some occupations, such as cost estimators, first-line

[44] NYS Department of Labor, Division of Research and Statistics, *New York State Green Jobs Survey*, RS-GR11, p. 12.

construction supervisors, construction managers, general / operations managers, accountants, and auditors, require work experience, bachelor degrees, or a combination of the two.

The LMI study noted that required job skills, job titles, and the supply-demand relationship of jobs in the clean energy economy are mostly similar to those in the wider labor market. For example, installers of solar hot water heaters or workers retrofitting energy efficiency equipment in buildings require many of the same construction skills that are required for "conventional" construction trades. Skills required for clean energy jobs, in many cases, require incremental training, not necessarily a new set of unique green-collar skills.

A common misconception is that one can train exclusively for entry into the clean energy economy. In reality, job seekers must possess traditional trade skills, such as construction, carpentry, electrical, or plumbing, as well as advanced skills specific to energy efficiency or renewable energy. The clean energy field presents opportunities for people who are transitioning from other industries, such as new construction, because they can build upon their previous skills-based training to enhance their qualifications as they seek to enter the clean energy sector.

For 17 of the 20 weatherization job titles, this study found the existing labor supply to be "tight," meaning that employers were having trouble finding skilled workers. Thus, at the time this report was written, there was demand for effective workforce training programs for weatherization-related occupations in New York.

When looking at all sectors of the clean energy economy, this study found that more than half (57%) of clean energy business resided within the Hudson Valley, New York City, and Long Island. This finding is consistent with other reports that have found that clean energy economies are larger around large metropolitan centers.

New York State Department of Labor Green Jobs Survey

Another key foundational study is the New York State Department of Labor Green Jobs Survey,[45] completed in 2010.[46] The goal of the NYSDOL Green Jobs Survey was to assess employer demand for green workers and the supply of green education and training opportunities throughout the State. The study focused on employers that produce goods and deliver services "that increase energy efficiency or generate renewable energy" and the

[45] NYS Department of Labor, *Green Jobs Survey*, p. 12.
[46] The NYSDOL conducted this green jobs study in conjunction with the following research partners: New York City Labor Market Information Service at the City University of New York Graduate Center, the Advanced Energy Research and Technology Center at Stony Brook University, and the Energy and Environmental Technical Applications Center at the University at Albany.

employees who work for them. Because a number of these occupations are not a part of the GJGNY Program[47], this study as the LMI Study before it, only partially overlaps with the focus of the Green Jobs Green New York Study.

The NYSDOL Green Jobs Survey identified industry sectors where green jobs appeared well represented and green occupations appeared to be in high demand, including within the construction, professional services, building services, and manufacturing industry clusters. In addition, the study defined industry clusters and occupations using the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) codes.[48] The Green Jobs Survey included, in part, a survey of more than 20,000 businesses throughout the state. The study's results highlighted opportunities for additional investigation and data gathering by the research team in an effort to explore existing gaps between the skills delivered by the existing workforce training infrastructure and the knowledge and experience demanded by green occupations that support the goals of GJGNY.

The training provider side of the Green Jobs Survey encompassed the training programs and courses that teach skills required for green careers in the state. The Survey primarily focused on identifying training and education programs that prepare students for occupations found in four main industry clusters (construction, professional services, building services and manufacturing), although information on additional industry clusters was collected. Programs identified included degree and non-degree programs; credit and non-credit courses; in-person, on-line, and blended learning (a combination of learning formats) offered by community colleges, universities, constituency-based organizations, BOCES and Career & Technical Education high schools, labor unions, credentialing organizations and private entities. Approximately 900 programs were identified and included in the dataset.[49]

A number of findings from the NYSDOL Survey were used to design the GJGNY study.[50]

Brookings Institution Report

Additional background information for this study was provided by the Brookings Institution report entitled, *Sizing the Clean Economy.* As its title suggests, this report sought to address the general lack of information on the size and

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[47] Some of these occupations included cleaning services, recycling and grounds keeping (associated with sustainability), which are not occupations associated with the GJGNY program. The NYSDOL Green Jobs Study relied heavily on data from the LMI study described above.

[48] To the extent possible, the current GJGNY study also links occupations to these codes. However, the research team did not limit its list of occupations to those defined by the NAICS or SOC systems, but expanded the list to those occupations listed in the O*Net classification system.

[49] http://www.labor.ny.gov/stats/green/statewide-findings.pdf

[50] http://www.labor.ny.gov/stats/green/statewide-findings.pdf

nature of the clean or green economy. Using industry and employment data from 2003 through 2010, the report provides a comprehensive, national assessment of trends in the clean economy across sectors.[51]

The Brookings Institution report defines the clean economy to be extremely large, employing more workers than the fossil fuel industry across a diverse number of industries. More than two-thirds of clean economy jobs are found within the nation's largest metropolitan areas. Most clean economy jobs involve delivering products or services aimed at protecting the environment, rather than deploying renewable energy or increasing energy efficiency. Compared to the nation's entire economy, occupations within the clean economy offer more job opportunities and higher wages for workers with low and middle-range skill sets.

Although the Brookings Institution report took a nationwide view and considered occupations and industries in the clean economy in broad terms, there are a number of findings relevant to the GJGNY program in New York State. For example, the New York Metropolitan region, including New York City, Northern New Jersey, and Long Island has the largest number of clean economy jobs among the nation's 100 largest metro regions. In addition, New York State is reported as having the second largest number of clean economy jobs when compared to other states, after California. The Albany metro region ranked highest in terms of percentage of clean jobs as a share of total jobs with 6.3% when compared to the 100 largest metro areas nationwide. Thus, New York State, the New York City metro region, and Albany display strength within the nation's clean economy.

The report also highlights how NYSERDA is fostering clean tech innovation by promoting successful partnerships between early stage clean tech companies and regional incubators, which provide guidance, technical assistance and consultation to companies to help them develop and commercialize clean energy technologies. Since 2009, NYSERDA has invested nearly $9 million in six clean tech incubators through the Clean Energy Business Incubator program, among them three in Western New York: Rochester Institute of Technology's Venture Creations; the University of Buffalo's Office of Science, Technology Transfer, and Economic Outreach; and the Tech Garden at Syracuse. [52]

From a national perspective, more than two-thirds of all clean economy occupations fall within the "green-collar" category. [53] "Green-collar" jobs include installation and construction occupations, which are particularly relevant and necessary in achieving GJGNY program goals. Improving training program outcomes and sharpening the job skills of New York's green-collar workforce would significantly improve job opportunities in the State's clean economy.

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[51] Muro, Mark, Jonathan Rothwell, & Devashree Saha, "Sizing the Clean Economy: A National and Regional Green Jobs Assessment," Brookings Institution, 2011.
[52] Ibid.
[53] Ibid.

Appendix C Surveys and Focus Group Questionnaires

GJGNY

***1. Interview ID or phone number used during interview:**

2. Please use these items to describe your business:

- ☐ Contractor - single family
- ☐ Contractor - multi family
- ☐ Contractor - commercial
- ☐ Provider
- ☐ CBO

Other (please specify)

3. How many customers does your organization serve in a typical year?

Number of customers/students, etc:

4. Has your organization hired anyone this year?

- ☐ No
- ☐ Yes

If yes, how many?

5. What zip code is your business location?

zip code:

6. How many people work in your organization?

Number of employees:

Number of Volunteers:

7. Do you experience any difficulty in hiring adequately skilled applicants when your company recruits new employees?

- ○ Yes
- ○ No

Other (please specify)

Page 1

GJGNY

8. What are the most important qualities that lead to hiring an employee?

- [ ] training
- [ ] job site
- [ ] experience
- [ ] interpersonal skills
- [ ] education
- [ ] language
- [ ] certifications

Other (please specify)

9. What qualifications have you found to be most valuable in retaining employees you've hired?

- [ ] personal qualities
- [ ] certifications
- [ ] experience

Other (please specify)

10. How do you find applicants to fill open positions in your company?

- [ ] Word of mouth/referrals from employees
- [ ] papers
- [ ] internet
- [ ] public postings (hanging flyers, etc)
- [ ] public locations (day labor from stores, landmarks, etc)
- [ ] placement services
- [ ] job fairs

Other (please specify)

11. Do you utilize energy efficiency or energy-related training and/or certification or credentialing programs for yourself or for your employees?

- ○ Yes
- ○ No

12. Why did you select them?

- [ ] location
- [ ] cost
- [ ] convenience
- [ ] offerings (course selection)
- [ ] language (for non-english speakers)
- [ ] NYSERDA requirement
- [ ] n/a

Other (please specify)

13. How did you find out about them?

- [ ] NYSERDA
- [ ] Web
- [ ] Radio
- [ ] Newspaper
- [ ] word of mouth
- [ ] former student
- [ ] teacher
- [ ] n/a

Other (please specify)

14. Is energy-related training readily available in your region or area?

- ○ yes
- ○ no

Other (please specify)

15. Do you feel these programs adequately prepare employees for positions at your company?

- yes
- no

Other (please specify)

16. Do you feel that outreach efforts of training providers are reaching those companies/individuals who could hire students trained by these programs?

- yes
- no
- n/a

Other (please specify)

17. What format of training works best for your organization?

- classroom
- on-line
- in-house through a training provider or consultant
- in-house OJT while performing actual job

Other (please specify)

18. What, if any, training or credentials have you found to most directly translate to success on the job?

- LEED GA
- LEED AP
- BPI Building Analyst
- BPI Envelope Professional

Other (please specify)

19. Do you require/prefer your employees to have credentials/certification?

- ○ yes
- ○ no

If yes, please specify

20. If you do not utilize these training/certification programs, why not?

- ☐ not necessary
- ☐ too expensive
- ☐ too far away
- ☐ too much time off job site
- ☐ not directly applicable
- ☐ n/a

Other (please specify)

21. If not, how do your employees gain the necessary qualifications for your line of business?

- ☐ prior training
- ☐ on their own time
- ☐ in-house through a training provider or consultant
- ☐ in-house OJT while performing actual job
- ☐ n/a

Other (please specify)

22. Do you have any direct communication with training providers as they seek to adapt to market demand or develop new curricula in your field?

- ○ yes
- ○ no

Other (please specify)

23. Do you feel there is adequate connectivity between contractors, training providers (including Unions) and CBOs to connect employers with potential employees?

- ○ yes
- ○ no
- ○ n/a

Other (please specify)

24. Do you see the following as barriers to hiring or retaining employees as it relates to training?

- ☐ Language
- ☐ Literacy
- ☐ Soft Skills (responsibility, communication, etc.)
- ☐ Hands on experience (lab, internship, apprenticeship)
- ☐ Business skills (marketing, sales)
- ☐ Credentials or certifications
- ☐ Changes in industry requirements, regulations, and codes
- ☐ Cost of training
- ☐ Availability of appropriate training
- ☐ Outreach and placement efforts of training providers/community agencies

Other (please specify)

25. What types of (additional) training do you wish were available but have been unable to find?

- ☐ energy-specific marketing
- ☐ energy-specific finance
- ☐ community outreach for lead generation
- ☐ hands-on apprenticeship programs in energy efficiency
- ☐ technology-specific training related to a specific type of equipment, system, application, etc
- ☐ other technical training modules

Other (please specify)

GJGNY

26. name

27. phone

28. email

29. note

Provider

***1. Interview ID or phone number used during interview:**

2. What type of training do you offer?

- [ ] degree / credit
- [ ] non-degree (vocational training) or non-credit?

Other (please specify)

3. Do you offer clean energy (EE and weatherization) training courses?

- ○ yes
- ○ no

Other (please specify)

4. Do you offer clean energy (renewable energy - solar thermal, solar PV, geothermal) training courses?

- ○ yes
- ○ no

Other (please specify)

5. How long have you been offering energy efficiency training?

years

6. How long have you been offering renewable energy training?

years

7. How many people enroll in a typical course?

attendees

8. Is there a website that lists the courses?

9. What is the primary zip code where you typically offer your training?

zip code

Provider

10. How do you market your course offerings?

- ☐ web
- ☐ mailings
- ☐ professional associations
- ☐ Department of Labor
- ☐ periodicals/newspapers
- ☐ brochures
- ☐ radio/tv

Other (please specify)

11. What kind of instruction do you offer?

- ☐ classroom
- ☐ hands-on
- ☐ lab
- ☐ apprenticeship
- ☐ job site training
- ☐ online

Other (please specify)

12. How do you decide what training programs/courses to offer?

- ☐ NYSERDA program requirements
- ☐ other training providers
- ☐ institutional decision making
- ☐ contractors
- ☐ students
- ☐ media

Other (please specify)

Provider

13. Do you have direct agreements with businesses to offer job site or customized training / externships?

- ○ yes
- ○ no

Other (please specify)

14. Do you partner with other training institutions to enhance your course offerings or to fill training gaps?

- ○ yes
- ○ no

Other (please specify)

15. Do you offer energy-related certification or registered apprenticeship training?

- ○ yes
- ○ no

16. If yes, do you offer classes to maintain those certifications?

- ○ yes
- ○ no

Other (please specify)

17. Do you provide any tools to help the student transition from school to job placement?

- ☐ job placement services
- ☐ resume development
- ☐ job fairs
- ☐ alumni associations
- ☐ registered apprenticeships
- ☐ internships
- ☐ none

Other (please specify)

Provider

18. What are your methods for evaluating the course and/or tracking success?

- ☐ Graduation
- ☐ Employment/placement
- ☐ Student feedback

Other (please specify)

19. What is the success rate (for completion) of your programs?

rate

20. Are you affiliated with (or have a relationship with) any organizations that could potentially hire your trainees or provide internship opportunities to help bridge the gap between training and employment?

- ○ yes
- ○ no

Other (please specify)

21. Do you have any direct communication with employers (home performance contractors, weatherization contractors, or engineering firms) as they seek to find appropriate training for their staff or new hires?

- ○ yes
- ○ no

Other (please specify)

22. Are you registered on the NYS Department of Labor's Eligible Training Provider List (ETPL)?

- ○ yes
- ○ no

Other (please specify)

Provider

23. Do you feel there is adequate connectivity between contractors, training providers (including Unions) and CBOs to connect employers with potential employees?

- ○ yes
- ○ no
- ○ don't know

24. Do you think your students experience barriers to enrollment in your training classes:related to the because of the following:

- ☐ language
- ☐ literacy
- ☐ interpersonal skills?
- ☐ business skills (marketing, sales)
- ☐ lack of certifications or credentials
- ☐ cost
- ☐ n/a

Other (please specify)

25. Do you think your students experience barriers to learning in your training classes:related to the because of the following:

- ☐ language
- ☐ literacy
- ☐ interpersonal skills?
- ☐ business skills (marketing, sales)
- ☐ lack of certifications or credentials
- ☐ n/a

Other (please specify)

26. Is any portion of your training program(s) reimbursable/subsidized by other agencies?

- ○ yes
- ○ no

if yes, list the source:

Provider

27. name

28. phone

29. email

30. notes

FOCUS GROUP QUESTIONNAIRE:

CONTRACTORS:

a. How do you find applicants to fill open positions in your company?
b. Do you experience any difficulty in hiring adequately skilled applicants when your company recruits new employees? Please explain.
c. What are the most important qualities that lead to hiring an employee
    i. Training, experience, soft skills, other
d. What qualifications (personal qualities, certifications, experience) have you found to be most valuable in retaining employees you've hired?

CONTRACTORS:

a. Do you utilize energy efficiency or energy-related training and/or certification or credentialing programs for yourself or for your employees?
    - If yes:
        - Which ones and why did you select them?
        - How did you find out about them?
        - What format of training works best for your organization? (classroom, on-line, in-house through a training provider or consultant, in-house OJT while performing actual job, etc)
        - Do you require/prefer your employees to have credentials/certification?
    - If you do not utilize these training/certification programs:
        - Why not?
        - How do your employees gain the necessary qualifications for your line of business?

TRAINING PROVIDERS:

a. How long have you been offering energy efficiency training? Facilitator define EE (HPwES, MPP, Flex-Tech) vs. RE (Solar Thermal, Geothermal, Wind ONLY)
b. Do you offer clean energy (EE and RE) training courses, and is there a website that lists the courses?
c. Do you offer hands-on, lab, apprenticeship or other types of simulated job site training?
d. How do you decide what training programs to offer?
e. Do you have direct agreements with businesses to offer job site or customized training?
f. Do you partner with other training institutions to enhance your course offerings or to fill training gaps?
g. Do you offer energy-related certification or registered apprenticeship training?
    - If so, please specify programs
    - Do you provide other continuing education to support the maintenance of these designations?

CONTRACTORS: Is [relevant] energy-related training readily available in your region or area?

- Do you feel these programs adequately prepare employees for positions at your company?
- What, if any, training or credentials have you found to most directly translate to success on the job? (Make sure attendees are specific with credentials)

TRAINING PROVIDERS - Methods for evaluating the course and tracking success:

- Graduation
- Employment/placement
- Student feedback
- Other: explain please
- What is the success rate (for completion) of your programs?

TRAINING PROVIDERS:

a. Who is your target audience?

- Do you feel like you are reaching the appropriate populations who need training?
- How do you know you're reaching appropriate populations? How is this measured? Job placement, regional employer feedback, student feedback?
- How do you most successfully inform potential trainees about your training programs?
- Are contractors in your area aware of your training programs?

CONTRACTORS:

a. Do you feel that outreach efforts of training providers are reaching those companies/individuals who could hire students trained by these programs?
b. Do you have any direct communication with training providers as they seek to adapt to market demand or develop new curricula in your field?
c. Do you have any suggestions on how they could improve their training or outreach efforts?

4. Placement: (CBOs/Unions may also answer these questions)

TRAINING PROVIDERS:

a. In what ways are advanced skills that students are getting helping with job placement?
b. Are you affiliated with any organizations who could potentially hire your trainees or provide internship opportunities to help bridge the gap between training and employment?
c. Do you have any direct communication with employers (home performance contractors, weatherization contractors, or engineering firms) as they seek to find appropriate training for their staff or new hires?
d. Have you worked with your local Department of Labor One Stop Career Center in order to connect trainees with advanced technical training or connections to employers?
e. What models are you utilizing to connect students to jobs in their industry?
    i. Are they successful?
    ii. If not, in what ways might they be improved?
    iii. Are potential job candidates able to connect to available jobs?

ALL: Do you feel there is adequate connectivity between contractors, training providers (including Unions) and CBOs to connect employers with potential employees?

ALL: How can we improve the channels of communication between stakeholders?

5. Barriers to hiring or retaining employees:

CONTRACTORS SHOULD ANSWER IN RELATION TO HIRING AND RETENTION. TRAINING PROVIDERS SHOULD RESPOND IN RELATION TO STUDENTS EXPERIENCING BARRIERS TO LEARNING OR EMPLOYMENT

CONTRACTORS - Do you see the following as barriers to hiring or retaining employees as it relates to training?

- **Language**
  - What languages are spoken at your job sites?
  - Would it be helpful to have courses taught in languages other than English?
- **Literacy**
- **Soft Skills** (responsibility, communication, etc.)
- **Hands on experience** (lab, internship, apprenticeship)
- **Business skills** (marketing, sales)
- **Credentials or certifications**
- **Changes** in industry requirements, regulations, and codes
- **Cost** of training
- **Availability** of appropriate training
- **Outreach and placement** efforts of training providers/community agencies

TRAINING PROVIDERS - Do you think your students experience barriers to learning or employment because of?

- **Language**:
  - Is there presently a need for any of your programs to be offered in another language?
- **Literacy**?
- **Soft Skills?**
- **Business skills** (marketing, sales)
- Lack of certifications or credentials?
- **Cost**:
  - Is any portion of your training program(s) reimbursable/subsidized by other agencies? Which one(s)?
- **Lack of connectivity** to businesses that are hiring?

CONTRACTORS - Are there other elements you would like to see taught in a structured course setting that might increase job opportunities or job performance for new or existing employees? (for example: apprenticeships, internships, lab or class time)

TRAINING PROVIDERS - Are there barriers to your flexibility in meeting industry demand for specific skills in your training curricula?

TP - What do you think can be done to minimize some of the barriers that exist to learning or employment?

ALL: Other barriers

ALL: Are any of the above (a) "teachable" in a structured course setting?

Conclusion:

1. **ALL** - Do you have additional thoughts?
2. **ALL** - Is there anything important that we have missed that you would like to add pertinent to this discussion?
3. Policy issues may be discussed here.

Focus Group Participant Information Form

NYSERDA-Pace Training / Employment Project

Name of Organization: _____

1. What city or county is your facility or office located in?
2. What is the primary function of your company or organization?
3. What specific role does your organization play under Green Jobs Green New York?
4. What is your title or job role?
5. What type of degree, certification, or training do you have?
6. Approximately how many employees do you have?
7. Has your company or organization hired any new employees in the past 12 months?
8. How many? In what capacity?
9. What languages are spoken at your work site?
10. Would you be willing to be contacted for follow-up questions if necessary?
11. Yes _____ No_____
12. If yes, please provide the following information:

Name _____

E-mail _____

Telephone _____

GENERAL INFORMATION AND GROUND RULES

- Goals flip-chart will state overarching goals – these are the questions we hope to come away with answered and will remain posted for the duration of the meeting.

- Question topic breakdown – we will be addressing:
  - Recruiting, hiring and retention
  - Training Programs and Certification
  - Matching students to appropriate levels of training
  - Training gaps
  - Connecting job seekers with employers
  - Stakeholder connectivity
  - Barriers to employment/hiring/retention

- Questions will be presented on the flipcharts individually by grouping for you to view as they are being answered – so we can stay on topic.

- Questions will be directed alternately to contractors, training providers and when generic (can be answered by anyone). This will be indicated by the facilitator. The moderator may call on you if we haven't heard from you in a while.

- The facilitator will determine when it is appropriate to move on to the next question.

- Please be courteous and respectful to fellow participants and give them the opportunity to complete their response. We would like the opportunity to hear from everyone.

- As we have a diverse group, it is important that we keep to the time limits of the meeting; 2 hours have been allocated for the meeting room.

- Refreshments have been provided for your convenience; please feel free to quietly avail yourself at any time of the refreshments.

- In order not to interrupt the momentum of the meeting we will not have a scheduled break. If you must leave the room please do so quietly.

- Please set your mobile phones on vibrate or turn them off.

Consent to Act as a Focus Group Participant

GJGNY - Pace Training / Employment Project - June 2012

I hereby agree to participate in a focus group led by Pace to provide information about my experiences with training and employment. I understand that I am being asked to participate because of my experiences in the industry.

I understand that I do not have to participate in this focus group, and that I have the right to withdraw from it at any time without suffering any adverse effects.

I also understand that I have the right to refuse to answer any question that I may not wish to answer.

I understand that participation in this focus group is unlikely to produce discomfort and that participation may, in fact, produce benefits to me in improving the provision of training, quality of training, and access to training especially as it is related to hiring and maintaining employment in my industry.

I understand that no information that identifies me will be released without my separate consent, except as specifically required by law.

I understand that if I have further questions, comments, or concerns about the focus group or the informed consent process, I may speak to Zywia Wojnar, Pace Energy and Climate Center, at 914-422-4450 or to Rebecca Sterling, NYSERDA 866-697-3732, x3618.

In signing this consent form, I acknowledge that I have received a copy of this form.

CONSENT TO PARTICIPATE AND BE RECORDED

Please sign and date below if you consent to take part in the focus group. Note that the focus group will be recorded so that we can better capture your responses for our reports. We will not release recordings and will destroy this recording as soon as we have had a chance to transcribe it or take relevant notes.

***I consent to take part in this recorded focus group and am aware of the risks, benefits, and voluntary nature of the research.**

_____	_____	_____
Respondent Signature	**Firm Name (printed)**	**Date**

Appendix D Survey Responses

GJGNY

SurveyMonkey

1. Interview ID or phone number used during interview:

	Response Count
	22
answered question	**22**
skipped question	**0**

2. Please use these items to describe your business:

	Response Percent	Response Count
Contractor - single family	55.6%	10
Contractor - multi family	**94.4%**	**17**
Contractor - commercial	83.3%	15
Provider	0.0%	0
CBO	5.6%	1
Other (please specify)		12
answered question		**18**
skipped question		**4**

3. How many customers does your organization serve in a typical year?

	Response Average	Response Total	Response Count
Number of customers/students, etc:	**1,257.53**	**23,893**	19
		answered question	**19**
		skipped question	**3**

4. Has your organization hired anyone this year?

	Response Percent	Response Count
No	19.0%	4
Yes	**81.0%**	**17**
	If yes, how many?	18
	answered question	**21**
	skipped question	**1**

5. What zip code is your business location?

	Response Average	Response Total	Response Count
zip code:	**11,870.43**	**249,279**	21
		answered question	**21**
		skipped question	**1**

6. How many people work in your organization?

	Response Average	Response Total	Response Count
Number of employees:	**319.14**	**6,702**	21
Number of Volunteers:	0.24	4	17
		answered question	**21**
		skipped question	**1**

7. Do you experience any difficulty in hiring adequately skilled applicants when your company recruits new employees?

	Response Percent	Response Count
Yes	**81.0%**	**17**
No	19.0%	4
	Other (please specify)	4
	answered question	**21**
	skipped question	**1**

8. What are the most important qualities that lead to hiring an employee?

	Response Percent	Response Count
training	66.7%	14
job site	0.0%	0
experience	81.0%	17
interpersonal skills	**90.5%**	**19**
education	57.1%	12
language	33.3%	7
certifications	57.1%	12
Other (please specify)		10
answered question		**21**
skipped question		**1**

9. What qualifications have you found to be most valuable in retaining employees you've hired?

	Response Percent	Response Count
personal qualities	**85.7%**	**18**
certifications	33.3%	7
experience	52.4%	11
Other (please specify)		7
answered question		**21**
skipped question		**1**

10. How do you find applicants to fill open positions in your company?

	Response Percent	Response Count
Word of mouth/referrals from employees	**81.0%**	**17**
papers	19.0%	4
internet	61.9%	13
public postings (hanging flyers, etc)	23.8%	5
public locations (day labor from stores, landmarks, etc)	0.0%	0
placement services	28.6%	6
job fairs	23.8%	5
	Other (please specify)	8
	answered question	**21**
	skipped question	**1**

11. Do you utilize energy efficiency or energy-related training and/or certification or credentialing programs for yourself or for your employees?

	Response Percent	Response Count
Yes	**100.0%**	**21**
No	0.0%	0
	answered question	**21**
	skipped question	**1**

12. Why did you select them?

	Response Percent	Response Count
location	71.4%	15
cost	71.4%	15
convenience	42.9%	9
offerings (course selection)	**85.7%**	**18**
language (for non-english speakers)	9.5%	2
NYSERDA requirement	71.4%	15
n/a	4.8%	1
Other (please specify)		4
answered question		**21**
skipped question		**1**

13. How did you find out about them?

	Response Percent	Response Count
NYSERDA	**76.2%**	**16**
Web	38.1%	8
Radio	0.0%	0
Newspaper	0.0%	0
word of mouth	23.8%	5
former student	0.0%	0
teacher	4.8%	1
n/a	4.8%	1
Other (please specify)		8
answered question		**21**
skipped question		**1**

14. Is energy-related training readily available in your region or area?

	Response Percent	Response Count
yes	**85.7%**	**18**
no	14.3%	3
Other (please specify)		1
answered question		**21**
skipped question		**1**

15. Do you feel these programs adequately prepare employees for positions at your company?

	Response Percent	Response Count
yes	47.6%	10
no	**52.4%**	**11**
Other (please specify)		4
answered question		**21**
skipped question		**1**

16. Do you feel that outreach efforts of training providers are reaching those companies/individuals who could hire students trained by these programs?

	Response Percent	Response Count
yes	33.3%	7
no	14.3%	3
n/a	**52.4%**	**11**
Other (please specify)		1
answered question		**21**
skipped question		**1**

17. What format of training works best for your organization?

	Response Percent	Response Count
classroom	45.0%	9
on-line	20.0%	4
in-house through a training provider or consultant	25.0%	5
in-house OJT while performing actual job	**100.0%**	**20**
Other (please specify)		2
answered question		**20**
skipped question		**2**

18. What, if any, training or credentials have you found to most directly translate to success on the job?

	Response Percent	Response Count
LEED GA	13.3%	2
LEED AP	40.0%	6
BPI Building Analyst	**73.3%**	**11**
BPI Envelope Professional	66.7%	10
Other (please specify)		18
answered question		**15**
skipped question		**7**

19. Do you require/prefer your employees to have credentials/certification?

	Response Percent	Response Count
yes	**76.2%**	**16**
no	23.8%	5
	If yes, please specify	8
	answered question	**21**
	skipped question	**1**

20. If you do not utilize these training/certification programs, why not?

	Response Percent	Response Count
not necessary	0.0%	0
too expensive	5.3%	1
too far away	5.3%	1
too much time off job site	0.0%	0
not directly applicable	0.0%	0
n/a	**94.7%**	**18**
	Other (please specify)	3
	answered question	**19**
	skipped question	**3**

21. If not, how do your employees gain the necessary qualifications for your line of business?

	Response Percent	Response Count
prior training	0.0%	0
on their own time	0.0%	0
in-house through a training provider or consultant	0.0%	0
in-house OJT while performing actual job	10.0%	2
n/a	**90.0%**	**18**
	Other (please specify)	1
	answered question	**20**
	skipped question	**2**

22. Do you have any direct communication with training providers as they seek to adapt to market demand or develop new curricula in your field?

	Response Percent	Response Count
yes	42.9%	9
no	**57.1%**	**12**
	Other (please specify)	4
	answered question	**21**
	skipped question	**1**

23. Do you feel there is adequate connectivity between contractors, training providers (including Unions) and CBOs to connect employers with potential employees?

	Response Percent	Response Count
yes	30.0%	6
no	**40.0%**	**8**
n/a	30.0%	6
Other (please specify)		2
answered question		**20**
skipped question		**2**

24. Do you see the following as barriers to hiring or retaining employees as it relates to training?

	Response Percent	Response Count
Language	50.0%	10
Literacy	60.0%	12
Soft Skills (responsibility, communication, etc.)	**85.0%**	**17**
Hands on experience (lab, internship, apprenticeship)	65.0%	13
Business skills (marketing, sales)	45.0%	9
Credentials or certifications	45.0%	9
Changes in industry requirements, regulations, and codes	55.0%	11
Cost of training	50.0%	10
Availability of appropriate training	30.0%	6
Outreach and placement efforts of training providers/community agencies	20.0%	4
	Other (please specify)	5
	answered question	**20**
	skipped question	**2**

25. What types of (additional) training do you wish were available but have been unable to find?

		Response Percent	Response Count
energy-specific marketing		53.3%	8
energy-specific finance		**66.7%**	**10**
community outreach for lead generation		33.3%	5
hands-on apprenticeship programs in energy efficiency		60.0%	9
technology-specific training related to a specific type of equipment, system, application, etc		60.0%	9
other technical training modules		40.0%	6
		Other (please specify)	14
		answered question	**15**
		skipped question	**7**

26. name

	Response Count
	20
answered question	**20**
skipped question	**2**

27. phone

	Response Count
	19
answered question	19
skipped question	3

28. email

	Response Count
	17
answered question	17
skipped question	5

29. note

	Response Count
answered question	17
skipped question	5

Provider

SurveyMonkey

1. Interview ID or phone number used during interview:

	Response Count
	17
answered question	**17**
skipped question	**0**

2. What type of training do you offer?

		Response Percent	Response Count
degree / credit		52.9%	9
non-degree (vocational training) or non-credit?		**94.1%**	**16**
	Other (please specify)		7
answered question			**17**
skipped question			**0**

3. Do you offer clean energy (EE and weatherization) training courses?

	Response Percent	Response Count
yes	**76.5%**	**13**
no	23.5%	4
Other (please specify)		9
answered question		**17**
skipped question		**0**

4. Do you offer clean energy (renewable energy - solar thermal, solar PV, geothermal) training courses?

	Response Percent	Response Count
yes	**62.5%**	**10**
no	37.5%	6
Other (please specify)		12
answered question		**16**
skipped question		**1**

5. How long have you been offering energy efficiency training?

	Response Average	Response Total	Response Count
years	**6.69**	**87**	13
answered question			**13**
skipped question			**4**

6. How long have you been offering renewable energy training?

	Response Average	Response Total	Response Count
years	5.50	55	10
		answered question	10
		skipped question	7

7. How many people enroll in a typical course?

	Response Average	Response Total	Response Count
attendees	15.94	255	16
		answered question	16
		skipped question	1

8. Is there a website that lists the courses?

	Response Count
	17
answered question	17
skipped question	0

9. What is the primary zip code where you typically offer your training?

	Response Average	Response Total	Response Count
zip code	**12,364.21**	**173,099**	14
		answered question	**14**
		skipped question	**3**

10. How do you market your course offerings?

	Response Percent	Response Count
web	**100.0%**	**17**
mailings	82.4%	14
professional associations	94.1%	16
Department of Labor	35.3%	6
periodicals/newspapers	52.9%	9
brochures	94.1%	16
radio/tv	23.5%	4
Other (please specify)		6
	answered question	**17**
	skipped question	**0**

11. What kind of instruction do you offer?

	Response Percent	Response Count
classroom	**100.0%**	**17**
hands-on	94.1%	16
lab	76.5%	13
apprenticeship	5.9%	1
job site training	52.9%	9
online	41.2%	7
Other (please specify)		4
answered question		**17**
skipped question		**0**

12. How do you decide what training programs/courses to offer?

	Response Percent	Response Count
NYSERDA program requirements	76.5%	13
other training providers	82.4%	14
institutional decision making	**94.1%**	**16**
contractors	88.2%	15
students	82.4%	14
media	29.4%	5
Other (please specify)		2
answered question		**17**
skipped question		**0**

13. Do you have direct agreements with businesses to offer job site or customized training / externships?

	Response Percent	Response Count
yes	**62.5%**	**10**
no	37.5%	6
Other (please specify)		14
answered question		**16**
skipped question		**1**

14. Do you partner with other training institutions to enhance your course offerings or to fill training gaps?

	Response Percent	Response Count
yes	**64.7%**	**11**
no	35.3%	6
Other (please specify)		11
answered question		**17**
skipped question		**0**

15. Do you offer energy-related certification or registered apprenticeship training?

	Response Percent	Response Count
yes	**70.6%**	**12**
no	29.4%	5
answered question		**17**
skipped question		**0**

16. If yes, do you offer classes to maintain those certifications?

	Response Percent	Response Count
yes	**66.7%**	**8**
no	33.3%	4
Other (please specify)		1
answered question		**12**
skipped question		**5**

17. Do you provide any tools to help the student transition from school to job placement?

	Response Percent	Response Count
job placement services	60.0%	9
resume development	66.7%	10
job fairs	**73.3%**	**11**
alumni associations	46.7%	7
registered apprenticeships	6.7%	1
internships	**73.3%**	**11**
none	6.7%	1
Other (please specify)		12
answered question		**15**
skipped question		**2**

18. What are your methods for evaluating the course and/or tracking success?

	Response Percent	Response Count
Graduation	88.2%	15
Employment/placement	58.8%	10
Student feedback	**100.0%**	**17**
Other (please specify)		10
answered question		**17**
skipped question		**0**

19. What is the success rate (for completion) of your programs?

	Response Average	Response Total	Response Count
rate	**85.88**	**1,374**	16
answered question			**16**
skipped question			**1**

20. Are you affiliated with (or have a relationship with) any organizations that could potentially hire your trainees or provide internship opportunities to help bridge the gap between training and employment?

	Response Percent	Response Count
yes	**76.5%**	**13**
no	23.5%	4
Other (please specify)		12
answered question		**17**
skipped question		**0**

21. Do you have any direct communication with employers (home performance contractors, weatherization contractors, or engineering firms) as they seek to find appropriate training for their staff or new hires?

	Response Percent	Response Count
yes	**88.2%**	**15**
no	11.8%	2
Other (please specify)		9
answered question		**17**
skipped question		**0**

22. Are you registered on the NYS Department of Labor's Eligible Training Provider List (ETPL)?

	Response Percent	Response Count
yes	**100.0%**	**7**
no	0.0%	0
Other (please specify)		10
answered question		**7**
skipped question		**10**

23. Do you feel there is adequate connectivity between contractors, training providers (including Unions) and CBOs to connect employers with potential employees?

	Response Percent	Response Count
yes	17.6%	3
no	**64.7%**	**11**
don't know	17.6%	3
answered question		**17**
skipped question		**0**

24. Do you think your students experience barriers to enrollment in your training classes:related to the because of the following:

	Response Percent	Response Count
language	25.0%	4
literacy	25.0%	4
interpersonal skills?	31.3%	5
business skills (marketing, sales)	25.0%	4
lack of certifications or credentials	6.3%	1
cost	**93.8%**	**15**
n/a	0.0%	0
	Other (please specify)	14
	answered question	**16**
	skipped question	**1**

25. Do you think your students experience barriers to learning in your training classes:related to the because of the following:

	Response Percent	Response Count
language	42.9%	6
literacy	**50.0%**	**7**
interpersonal skills?	42.9%	6
business skills (marketing, sales)	35.7%	5
lack of certifications or credentials	28.6%	4
n/a	7.1%	1
	Other (please specify)	10
	answered question	**14**
	skipped question	**3**

26. Is any portion of your training program(s) reimbursable/subsidized by other agencies?

	Response Percent	Response Count
yes	**87.5%**	**14**
no	12.5%	2
	if yes, list the source:	14
	answered question	**16**
	skipped question	**1**

27. name

	Response Count
	16
answered question	16
skipped question	1

28. phone

	Response Count
	16
answered question	16
skipped question	1

29. email

	Response Count
	16
answered question	16
skipped question	1

30. notes

	Response Count
	15
answered question	15
skipped question	2

Appendix E List of consolidated job titles from GJGNY programs

Energy Technology and Services: Residential

- Building Analyst
- Envelope Professional
- Heating Professional
- Cooling Professional
- Home Energy Rating System (HERS) rater
- Home Performance Sales
- Home Performance Marketing
- Insulation Technician
- Air Sealing Technician
- Air Sealing Crew Chief
- Residential Building Envelope Dense-pack Insulation Installer
- Dense-pack Installation Crew Chief
- Manufactured Housing Technician

Energy Technology and Services: Multifamily

- Multifamily Energy Efficiency Building Operator
- Multifamily Building Manager
- Multifamily Building Analyst
- Hydronic Heating Design Specialist

Energy Technology and Services: Commercial

- Management
- Energy Assessment
  - Energy Auditor
  - Energy Analyst
  - Energy Portfolio Planner
  - Industrial Process Specialist
- Installers
  - HVAC
  - Lighting
- Renewable
  - Solar Thermal Installation
  - Solar Thermal Technical Sales
  - Photovoltaic
  - Geothermal
  - Wind
  - Fuel Cell
  - Anaerobic Digestion
- Design/Building
- Procurement
- Energy Auditors
  - Res./Multifamily
  - Commercial
- Building Operations

    - Building Control Operation
    - Building Control Tech
- Technicians
- Professional Engineers
- Estimators
- CAD Drafts people
- Project Manager
- Risk Manager
- Balancer
- Commissioning Agent
- Certified Lighting Efficiency Professional

Appendix F Training providers and Curriculum Inventory

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Background Skills / General	Background Skills / General	none	Basic Computer Skills CECM 326	Tompkins Cortland Community College	Central NY/Southern Tier
Background Skills / General	Background Skills / General	none	Basic Construction Math & Estimating CEPE 508	Tompkins Cortland Community College	Central NY/Southern Tier
Background Skills / General	Background Skills / General	none	Basic Green Skills	The Altamont Program	Capital District/North Country/Mohawk Valley
Background Skills / General	Background Skills / General	none	Basic Math for Renewable Energy CEPE 578	Tompkins Cortland Community College	Central NY/Southern Tier
Background Skills / General	Background Skills / General	none	Construction Math Refresher	Erie Community College	Western NY/Finger Lakes
Background Skills / General	Background Skills / General	none	Electrical Wiring: Residential, Commercial & NEC I-9204	SUNY Orange County Community College	Hudson Valley
Background Skills / General	Background Skills / General	none	Green Job Corps Training Progm	The Altamont Program	Capital District/North Country/Mohawk Valley
Electrical / Power / Lighting	Electrical / Power / Lighting	none	Electricity for Green Jobs	Hostos Community College	New York City
Electrical / Power / Lighting	Electrical / Power / Lighting	none	Full-Spectrum Polarized Lighting Systems PMPD 993	Pratt Institute	New York City
Electrical / Power / Lighting	Electrical / Power / Lighting	none	Green Building Design Certificate Programs: Daylighting 1020002	Cooper Union	New York City
Electrical / Power / Lighting	Electrical / Power / Lighting	none	LED Lighting	SUNY Ulster County Community College	Hudson Valley
Electrical / Power / Lighting	Electrical / Power / Lighting	none	LED Lighting Seminar (3 CEUs)	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Electrical / Power / Lighting	Electrical / Power / Lighting	none	Outdoor Lighting Institute	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	1,000 Green Supers Program	32BJ Thomas Shortman Training Fund	New York City
Energy Efficiency	Energy Efficiency	none	90% Furnace Install	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Air Barrier Technician	Niagara County Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Air Conditioning and Refrigeration Certificate Program	Hostos Community College	New York City
Energy Efficiency	Energy Efficiency	none	Air-Conditioning Certification	Ulster BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Basics of Building Performance With Case Studies PMPD 669	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Basics of Building Science	Hudson Valley Community College	Online*
Energy Efficiency	Energy Efficiency	none	Basics of Building Science	Sullivan County Community College	Online*
Energy Efficiency	Energy Efficiency	none	BPI - Building Analyst Training	SUNY at Stony Brook	Long Island
Energy Efficiency	Energy Efficiency	none	BPI - Building Envelope Professional Training	SUNY at Stony Brook	Long Island
Energy Efficiency	Energy Efficiency	none	BPI Building Analyst	Point & Click Inc.	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI Building Analyst (BPI Certifiication Training)	Nassau County BOCES	Long Island

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Energy Efficiency	Energy Efficiency	none	BPI Building Envelope H6065	Hofstra University	Long Island
Energy Efficiency	Energy Efficiency	none	BPI Building Envelope Professional (BPI Certification Training)	Nassau County BOCES	Long Island
Energy Efficiency	Energy Efficiency	none	BPI Energy Auditor Certification Training H6054	Hofstra University	Long Island
Energy Efficiency	Energy Efficiency	none	BPI Heating Professional Certification Training	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI -Heating Professional Certification Training	SUNY at Stony Brook	Long Island
Energy Efficiency	Energy Efficiency	none	BPI Manufactured Housing Specialist Certification Training	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: A/C Heat Pump "Cooling" Professional	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Air Sealing & Insulation	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Basic Air Sealing and Insulation (BASI)	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Basic Air Sealing and Insulation (Installer)	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Basic Air Sealing and Insultation	Onondaga Community College	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Bronx Community College	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Broome Community College	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Fulton-Montgomery community college	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Green Jobs Training Center	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	SUNY Ulster County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst	Westchester Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst - leading to BPI Cetification	SUNY Canton	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst CN7 157	Tompkins Cortland Community College	Central NY/Southern Tier

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst (HVC 1007)	Sullivan County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst 1 (Auditor)	Onondaga-Cortland-Madison BOCES	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst 1 Certification and Train the Trainer	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst Field Training & Testing	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst Quick Start	SUNY at Binghamton	Online*
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst Training Certification	Genesee Community College	Online*
Energy Efficiency	Energy Efficiency	none	BPI: Building Analyst Training for Raters	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Building Envelope Professional Training CN7 164	Tompkins Cortland Community College	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Cooling Professional	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Cooling Professional	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Cooling Professional	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Cooling Professional	Onondaga-Cortland-Madison BOCES	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Cooling Professional - leading to BPI Cetification	SUNY Canton	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Energy Efficiency Technician I	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Bronx Community College	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Broome Community College	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Onondaga-Cortland-Madison BOCES	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	SUNY Ulster County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional	Westchester Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Envelope Professional - leading to BPI certification	SUNY Canton	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Broome Community College	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Erie Community College	Western NY/Finger Lakes

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	Onondaga-Cortland-Madison BOCES	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional	SUNY Ulster County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	BPI: Heating Professional - leading to BPI certification	SUNY Canton	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Multifamily Building Analyst	Association for Energy Affordability	New York City
Energy Efficiency	Energy Efficiency	none	BPI: Multifamily Building Analyst	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	BPI: Multi-Family Building Analyst	CUNY- Central Office	New York City
Energy Efficiency	Energy Efficiency	none	Buidling Analyst (stand alone)	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Building Energy Simulation Analyst (BESATM)	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Building Maintenance and Weatherization Training	Northern Manhattan Improvement Corporation	New York City
Energy Efficiency	Energy Efficiency	none	Building Science Single Point of Entry	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Clean and Tune Procedures	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Construction and Weatherization	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Electricity for HVAC/R Technician Part 1	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Electricity for HVAC/R Technician Part 2	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Energy Efficiency for Homes	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Energy Modeling for Code Compliance and High Performance	Karpman Consulting, LLC	New York City
Energy Efficiency	Energy Efficiency	none	Energy Rater	Suffolk County Community College	Long Island
Energy Efficiency	Energy Efficiency	none	Energy, Greenhouse Gas, Weatherization Audits and Capital Planning PMPD 604	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Energy-Efficient Design for Architects	NYDesigns	Online*
Energy Efficiency	Energy Efficiency	none	Entry Level Weatherization Installer Boot Camp 4-day	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Facility "Go Green" employee and Maintenance Training	SUNY Ulster County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Facility “Go Green” Employee and Maintenance Training	Sullivan County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Go Green Retrofits PMPD 809	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	GPRO-TBA Spring 2011	College of Staten Island/CUNY	New York City
Energy Efficiency	Energy Efficiency	none	Green Handyman and Weatherization Specialist	SUNY Ulster County Community College	Online*

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Energy Efficiency	Energy Efficiency	none	Green Maintenance for Buildings	New York City College of Technology	New York City
Energy Efficiency	Energy Efficiency	none	Green Maintenance for facilities training program	New York City College of Technology	New York City
Energy Efficiency	Energy Efficiency	none	GreenWorks-Building Maintenance Training	ICD	New York City
Energy Efficiency	Energy Efficiency	none	Heating Systems and Chimney Fundamentals	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Heating Ventilation & Air Conditioning (HVAC) Excellence	Capital Region BOCES	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	HERS Energy Rater Training (RESNET Certification)	Hofstra University	Long Island
Energy Efficiency	Energy Efficiency	none	HERS Energy Rater Training (RESNET Certification)	Performance Systems Development	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	HERS Rater	Hudson Valley Community College	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	Home Energy Audit	Lehman College, Division of Adult & Continuing Education	New York City
Energy Efficiency	Energy Efficiency	none	How to Certify a Passive House	SUNY Ulster County Community College	Hudson Valley
Energy Efficiency	Energy Efficiency	none	HVAC Service Technician	Monroe 2-Orleans BOCES	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	HVAC Technician Level 2 (Includes BPI building Analyst)	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	HVAC Technician Level I	Dutchess BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Improving the Energy Efficiency of Steam Systems PMPD 969	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Insulation & Air Sealing Level 1	Energy Efficiency Training Center (EETC)	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Insulation & Air Sealing Level 2	Energy Efficiency Training Center (EETC)	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Insulation & Air Sealing Level 3	Energy Efficiency Training Center (EETC)	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Intro to Building Energy Efficiency	NYDesigns	Online*
Energy Efficiency	Energy Efficiency	none	Introduction of Building Analyst (BA)	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Introduction to Envelope Professional (Basics)	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Introduction to Shell Efficiency (Envelope Basics)	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Introduction to Weatherization	Associated Builders & Contractors (ABC), Empire State Chapter	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	Multifamily Building Modeling for Weatherization Online Course	Performance Systems Development (PSD)	Online*
Energy Efficiency	Energy Efficiency	none	Performance Rating of New Buildings: The Process PMPD 982	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Performing Comprehensive Building Assessments	Genesee Community College	Online*

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Energy Efficiency	Energy Efficiency	none	Preparing Energy Audit Reports PMPD 659	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Principals of Green Building	Genesee Community College	Online*
Energy Efficiency	Energy Efficiency	none	Residential Air Conditioning and Heat Pumps and How to Evaluate Them Holistically PMPD 680	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Electrical Systems and How To Evaluate Them Holistically PMPD 682	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Gas and Oil Furnaces and How To Evaluate Them Holistically PMPD 684	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential House Inspections PMPD 663	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Insulation and How to Evaluate It Holistically PMPD 685	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Interiors and How to Evaluate Them Holistically PMPD 686	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Plumbing and How to Evaluate Them Holistically PMPD 687	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Residential Steam, Electric, Floor, Wall Wall Heat Plus Hot Water Boilers and How To Evaluate Them H	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Small Home Auditor Training	NYS Weatherization Directors Association (NYSWDA)	Central NY/Southern Tier
Energy Efficiency	Energy Efficiency	none	The New York State Energy Conservation Code PMPD 936	Pratt Institute	New York City
Energy Efficiency	Energy Efficiency	none	Weatherization and Building Trades	Albany Community Action Partnership	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	none	Weatherization Program	ANDO International Organization	New York City
Energy Efficiency	Energy Efficiency	none	Weatherization Program	Orange-Ulster BOCES	Hudson Valley
Energy Efficiency	Energy Efficiency	none	Weatherization Technician	Erie Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Weatherization Training (40)	Niagara County Community College WDI	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Weatherization Workforce	MRBS, Inc.	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	none	Youthbuild, Green Job Corps, Green Academy	United Way Long island	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	A Guide to Sustainable Materials for High-Performance Building PMPD 665	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Basic Construction Management CEPE 509	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Basic of Building Science (Online)	SUNY Canton	Online*

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Building Maintenance with Green Awareness	Monroe 2-Orleans BOCES	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Capstone Project - Sustainable Building and Infrastructure Design and Management PMPD 606	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Climate Change Fundamentals for Design and Management Professionals PMPD 600	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Construction Management for Green Building	NYDesigns	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Construction Technology	Erie 1 BOCES	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Designing and Renovating Carbon Neutral Buildings PMPD 601	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Forever Green Training & Sustainable Design	Forever Green Training & Sustainable Design	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Fundamentals of Building Green	NYDesigns	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Fundamentals of Sustainable Buildings and High Performance Systems Design	NYDesigns	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Bldg for Home Insp (Onl) DCB 060-01	SUNY Ulster County Community College	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building & Sustainability	Westchester Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building Design CEPE 542	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building for Building Professionals	NYSBA Research & Education Foundation	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building for Building Professionals	SUNY at Stony Brook	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building for Building Professionals	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building for Contractors	NYDesigns	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building Practices	Monroe Community College	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building Technical Professional	NYDesigns	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Building Technology	Monroe 2-Orleans BOCES	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Constctn Refab Bldgs & Methods	SUNY Ulster County Community College	Hudson Valley

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Construction Training Program	Bedford Stuyvesant Restoration Corp	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Construction Workshop	Construction Training Centers of NYS/ABC	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Contractor Training	Ulster BOCES	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Design Versus Historic Preservation PMPD 963	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Green Facilities Management Certificate Program	New York Institute of Technology (NYIT)	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	GREEN TECHNOLOGY	Continuing Education at Hunter College	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Healthy Building	SUNY Ulster County Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Managing Renewable Energy & Energy Efficiency Improvement Projects CEPE 543	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	National Sustainable Buildiing Advisor Program	SUNY Ulster County Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Performance Modeling for Carbon Neutral Buildings PMPD 602	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Plumbing and Electricity Basics for Green Jobs	Hostos Community College	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Plumbing for Green Jobs	Hostos Community College	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Principals of Green Bldg	SUNY at Binghamton	Online*
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Principles of Sustainable Design: An Introduction to High Performance Bldg PMPD 673	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Residential Exteriors and How to Evaluate Them Holistically PMPD 683	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Residential Roofing and How to Evaluate Them Holistically PMPD 688	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	REVIT Level I -Intro to Building Information Management (BIM) CEPE 546	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	REVIT Level II - Intro to Building Information Modeling (BIM) CEPE 547	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainability Approach to Engineering Design PMPD 897	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainable Building Advisor (SBA)	Queens College Professional & Continuing Studies	New York City

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Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainable Building Advisor Certificate Program	New York Institute of Technology (NYIT)	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainable Building, Infrastructure Design & Management (Certificate)	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainable Restoration of Historic Buildings DCB 561-01	SUNY Ulster County Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Sustainable Standards for Buildings and Infrastructure - LEED, BREAM and Energy Star PMPM 603	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Understanding the National Green Building Standard	NYSBA Research & Education Foundation	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	none	Your Role in Green Design CEPE 530	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED New (BD+C) Construction V3, core Shell, and K-12 Schools PMPD 678	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED & Americans with Disabilities Act	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED AP Building Design and Construction (BD+C)	NYDesigns	Online*
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED AP CERTIFICATION	Emerging Technologies Institute	Online*
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED AP Exam Prep and Continuing Education	Enterprise Training Solutions	Online*
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED AP Exam Preparation	SUNY at Stony Brook	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED exam prep	Institute of Design and Construction	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED for Green Associate Plus PMPD 671	Pratt Institute	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED for Homes	SUNY Ulster County Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED for Real Estate Professionals	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED GA	Suffolk County Community College	Online*
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED GA: Sustainable Building - (included in the Advanced Certificate in Construction Management)	York College Continuing & Professional Education	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED GREEN ASSOCIATE	Continuing Education at Hunter College	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate	NYDesigns	Online*

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Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate (GA) Exam Prep & Qualification	Enterprise Training Solutions	Online*
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate Accreditation Exam Preparation	Wagner College	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate Exam Prep	SUNY Ulster County Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate Exam Prep Class	New York School of Interior Design	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate Exam Prep Class CEPE 548	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED GREEN ASSOCIATE EXAM PREP H6050	Hofstra University	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Associate Exam Preparation	SUNY at Stony Brook	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED Green Bldg. Design & Construction-V-3	Wagner College	New York City
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED: Become a Green Expert	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED: Green Construction Management: Intro to LEED-CE-GREEN	Westchester Community College	Hudson Valley
Green Construction / Sustainable Building, Materials and Design	LEED Program	none	LEED: Improving Public Health By Greening Your Specifications PMPD 955	Pratt Institute	New York City
Other / Miscellaneous	Other / Miscellaneous	none	AutoCAD 2011 Level I CECM 376	Tompkins Cortland Community College	Central NY/Southern Tier
Other / Miscellaneous	Other / Miscellaneous	none	AutoCAD 2011 Level II CECM 377	Tompkins Cortland Community College	Central NY/Southern Tier
Other / Miscellaneous	Other / Miscellaneous	none	BEST Academy	Sustainable South Bronx	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Building Operator Certification	CUNY School of Professional Studies	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Center for Environmental Workforce Training	Consortium for Worker Education	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Certified Indoor Air Quality Manager	Genesee Community College	Online*
Other / Miscellaneous	Other / Miscellaneous	none	Certified Indoor Environmentalist (CIE)	Genesee Community College	Online*
Other / Miscellaneous	Other / Miscellaneous	none	Clean Energy Entrepreneurship CEPE 558	Tompkins Cortland Community College	Central NY/Southern Tier
Other / Miscellaneous	Other / Miscellaneous	none	Continuing Education in Property Management	Hostos Community College	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Environmental & Energy Management ISO 14001/ISO 50001	SUNY at Stony Brook	Long Island
Other / Miscellaneous	Other / Miscellaneous	none	Facilities 101 Anatomy of a Building	New York City College of Technology	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Green Career Center	Green Career Center, The Osborne Association	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Green CUNY Young Adult Program	Green CUNY Young Adult Program	New York City

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Other / Miscellaneous	Other / Miscellaneous	none	Green Facilities 101	New York City College of Technology	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Green Workforce Training Prgram	Solar One Green Workforce Training Program	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Indoor Air Quality PMPD 951	Pratt Institute	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Intro to Opportunities in the Green Economy WFD 6016	Sullivan County Community College	Hudson Valley
Other / Miscellaneous	Other / Miscellaneous	none	NCCER Your Role in the Green Environment	Henkels & McCoy	New York City
Other / Miscellaneous	Other / Miscellaneous	none	NJATC	Tri-City JATC	Capital District/North Country/Mohawk Valley
Other / Miscellaneous	Other / Miscellaneous	none	Oil Heat Technician	Ulster BOCES	Hudson Valley
Other / Miscellaneous	Other / Miscellaneous	none	OSHA - 10 Construction CEPE 533	Tompkins Cortland Community College	Central NY/Southern Tier
Other / Miscellaneous	Other / Miscellaneous	none	OSHA 090-A: OSHA 10 HOUR CONSTRUCTION H6408	Hofstra University	Long Island
Other / Miscellaneous	Other / Miscellaneous	none	OSHA 10	Electrical Training Center	Long Island
Other / Miscellaneous	Other / Miscellaneous	none	OSHA 10 Standard for the Construction Industry	SUNY Ulster County Community College	Hudson Valley
Other / Miscellaneous	Other / Miscellaneous	none	OSHA Construction 10 Hour	Erie Community College	Western NY/Finger Lakes
Other / Miscellaneous	Other / Miscellaneous	none	ReNEW Program	Nontraditional Employment for Women (NEW)	New York City
Other / Miscellaneous	Other / Miscellaneous	none	SoBRO Environmental Workforce Training Services	South Bronx Overall Economic Development Corporation	New York City
Other / Miscellaneous	Other / Miscellaneous	none	STRIVE/East Harlem Employment Services	STRIVE/East Harlem Employment Services	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Urban Assembly School for Green Careers	Urban Assembly School for Green Careers	New York City
Other / Miscellaneous	Other / Miscellaneous	none	Women's Pathway's into Green Careers	New York Institute of Technology (NYIT)	Long Island
Other / Miscellaneous	Other / Miscellaneous	none	Youth Build Cypress Hills	Cypress Hills Local Development Corporation	New York City
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	none	Alternative & Sustainable Energy Programs	Farmingdale State College	Long Island
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	none	Clean and Alternative Energies	Monroe Community College	Western NY/Finger Lakes
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	none	Introduction to Renewable Energy CEPE 557	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	none	PV, Small wind, geothermal, solar theraml and green constsuction	Alfred State College	Western NY/Finger Lakes
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	none	Solar, Wind and Other Renewable Energy (course)	Adirondack Community College	Capital District/North Country/Mohawk Valley
Renewable / Alternative Energy	Solar Thermal	none	Advanced Solar Hot Water Installation & Design	SUNY Ulster County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Fundamentals of Solar Hot Water Heating	NYDesigns	Online*

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Renewable / Alternative Energy	Solar Thermal	none	Hydronics and Electrical Applications for Solar Hot Water Practitioners - NEW	Ulster BOCES	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Heating	Nassau County BOCES	Long Island
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Install & Design	SUNY Ulster County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Installation & Design WFD 6034	Sullivan County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Installer's Course - NEW	Ulster BOCES	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Sales	SUNY Ulster County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water System Design	SUNY Rockland County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	Solar Hot Water Systems Workshop	New York City College of Technology	New York City
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Design and Installation (Basic Introduction)	SUNY Delhi	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Level 1 - Understanding Solar Thermal Technologies & Application	Broome Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Level 2 - Sizing, Designing and Installation of Domestic Hot Water Systems	Broome Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Level 3 - Combustion, Design and Installation	Broome Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	SOLAR Thermal Systems Level I CEPE 565	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	SOLAR Thermal Systems Level II CEPE 566	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	SOLAR Thermal Systems Level III CEPE 567	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Systems Level IV CEPE 579	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal Systems V CEPE 580	Tompkins Cortland Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Solar Thermal	none	Solar Thermal: Solar Hot Water System Design- I-9182	SUNY Orange County Community College	Hudson Valley
Renewable / Alternative Energy	Solar Thermal	none	VOC018 SOLAR HOT WATER SYSTEM DESIGN	Dutchess County Community College	Hudson Valley
Waste Management / Environmental Remediation	Waste Management / Environmental Remediation	none	Lead Renovator	Erie Community College	Western NY/Finger Lakes
Waste Management / Environmental Remediation	Waste Management / Environmental Remediation	none	Lead Renovators Certification (Initial) CEPE 550	Tompkins Cortland Community College	Central NY/Southern Tier

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Electrical / Power / Lighting	Electrical / Power / Lighting	Other	Electrical Construction and Maintenance Electrician AOS	Alfred State College	Western NY/Finger Lakes
Electrical / Power / Lighting	Electrical / Power / Lighting	MS	Lighting MS	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Energy Efficiency	Energy Efficiency	Other	Air Conditioning and Heating Technology AOS	Alfred State College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	AAS	Air Conditioning Technology: Heating and Ventilation A. A. S. Degree program	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	Other	Certificate: HVAC (Heating, Ventilation, and Air Conditioning)	Manhattan College	New York City
Energy Efficiency	Energy Efficiency	B-Tech	Heating, Ventilating, Air Conditioning Certificate	Monroe Community College	Western NY/Finger Lakes
Energy Efficiency	Energy Efficiency	AAS	HEATING, VENTILATION, AIR CONDITIONING and REFRIGERATION (HVAC/R) / A.A.S. DEGREE	Suffolk County Community College	Long Island
Energy Efficiency	Energy Efficiency	B-Tech	HEATING, VENTILATION, AIR CONDITIONING, REFRIGERATION (HVACR) / Credit Certificate PROGRAM	Suffolk County Community College	Long Island
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	B-Tech	Advanced Certificate in Facilities Management - credit certificate	New York Institute of Technology (NYIT)	Long Island
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Other	Certificate: Energy Management	Manhattan College	New York City
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Other	Combined B.S. in Mechanical Engineering and M.S. in Energy Management Program	New York Institute of Technology (NYIT)	Long Island
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	MS	Energy Management MS	New York Institute of Technology (NYIT)	Long Island
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	BS	Energy Studies MINOR	Union College	Capital District/North Country/Mohawk Valley
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	AAS	Energy Systems AAS	Westchester Community College	Hudson Valley
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Other	ENV 101 Energy Environment and Sustainability 3 credits	Farmingdale State College	Long Island

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Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	B-Tech	Environmental and Energy Technologies, B-Tech	SUNY Cobleskill	Capital District/North Country/Mohawk Valley
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	MS	Environmental Health and Safety Management MS	Rochester Institute of Technology	Western NY/Finger Lakes
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	BS	Environmental Sustainability, Health and Safety BS	Rochester Institute of Technology	Western NY/Finger Lakes
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	AAS	Green Building Maintenance and Management (AAS)	Sullivan County Community College	Hudson Valley
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	BS	Industrial Technology - Facility Management Technology B.S.	Farmingdale State College	Long Island
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	AAS	School Facilities Management AAS	Mohawk Valley Community College	Online*
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Credit Certificate	School facilities Management Certificate	Mohawk Valley Community College	Online*
Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	Energy Mgmt / Env Mgmt / Sust Mgmt / Facil Mgmt	MS	Sustainable Energy Systems MS	SUNY College at Cortland	Central NY/Southern Tier
Engineering	Engineering	MS	BS in Industrial and Systems Engineering, M. Eng in Sustainable Engineering BSISE/MESE	Rochester Institute of Technology	Western NY/Finger Lakes
Engineering	Engineering	MS	BS in Industrial and Systems Engineering/MS in Sustainable Engineering BSISE/MSSE	Rochester Institute of Technology	Western NY/Finger Lakes
Engineering	Engineering	AAS	Electrical Engineering Technology (AAS)	Alfred State College	Western NY/Finger Lakes
Engineering	Engineering	BS	Electrical Engineering Technology (BS)	Alfred State College	Western NY/Finger Lakes
Engineering	Engineering	AAS	Mechanical Engineering Technology (AAS)	Alfred State College	Western NY/Finger Lakes
Engineering	Engineering	BS	Mechanical Engineering Technology (BS)	Alfred State College	Western NY/Finger Lakes
Engineering	Engineering	BS	Mechanical Engineering, BS	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Engineering	Engineering	Other	Sustainability Engineering Minor	SUNY at Binghamton	Central NY/Southern Tier
Engineering	Engineering	Other	Sustainable Engineering ME	Rochester Institute of Technology	Western NY/Finger Lakes
Engineering	Engineering	MS	Sustainable Engineering MS	Rochester Institute of Technology	Western NY/Finger Lakes
Environmental Studies	Environment / Climate / Policy / Politics / Law / Economics / Social Aspects / Planning	BA	Environmental Policy (ENERGY and SUSTAINABILITY TRACK) BA	Union College	Capital District/North Country/Mohawk Valley

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Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	AAS	Architectural Engineering Technology AAS	Alfred State College	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Architectural Engineering Technology BS	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	MS	Architectural Sciences (Concentration in Lighting) MS	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	PhD	Architectural Sciences: PhD	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Architectural Technology BS	Alfred State College	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Bachelor of Architecture	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Building Trades-Building Construction AOS	Alfred State College	Western NY/Finger Lakes
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	MS	Built Ecologies (Architecture): M.S.	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Combined B.S. in Architectural Technology and M.S. in Energy Management Program	New York Institute of Technology (NYIT)	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	AAS	Construction and Environmental Technology	Tompkins Cortland Community College	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Construction Management BS	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Construction Management BS (Concentration in Sustainable Construction and Renewable Materials)	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Construction Management BS (Concentration in Wood Products Engineering)	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	BS	Construction Management Engineering Technology	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	ENV 203 Sustainability in Architecture - 3 credit course	Farmingdale State College	Long Island
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	AAS	Green Building Technology - One Year Credit Certificate	Erie Community College	Western NY/Finger Lakes

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Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	None	Master of Architecture Post-professional Program	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Master of Architecture Professional Program	Rensselaer Polytechnic Institute	Capital District/North Country/Mohawk Valley
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Master of Professional Studies in Sustainable Interior Environments	New York School of Interior Design	New York City
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	MPS Construction Management	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	MPS Sustainable Construction	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	MS/PhD Sustainable Construction Management and Wood Science	SUNY College of Environmental Science & Forestry	Central NY/Southern Tier
Green Construction / Sustainable Building, Materials and Design	Green Construction / Sustainable Building, Materials and Design	Other	Sustainable Architecture M. ARCH	Rochester Institute of Technology	Western NY/Finger Lakes
Other / Miscellaneous	Other / Miscellaneous	Other	SCI 209 - Fundamentals of Environmental Safety and Health - 3 credit course	Nassau County Community College	Long Island
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	MS	(focus) Sustainable Energy Systems (MS)	Cornell University	Central NY/Southern Tier
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	PhD	(focus) Sustainable Energy Systems (PhD)	Cornell University	Central NY/Southern Tier
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	Credit Certificate	Advanced Certificate in Energy Technology-credit certificate	New York Institute of Technology (NYIT)	Long Island
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	B-Tech	Alternative and Renewable Energy Systems B-Tech	SUNY Canton	Capital District/North Country/Mohawk Valley
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	MS	Alternative Energy MS	University of Rochester	Western NY/Finger Lakes
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	AAS	Alternative Energy Technology AAS	Schenectady County Community College	Capital District/North Country/Mohawk Valley
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	AAS	EET127 - Alternate Energy Concepts and Solutions	Broome Community College	Central NY/Southern Tier
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	AAS	Renewable Energy Technology AAS	Morrisville State College	Central NY/Southern Tier

Primary Program Focus Group	Program Focus within Primary Group	Degree Type	Program Name	Organization	Region
Renewable / Alternative Energy	Multifocus or Other Renewable / Alternative Energy	Other	Sustainable Energy Systems Minor	Clarkson University	Capital District/North Country/Mohawk Valley

Appendix G Glossary

Term	Acronym	Definition - or relevance to GJGNY	Website
Air Conditioning Contractors of America	**ACCA**	ACCA is a non-profit association serving more than 60,000 professionals and 4,000 businesses in the HVACR community, working together to promote professional contracting, energy efficiency, and healthy, comfortable indoor environments.	https://www.acca.org/
Association of Energy Engineers	**AEE**	Professional organization that is a source for information and networking in the dynamic fields of energy engineering and energy management, renewable and alternative energy, power generation, energy services, sustainability, and all related areas. Its membership base consists of over 16,000 professionals in 89 countries and its widely recognized energy certification programs. Its network of 82 local chapters located throughout the U.S. and abroad meet regularly to discuss issues of regional importance.	www.aeecenter.org
American National Standards Institute	**ANSI**	A private, not-for-profit organization that acts as the voice of the U.S. standards and conformity assessment system. The ANSI empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment. The Institute oversees the creation, promulgation and use of thousands of norms and guidelines that directly impact businesses in nearly every sector. ANSI is also actively engaged in accrediting programs that assess conformance to standards – including globally-recognized cross-sector programs such as the ISO 9000 (quality) and ISO 14000 (environmental) management systems.	http://www.ansi.org/
American Society of Heating, Refrigerating and Air-Conditioning Engineers	**ASHRAE**	ASHRAE, founded in 1894, is a building technology society with more than 50,000 members worldwide. The Society and its members focus on building systems, energy efficiency, indoor air quality and sustainability within the industry. Through research, standards writing, publishing and continuing education, ASHRAE shapes tomorrow's built environment today.	www.ashrae.org
Building Commissioning Association	**BCA**	The Building Commissioning Association (BCA) is an international non-profit organization that serves as the recognized authority and resource on commissioning. Our membership is made up of professionals from all across the commercial buildings industry who maintain the highest standards and practices for the commissioning process. Our organization is education-driven. We develop technical resources, form collaborative relationships with related organizations within the building community, hold an annual conference on the latest innovations in the industry, and manage a certification program that sets the highest industry standards for credentialed commissioning professionals.	https://netforum.avectra.com/eweb/StartPage.aspx?Site=BCA&WebCode=HomePage
Board of Environmental, Health & Safety Auditor Certifications	**BEAC/CESB**	BEAC is an independent, nonprofit corporation established in 1997 to issue professional certifications relating to environmental, health, and safety auditing and other scientific fields.	http://www.beac.org/
CUNY Building Operation Certification	**BOC**	The Department of Education's Division of School Facilities (DSF) is responsible for the maintenance, repair and safe operation of all facilities under the jurisdiction of the City's school system.	http://www.opt-osfns.org/dsf/reference/boc/index.html

Term	Acronym	Definition - or relevance to GJGNY	Website
Building Performance Institute	**BPI**	BPI develops standards for energy efficiency retrofit work using an open, transparent, consensus-based process built on sound building science. From these standards, BPI has developed professional credentials for individuals, accreditation for contracting companies –including quality assurance programs– that help raise the bar in home performance contracting.	www.bpi.org
Consituency-based organization	**CBO**	Constituency-based organizations (CBOs) facilitate community members in participating in NYSERDA's energy efficiency programs. CBOs are local and accessible organizations -- ready to help the homeowner, business or not-for-profit organization.	http://www.nyserda.ny.gov/Programs/Green-Jobs-Green-New-York/Constituency-Based-Outreach.aspx
Certified Energy Auditor (through AEE)	**CEA**	Based on the growing demand for qualified professionals, the Certified Energy Auditor (CEA™) and Certified Energy Auditor in Training (CEAIT™) certifications were developed and added to the broad portfolio of professional certifications offered by the Association of Energy Engineers. Rising energy costs and inefficiency in plants and buildings is continually driving the need for trained and experienced energy auditors. The CEA certification is one that identifies professionals as having the required knowledge and experience needed to succeed in the growing field of energy auditing.	http://www.aeecenter.org/i4a/pages/index.cfm?pageid=3365
Center for Energy Efficiency and Building Science (at HVCC)	**CEEBS**	The Center for Energy Efficiency and Building Science (CEEBS), a division of the Workforce Development Institute at Hudson Valley Community College, delivers energy efficiency and building science courses. The courses are designed to prepare students for the Building Performance Institute (BPI) certification examination.	https://www.hvcc.edu/ceebs/
Certified Energy Manager (through AEE)	**CEM**	Since its inception in 1981, the Certified Energy Manager (CEM) credential has become widely accepted and used as a measure of professional accomplishment within the energy management field. It has gained industry-wide use as the standard for qualifying energy professionals both in the United States and abroad. It is recognized by the U.S. Department of Energy, the Office of Federal Energy Management Programs (FEMP), and the U.S. Agency for International Development, as well as by numerous state energy offices, major utilities, corporations and energy service companies.	http://www.aeecenter.org/i4a/pages/index.cfm?pageid=3351
Certified Employee Training Program (NPGA)	**CETP**	The NPGA CETP Certification Program verifies propane employees' knowledge and skills, and provides documentation through a paper certificate as well as an online database where all candidate CETP training records can be accessed by candidates or their employers.	https://www.npga.org/i4a/pages/index.cfm?pageid=545
Combined Heat and Power	**CHP**	The CHP Partnership is a voluntary program seeking to reduce the environmental impact of power generation by promoting the use of CHP. The Partnership works closely with energy users, the CHP industry, state and local governments, and other clean energy stakeholders to facilitate the development of new projects and to promote their environmental and economic benefits.	http://www.epa.gov/chp/
Conservation Services Group	**CSG**	Organization that is coordinating the CBO program	http://www.csgrp.com/
NYSDOL Eligible Training Provider List	**ETPL**	The New York State Eligible Training Provider List (NYS-ETPL) was established in compliance with Title 1 of the Workforce Investment Act (WIA) of 1998. The purpose of the ETPL is to present a broad and diverse selection of training choices to support employment goals of individuals.	https://applications.labor.ny.gov/ETPL/

Term	Acronym	Definition - or relevance to GJGNY	Website
Green Advantage (Building Professionals)	**GA**	Green Advantage is committed to delivering an exemplary green building certification for and with construction personnel. The boards, staff, volunteers and interns, as well as the thousands of Green Advantage Certified Practitioners contribute to the organization's continuing success.	www.greenadvantage.org
High Performance Building Design Professional (ASHRAE)	**HPBDP**	ASHRAE has developed the HBDP program in close collaboration with the Illuminating Engineering Society (IES) and the Mechanical Contractors Association of America (MCAA) and with input from the U.S. Green Building Council (USGBC) and the Green Building Initiative (GBI). Candidates who earn the HBDP certification will have demonstrated a well-rounded understanding and knowledge of how HVAC&R design is integrated into high performing buildings to achieve the overall goal of producing a sustainable HVAC&R design.	http://www.ashrae.org/education--certification/certification/high-performance-building-design-professional-certification
Heating, ventilation and air conditioning	**HVAC**	The main purposes of a Heating, Ventilation, and Air-Conditioning (HVAC) system are to help maintain good indoor air quality through adequate ventilation with filtration and provide thermal comfort. HVAC systems are among the largest energy consumers in schools.	http://www.epa.gov/iaq/schooldesign/hvac.html
Home Performance with Energy Star	**HPwES**	One of the GJGNY programs administered by NYSERDA -- for 1-4 family homes.	http://www.nyserda.ny.gov/Page-Sections/Residential/Programs/Existing-Home-Renovations.aspx
Hudson Valley Community College	**HVCC**	Hudson Valley Community College's mission is to provide dynamic, student-centered, comprehensive, and accessible educational opportunities that address the diverse needs of the community.	https://www.hvcc.edu/
Institute of Electrical and Electronic Engineers	**IEEE**	IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through IEEE's highly cited publications, conferences, technology standards, and professional and educational activities.	http://www.ieee.org
Leadership in Energy and Environmental Design	**LEED**	LEED certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.	http://www.usgbc.org/DisplayPage.aspx?CategoryID=19
Multifamily Building Analyst (BPI)	**MFBA**	BPI certified professionals are specialists in their chosen field(s). By attaining certification, an individual demonstrates knowledge and skills that are among the best in the country – capable of diagnosing critical performance factors in a home that impact comfort, health, safety, durability and energy efficiency. Multifamily – apply building-as-a-system fundamentals to diagnose problems and improve the performance of larger, more complex residential structures.	http://www.bpi.org/professionals_designations.aspx
Multifamily Performance Program	**MPP**	One of NYSERDAs programs that is part of GJGNY, intended for existing multifamily property, or forplanned construction of multifamily building (5+ units); the program assists owners in maximizing a building's energy efficiency for lower energy costs and greater resident comfort	http://www.nyserda.ny.gov/Programs/Green-Jobs-Green-New-York/Multifamily.aspx
North American Board of Certified Energy Practitioners	**NABCEP**	The North American Board of Certified Energy Practitioners (NABCEP) is a volunteer board of renewable energy stakeholder representatives that includes representatives of the solar industry, NABCEP certificants, renewable energy organizations, state policy makers, educational institutions, and the trades.	www.nabcep.org

Term	Acronym	Definition - or relevance to GJGNY	Website
National Association of Home Builders	**NAHB**	NAHB is a trade association that helps promote the policies that make housing a national priority.	http://www.nahb.org/
North American Industry Classification System	**NAICS**	The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.	http://www.census.gov/eos/www/naics/
National Environmental Balancing Bureau	**NEBB**	The National Environmental Balancing Bureau (NEBB) is the premier international certification association for firms that deliver high performance building systems. Our members perform testing, adjusting and balancing of heating, ventilating and air-conditioning systems, commission and retro-commission building systems, execute sound and vibration testing, building envelope testing, test and certify laboratory fume hoods, and electronic and biological cleanrooms.	http://www.nebb.org/
National Electrical Manufacturers Association	**NEMA**	NEMA is the association of electrical equipment manufacturers, founded in 1926 and headquartered in Arlington, Virginia. Its member companies manufacture a diverse set of products including power transmission and distribution equipment, lighting systems, factory automation and control systems, and medical diagnostic imaging systems.	http://www.nema.org/Pages/default.aspx
New York State Department of Labor	**NYSDOL**	The mission of the New York State Department of Labor is to protect workers, assist the unemployed, and connect job seekers to jobs. NYSDOL has provided valuable research on clean energy jobs in New York.	http://www.labor.ny.gov/home/
New York State Energy Research and Development Authority	**NYSERDA**	New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 under Article 8, Title 9 [PDF] and Title 9A [PDF] of the State Public Authorities Law through the reconstitution of the New York State Atomic and Space Development Authority.	http://www.nyserda.ny.gov/
Occupational Safety and Health Administration	**OSHA**	Created by Congress under the Department of Labor, OSHA was established to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.	http://www.osha.gov/
Occupational Information Network	**O*NET**	The O*NET program is the nation's primary source of occupational information. The Occupational Information Network (O*NET) is being developed under the sponsorship of the US Department of Labor/Employment and Training Administration (USDOL/ETA). Central to the project is the O*NET database, containing information on hundreds of standardized and occupation-specific descriptors. The database is continually updated by surveying a broad range of workers from each occupation. Information from this database forms the heart of O*NET OnLine, an interactive application for exploring and searching occupations.	http://www.onetcenter.org/overview.html
Residential Energy Services Network	**RESNET**	The Residential Energy Services Network (RESNET) was founded in 1995 as an independent, non-profit organization committed to helping homeowners reduce the cost of their utility bills by making their homes more energy efficient.	http://www.resnet.us/
Small Business/Not for profit	**SB/NFP**	The SB/NFP is one of the GJGNY programs -- for small businesses and not-for-profits, it offers access to energy audits and low-interest energy efficiency project financing.	http://www.nyserda.ny.gov/Program-Areas/Energy-Efficiency-and-Renewable-Programs/Green-Jobs-Green-New-York.aspx

Term	Acronym	Definition - or relevance to GJGNY	Website
Savings to Investment Ratio	**SIR**	The SIR is equal to the present value of anticipated energy savings over the weighted useful life of measures installed, divided by the total cost of the project.	http://naseo.org/resources/selfs/documents/NYSERDA-Underwriting_Criteria_Residential_Direct_Loans.pdf
Standard Occupational Classification (Code)	**SOC Code**	The 2010 Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data.	http://www.bls.gov/SOC/
Urban Green Council	**UGC/G-PRO**	Urban Green Council is the New York Chapter of the U.S. Green Building Council (USGBC). The mission is to lead in advancing the sustainability of urban buildings through education, advocacy and research.	http://www.urbangreencouncil.org/Home
U.S. Green Building Council	**USGBC**	The U.S. Green Building Council is committed to a prosperous and sustainable future through cost-efficient and energy-saving green buildings.	http://www.usgbc.org/

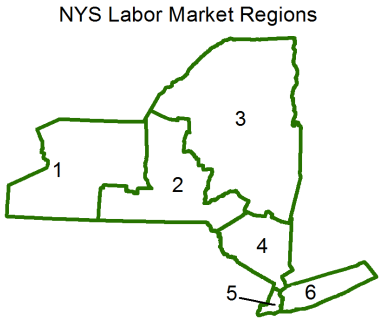
Appendix H Relevant findings of NYSDOL Survey

Most of the NYSDOL survey responses came from the New York City and Long Island regions, with the remainder from the Hudson Valley, Western New York / Finger Lakes, Capital Region / Mohawk Valley / North Country, and the Central / Southern Tier. Interestingly, the proportion of employers reporting that they have "green employees" is nearly opposite.

Table A. Regional distribution of firms in NYSDOL employer survey, and their proportion of "green employee" presence within each region

sample	region	green employees
8%	Capital Region/ Mohawk Valley/ North Country	32%
6%	Central New York/ Southern Tier	32%
14%	Hudson Valley	27%
18%	Long Island	21%
44%	New York City	19%
10%	Western New York/ Finger Lakes	25%

Table A. describes the greenest regions measured by green employee presence (in employers) as Central (32%), Capital/Mohawk Valley/ North Country (32%), Hudson Valley (27%), Western / Finger Lakes (25%), and finally Long Island (21%) and New York City (19%). The map below shows the regions where 1 = Western/Finger Lakes; 2= Central, 3= Capital/Mohawk/North Country; 4= Hudson Valley; 5= New York City; and 6= Long Island



Readers should be familiar with the distribution of responses across the state to the DOL survey in order to appreciate the strengths of the sample. New York State consists of 62 counties, and the DOL assigns them to labor market regions. These labor market regions were further collapsed for the Green Jobs Survey [54]

Table B shows the distribution of DOL survey sample responses by industry, where construction is the largest represented group (42%), followed by building services (40%), professional services (16%), and manufacturing (3%). The construction industry is of particular interest to NYSERDA-GJGNY programs, because the distribution of occupations within this industry sector is most closely aligned with GJGNY.

Table B. Industry distribution of firms in NYS-DOL employer survey, and their proportion of "green employee" presence within each industry.

sample	industry	green employees
40%	Building Services	16%
42%	Construction Trades	27%
3%	Component Manufacturing	15%
16%	Professional Services	28%

Table C shows the regional distribution of employers in construction and their reporting on green employees in their companies. Much like the regional distribution of employers in the whole-state sample, the construction responses are mostly from New York City (30%), and Long Island (24%), followed by Hudson (17%), Western (12%), Capital (11%), and Central (7%). Table C also shows the distribution of construction employers reporting the presence of green employees. This tracks closely to the trend in employer responses from all industries, whereby Central (38%), Capital (36%), and Hudson (32%) are the "greenest" regions, followed by Western (29%), Long Island (23%), and New York City (21%) regions.

[54] http://www.labor.ny.gov/stats/green/index.shtm

Table C. Regional distribution of Construction Trade firms in NYS-DOL employer survey, and their proportion of "green employee" presence within each region.

sample	region	green employees
11%	Capital Region/ Mohawk Valley/ North Country	36%
7%	Central New York/ Southern Tier	38%
17%	Hudson Valley	32%
24%	Long Island	23%
30%	New York City	21%
12%	Western New York/ Finger Lakes	29%

Tables D highlights the preferred credentials among employers with green employees for all industries. where LEED (46%) and BPI (17%) are the most reported by far, followed by NAHB and NATE (9% each), AEE (8%), GA (5%), BEAC (4%), and finally IEEE (3%). Table E describes responses to the same question with the construction industry, showing a remarkably similar distribution of preferences.

Table D. Preferred credential with green employees among employers in New York State.

rate	credential
8%	Association of Energy Engineers (AEE)
4%	Board of Environmental, Health & Safety Auditors (BEAC)
17%	Building Performance Institute (BPI)
5%	Green Advantage (Building Professionals) (GA)
3%	Institute of Electrical and Electronic Engineers (IEEE)
46%	Leadership in Energy and Environmental Design (LEED)
9%	National Association of Home Builders (NAHB)
0%	National Association of the Remodeling Industry (NARI)
0%	North American Board of Certified Energy Practitioners (NABCEP)
9%	North American Technician Excellence (NATE)
0%	Residential Energy Services Network Rating Providers (RESNET)

Table E. Preferred credential with green employees among Construction Trade employers in New York State.

rate	credential
21%	Leadership in Energy and Environmental Design (LEED)
10%	National Association of Home Builders (NAHB)
4%	Green Advantage (Building Professionals) (GA)
14%	Building Performance Institute (BPI)
3%	Association of Energy Engineers (AEE)
9%	North American Technician Excellence (NATE)

Table F describes the regional distribution of employers having difficulty in recruiting qualified green workers, which matches the overall distribution of green employers whereby the Capital and Central regions (20% each) report the highest level of difficulty in recruiting, and New York City reporting the lowest difficulty (11%) with the other regions falling between those extremes. One interpretation may be that regions with lower rates of green employers, designated by the presence of green employees, are probably not trying to find green employees. Another interpretation may be that the labor market is more saturated downstate, where population densities are so much higher. This trend is not tracked within the construction trade, however, where Table G shows that only Central (10%) and Long Island (12%) report low rates of difficulty. Table H suggests that construction employers are no different from professional service employers in the difficulty they experience recruiting qualified workers.

Table F. Rates of difficulty in recruiting one or more qualified green workers for six NYSDOL regions in New York State.

rate	region
20%	Capital Region/ Mohawk Valley/ North Country
20%	Central NY/ Southern Tier
16%	Hudson Valley
18%	Long Island
11%	New York City
16%	Western NY/ Finger Lakes

Table F-2. SOC linked and weighted rates of difficulty in recruiting one or more qualified green workers and NYSERDA-GJGNY program initiatives.

	SOC MAJOR GROUP	GROUP TITLE	frequency	GJGNY	SBNFP	MULTI-FAMILY	FAMILY	GJGNYweighted	FIRMS WITH DIFFICULTY HIRING	within Difficulty
		total	686	82	42	82	75	363	**4915**	100.00%
STATEWIDE	11	Management Occupations	74	6	3	6	6	23	**506**	**10.30%**
	13	Business and Financial Operations Occupations	8	7	5	7	4	25	**163**	3.32%
	15	Computer and Mathematical Occupations	6	4	1	4	4	10	**53**	1.09%
	17	Architecture and Engineering Occupations	47	20	19	20	19	171	**666**	**13.55%**
	19	Life, Physical, and Social Science Occupations	91	1	0	1	1	2	**59**	1.20%
	27	Arts, Design, Entertainment, Sports, and Media Occupations	3	2	1	2	0	14	**51**	1.03%
	29	Healthcare Practitioners and Technical Occupations	1						**21**	0.42%
	37	Building and Grounds Cleaning and Maintenance Occupations	27	3	0	3	3	6	**414**	8.43%
	41	Sales and Related Occupations	14	1	0	1	1	2	**117**	2.38%
	43	Office and Administrative Support Occupations	5	2	0	2	2	4	**149**	3.04%
	47	Construction and Extraction Occupations	182	21	8	21	21	71	**1846**	**37.56%**
	49	Installation, Maintenance, and Repair Occupations	210	7	4	7	7	18	**670**	**13.63%**
	51	Production Occupations	18	8	1	8	7	17	**200**	4.06%

Table F-2 shows the effort to link DOL survey responses to NYSERDA programs using SOC logic. For this table the team reviewed the programs descriptions of each GJGNY-NYSERDA program, including their goals, eligibility, and credentialing. The team then read through the list of job titles in the SOC listing. A "relevant job title" list was then constructed for each NYSERDA program that contained the SOC job titles that were determined to be relevant to the NYSERDA program. Keep in mind that each NYSERDA Program was considered separately, so the full SOC job title list was reviewed for each NYSERDA program. In this way, some job titles could appear in each (all) NYSERDA program. At the highest level of SOC Major Grouping in table F-2, we see that there are 666 unique job

titles in review[z2] , with 82 titles map[z3] to at least one program in NYSERDA-GJGNY. Moving further to the right in the linkage table shows that 42 unique job titles were associated with the Small Commercial Energy Assessment program, 82 unique job title were associated with the Multi-Family program, and 75 titles were associated with the Single Family program.

We then reviewed the relevant SOC job titles in each NYSERDA program without removing redundancies and counted the total likely linkages to GJGNY as approaching 363 job titles (with redundancy). Architecture (20 job titles) and Construction (21 job titles) stand out as the most highly linked to each NYSERDA-GJGNY program. Using the SOC title linkages allowed us to assess the impact of difficulty in hiring (a DOL survey question) within the NYSERDA-GJGNY programs. About 37% of employers reporting difficulty hiring were in the Construction SOC Major Grouping, which has a large impact on all programs at NYSERDA. Another 13% (each) of employers experiencing difficulty in hiring were in SOC major groups associated with architecture, and installation/maintenance. These SOC groups have a high implication with NYSERDA programs, as does the next largest group with difficulty hiring: Business and Financial operations.

Table G. Rates of difficulty in recruiting one or more qualified green workers in construction trades for each region in New York State.

rate	region
22%	Capital Region/ Mohawk Valley/ North Country
10%	Central NY/ Southern Tier
18%	Hudson Valley
12%	Long Island
19%	New York City
20%	Western NY/ Finger Lakes

Table H. Rates of difficulty in recruiting one or more qualified green workers for industries in New York State.

rate	industry
12%	Building Services
17%	Construction Trades
17%	Professional Services

Table I. Products and services involving green workers at green employers for all industries in New York State, and for construction trades only.

overall	product	construction
92%	**Energy Efficiency**	**93%**
84%	*Retrofitting*	*84%*
79%	*New Construction*	*77%*
39%	**Renewable Energy**	**33%**
57%	*Solar PV*	*47%*
40%	*Solar Thermal*	*32%*
21%	*Wind*	*12%*
14%	*Biomass*	*6%*
50%	*Geothermal*	*48%*
17%	*Hydro*	*16%*

Table I describes the distribution of green products and services for all industries where energy efficiency is most prevalent service (92%) with similar amounts of retrofitting (84%) and new construction service (79%). The prevalence of green workers is far less visible in the renewable energy industry (about half, 39%), with solar (57%), geothermal (50%) and solar thermal (40%) being far more abundant in comparison to wind (21%), hydro (17%), and biomass (14%). These trends are very similar in the overall industry state-wide as in the construction trades only.

Table J shows that "on the job" (71%) and "in-house" (59%) are the most frequent sources of advance training for advanced skills. The next discernible levels of training sources are trade associations (49%) and suppliers (43%), while the remaining sources are far less prevalent.

Table J. Sources of advance training for enhanced skills among employers requiring such training.

rate	skill
71%	On the Job Training
49%	Professional Trade Associations
59%	In-House Training
43%	Supplier Training
13%	Labor Unions
7%	Community Based Organizations
22%	Proprietary or Trade Technical Schools
13%	Boces or Vocational Schools
15%	Community Colleges
24%	4-Year Colleges
11%	Advanced Degrees

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise and funding to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels. NYSERDA professionals work to protect our environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York since 1975.

Visit nyserda.ny.gov to learn more about NYSERDA programs and funding opportunities.

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State of New York
Andrew M. Cuomo, Governor

Making the Right Connections: Ways to Improve Workforce Training to Better Meet Employer Needs in the Green Jobs-Green New York Program

Final Report
August 2013

New York State Energy Research and Development Authority
Richard L. Kauffman, Chairman | Francis J. Murray, Jr., President and CEO