

CHAPTER 1. INTRODUCTION AND METHODOLOGY

Where are New York's green jobs? What preparation and skills do people need to perform them?

The New York State Department of Labor and its research partners – the New York City Labor Market Information Service (NYCLMIS) at the CUNY Graduate Center, the Advanced Energy Center (AEC) at Stony Brook University and the Energy and Environmental Technical Applications Center (E2TAC) at the University at Albany – conducted a groundbreaking study to answer these questions. The NYCLMIS and the AEC present this report, which brings together the findings from all of the research activities, including assessments of the employer demand for green workers, the supply of education and training opportunities, and the adequacy of those opportunities to meet employer demand. This research was conducted in 2010-2011.

Understanding New York State's Green Economy and Its Workforce Implications

The New York State Green Jobs study is part of a larger national effort to understand the emerging green economy and its impact for the workforce. Today's green movement started decades ago, evolving from grass roots activism to protect the environment into a broad campaign to diversify energy sources, reduce carbon emissions and improve the quality of life. The movement has brought about real change in the way that many goods and services are produced, distributed and consumed. In general, the term *green economy* refers to activities related to preserving or restoring the environment. Several categories of green economic activity that are almost universally cited include: renewable energy, energy efficiency, pollution prevention and clean-up, and natural resources conservation.¹ The term *green jobs* describes occupations that have been the most affected by the emerging green economy.

For the last several years, many people have been excited about the prospects represented by green jobs and have wanted more concrete information to navigate this new and evolving field. Many non-profit organizations, industry groups, institutions of higher education, state and local governments and federal agencies have conducted some form of green jobs-related research. The goals of the New York State study were to benchmark the number of green jobs in selected industry clusters, develop information on industry trends, occupations, preparation required and geographic distribution of these jobs, and identify education and training programs related to green jobs, especially in the selected industry clusters.

Both New York State and City are acknowledged leaders in the green economy, especially for their focus on energy efficiency, renewable energy and clean technology industries. The American Council for an Energy-Efficient Economy ranked New York State third in its 2011 State Energy Efficiency Scorecard.² New York City placed third of the 27 cities included in Siemens' 2011 U.S. and Canada Green Cities Index.³

¹ Federal Register, Vol 75, No. 50, Tuesday, March 16, 2010, Bureau of Labor Statistics

² American Council for an Energy-Efficient Economy, The 2011 State Energy Efficiency Scorecard, October 2011, available at www.aceee.org.

³ US and Canada Green City Index, a research project conducted by the Economist Intelligence Unit, sponsored by Siemens, June 30, 2011, available at www.siemens.com/greencityindex

New York State and City Policy Context. The major forces promoting a green economy in New York State and City are described below.

New York State's Energy Goals. New York State's Energy Plan was first developed in 2002 and was revised in 2009. A new State Energy Plan is currently being developed and is due to be completed by March 15, 2013. The current plan includes many initiatives related to **energy efficiency** and **renewable energy**.

- ✓ **Energy Efficiency Portfolio Standard (EEPS).** On June 23, 2008, the Public Service Commission (PSC) issued a decision establishing New York's EEPS. As part of a statewide program to reduce New Yorkers' electricity usage by 15 percent below previously forecasted levels by 2015, the PSC established interim targets and funding for energy efficiency program activity through the year 2011.
- ✓ **Renewable Portfolio Standard (RPS).** This is a policy that seeks to increase the proportion of retail electricity consumption derived from renewable sources to 30 percent by 2015 from a base level of 19.3 percent in 2004.
- ✓ **45 x 15.** In his State of the State address in 2009, former Governor David Patterson combined the EEPS and RPS goals into a new goal of "45 x 15" meaning that 45 percent of the state's electricity usage would be derived from the combination of renewable energy sources and energy efficiency improvements by 2015. He also issued an Executive Order (Number 24) to reduce greenhouse gas emissions by 80 percent below 1990 levels by 2050 and required the state to draft a climate action plan.
- ✓ **Regional Greenhouse Gas Initiative (RGGI).** New York State is part of a cooperative effort by several Northeast and Mid-Atlantic states. RGGI is the first mandatory, market-based effort to limit greenhouse gas emissions in the United States.
- ✓ **Green Jobs/Green New York.** New York State enacted the **Green Jobs/Green New York** law in 2009, which earmarked \$112 million in revenue from carbon credits sold through RGGI and other sources to establish a revolving loan fund to support home energy audits and energy-efficiency building retrofits.
- ✓ **On-bill recovery.** In June 2011, Governor Andrew Cuomo and the state legislature enacted a law that allows for "on-bill recovery," which is designed to help consumers pay for energy efficiency retrofits. On-bill financing allows homeowners to finance these improvements with payments on their utility bills.

New York State Energy Research and Development Authority (NYSERDA). NYSERDA, a public benefit corporation, has a unique role in New York State. Its aim is to help New York meet its energy goals by reducing energy consumption, promoting the use of renewable energy sources, and protecting the environment. NYSERDA supports energy efficiency and renewable energy projects, research and development, education, and low-income energy assistance. NYSERDA also funds a number of workforce development initiatives that support green career preparation in New York State. NYSERDA programs are funded through multiple sources, among which are the Systems Benefit Charge (SBC) collected through the State's utility

companies, EEPS, RPS, and RGGI. The revenue basis for NYSERDA has allowed it to play a significant role in the growth of clean energy and in clean energy business development.

New York State Green Buildings Policy. Since 2000, the state has offered a green building tax credit for energy efficiency and other building improvements. Guidelines under the 2001 Executive Order Number 111, also known as the Green and Clean State Buildings and Vehicles Order, call for a 35 percent reduction in energy consumption from 1990 in state government buildings, 20 percent renewable energy for electricity consumption for state buildings; and procurement of energy-efficient products.

The Dormitory Authority of the State of New York, which provides financing and construction services to public and private universities, not-for-profit healthcare facilities and other institutions which serve the public good released a sustainability policy in 2008 that promotes and supports sustainable design approaches and construction practices in every project, *regardless of size or complexity.* As of January 1, 2008, all projects that are *new construction, addition, or significant renovation* must include a goal of LEED Silver and are required to be fully submitted to the US Green Building Council (USGBC) for a rating review.

New York City's PlaNYC. Originally released in 2007, and updated in 2011, PlaNYC is New York City's effort to prepare the city for one million more residents, strengthen the city's economy, combat climate change and enhance the quality of life for all New Yorkers. The Plan brought together more than 25 City agencies to work toward the vision of a greener, greater New York.⁴ Many of PlaNYC's action items relate to the green economy.

Green Buildings Laws. As noted in PlaNYC, "Buildings dominate New York City's carbon footprint. Approximately 75 per cent of New York City's carbon emissions stem from energy used in buildings, and today's existing buildings will make up 85 per cent of all real estate in 2030."⁵ Enacted in 2005, the Green Building Law (New York City Local Law 86), requires that all city-funded construction projects achieve certification under LEED or LEED-equivalent green building standards and meet energy and water efficiency targets. One outcome of this law was the issuance, by the New York City School Construction Authority, of the NYC Green Schools Guide and Rating System, which covers new construction, additions, substantial reconstruction of buildings and capital renovation projects (e.g. major boiler replacement). The Green Schools Guide also includes energy modeling and development of energy efficiency measures.

In December of 2009, New York City enacted the *Greener, Greater Buildings Plan* (Local Laws 84, 85, 87 and 88), designed to reduce greenhouse gas emissions and improve building energy performance. For 24,000 of the city's largest buildings (50,000 square feet and larger), these laws require benchmarking of energy and water use, energy audits and retro-commissioning, lighting upgrades and sub-metering to measure the flow of electricity in tenant spaces. The laws impose significant obligations on existing buildings, which had previously been grandfathered or exempted under the New York State Energy Code and prior amendments to New York City's codes.

⁴ PlaNYC can be accessed at www.nyc.gov/html/planyc2030

⁵ Ibid.

In 2010, the New York City Green Codes Taskforce issued a report to Mayor Bloomberg making 111 recommendations for green changes to existing New York City Building Codes in such areas as air quality, emissions, water efficiency and construction standards. Several of these recommendations have already been enacted into law or included in regulation and others are pending.

The New York State Green Jobs Study

The New York State Green Jobs Study specifically focused on industry clusters that reflected New York State's Energy Plan priority areas — **energy efficiency** and **renewable energy**. The study was financed primarily through a \$1.1 million grant awarded to the New York State Department of Labor in November 2009 by the U.S. Department of Labor/Employment and Training Administration (ETA), under the American Recovery and Reinvestment Act. The research partners studied the recent history of green jobs definition and research, which informed the study's design and approach.⁶

Industry selection. The research partners identified industries that were most likely to have employment related to energy efficiency and renewable energy. Utilizing the North American Industry Classification System (NAICS) categories, six primary industry clusters were chosen and the appropriate 6-digit NAICS codes were identified.⁷ The industry clusters selected were:

- ✓ **Construction**, predominantly related to residential, industrial, commercial and power system construction.
- ✓ **Professional Services**, which includes architectural and engineering services, computer systems design, and research and development.⁸
- ✓ **Building Services**, which includes portions of the real estate and services to buildings industries. This cluster was selected because of its heavy concentration in New York City and its alignment with energy efficiency activity.
- ✓ **Component Manufacturing**, which includes segments related to energy efficiency components and renewable energy only. This industry was chosen because of the state's efforts to refocus its manufacturing sector, especially upstate, towards the production of advanced energy technologies and their component parts.
- ✓ **Electric Power Generation, Transmission, and Distribution**, which, although small in terms of employment, is integral to energy policy.

⁶ Key resources included: *Greening of the World of Work: Implications for O*NET-SOC and New and Emerging Occupations*, ETA, February 2009; *Measurement and Analysis of Employment in the Green Economy*, Workforce Information Council (WIC), October 2009, and federal register notices published by the Bureau of Labor Statistics on March 16, 2010 and September 21, 2010.

⁷ See Appendix A for a full list of 6-digit North American Industry Classification System (NAICS) codes for industry clusters included in employer demand research.

⁸ "Offices of Lawyers" are also included in this category; because this one group comprises nearly half of the employment in Professional Services, they were surveyed and otherwise researched as a separate group.

- ✓ *Financial Services*, which was defined to include investment banking and securities brokerage and excluded commercial banking. This industry was selected because of its importance, especially in New York City, and to better understand private financing for energy efficiency and renewable energy.

Research questions on employer demand. The key questions for employer research fell into four categories, as shown below.

New York State Green Jobs Study Employer Demand Research Questions
<p>Industry information</p> <p><i>What are examples of green business activities that employers are engaged in?</i></p> <p><i>How many firms in New York have green jobs?</i></p> <p><i>How many workers in New York have green jobs?</i></p> <p><i>Do firms expect their green employment to change in the next year?</i></p> <p><i>What are the geographic concentrations of green industries and employment?</i></p> <p><i>What factors influence firm and industry decisions about investment and growth? How does this affect employer decisions to increase or reduce the workforce?</i></p> <p><i>What are the characteristics of the current workforce in selected industries?</i></p> <p><i>To what extent does the green workforce consist of existing workers vs. the need to hire new employees with green skills or credentials?</i></p>
<p>Occupational Information</p> <p><i>Which occupations are green, or greening?</i></p> <p><i>What are the skill and knowledge requirements for key occupations?</i></p> <p><i>What are employers' education and experience preferences for key occupations?</i></p> <p><i>What green credentials are employers looking for?</i></p> <p><i>Which green jobs are in demand?</i></p>
<p>Recruitment/Retention Information</p> <p><i>Are employers having difficulty finding qualified applicants for key green occupations?</i></p> <p><i>What are the major sources of recruitment for new employees?</i></p> <p><i>What recruitment methods are effective and why?</i></p> <p><i>What are employers' recruitment/hiring/retention challenges, if any?</i></p>
<p>Education and Training Information</p> <p><i>Is additional education or training needed for occupations employers identify as green?</i></p> <p><i>What are the methods and sources of education and training for green skills?</i></p> <p><i>What advice would employers give to education and training providers on preparing the green workforce?</i></p>

In addition to identifying employer demand for green skills in the workplace, the other major purpose of the research was to assess the capacity of those who prepare the workforce to serve employers' needs in high growth, enhanced skills, and new and emerging occupations in the relevant sectors. The goal of this research was to identify as many programs and offerings as possible in New York State that prepare individuals for green jobs or upgrade their existing skill sets so they are able to move in a green or sustainability direction.

Research questions on education and training. The key questions for education and training research are shown below.

New York State Green Jobs Study Education and Training Research Questions

Types of Green Education and Training

What are the main types of education and training that prepare people for green jobs?
What are the key occupations that education and training programs prepare people for?
What industries employ people in the occupations in which green education and training is provided?

For Non-Degree Programs

How many and what types of non-degree programs in New York State are preparing people for green jobs?
What types of organizations are providing non-degree education and training?
What industry-recognized credentials are these programs preparing people for?
What are the major sources of funding for non-degree education and training programs?
What is the education and training provider experience placing trainees into jobs?

For Degree Programs

How many and what types of degrees are granted in New York State's higher educational institutions that are associated with green jobs in New York State?
What special degree programs focus on green jobs?

Incumbent Workers vs. Unemployed Job Seekers

To what extent are education and training programs upgrading the skills of existing workers vs. targeting workers targeting unemployed workers seeking to enter green jobs?

Research Methods: Employer Demand

The primary research methods to gauge employer demand included a large-scale employer survey, interviews with approximately 50 industry experts and facilitation of 18 industry focus groups across the state.

Employer Survey. An important element of the New York State Green Jobs Study was a large-scale survey of employers in the selected industry clusters.

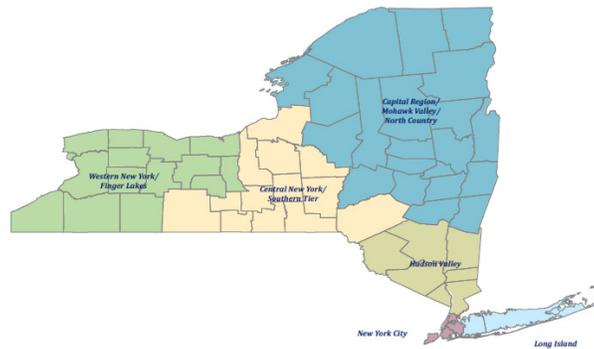
Instrument development. The survey was administered in both online and paper formats. Instrument development was a collaborative effort among the research partners with the New York State Department of Labor as the lead partner in this effort. The surveys were tailored to the seven industry clusters – Building Services; Component Manufacturing; Construction Trades; Professional Services (ex. Legal Services); Legal Services, Electric Power Generation, Transmission, Distribution; and Financial Services.⁹

Each industry survey was a different color on paper and online. Surveys targeted to larger firms included a pre-populated listing of the most common occupations in the industry for employers to respond to. The occupational selection was based on New York State's staffing patterns matrix. Surveys sent to small firms were designed so that the occupations could be filled in by the employer.

In designing the employer survey, the research team used its own experience with other labor market surveys, especially the Occupational Employment Survey (OES), and also followed the

⁹ See Appendix B for copies of the surveys developed for each industry cluster.

New York State Green Jobs Survey Regions



advice offered by the Workforce Information Council’s report, *Measurement and Analysis of Employment in the Green Economy*, released in October 2009. Specifically:

- ✓ The New York State team established a working definition of a green job that was tied to the green economic activity categories of energy efficiency and renewable energy.
- ✓ Each questionnaire provided clear examples of what would be considered green, tailored to that industry cluster.
- ✓ The purpose of the study was clear as were the key questions to be answered.

Sampling. The sample was drawn from the fourth quarter of 2010 Quarterly Census of Employment and Wages (QCEW) Program. A stratified random sample of approximately 20,000 employers was selected in order to allow for analysis by three areas of interest: geographic region, industry cluster, and firm size.

The state was partitioned into 6 geographic regions: Capital District/North Country/Mohawk Valley, Central New York/Southern Tier, Hudson Valley, Long Island, New York City, and Western New York/Finger Lakes. (See map below.) Employers were grouped into three size classes by employment: small (1-25 employees), medium (26-100) and large (more than 100). All employers in the large and medium size classes and approximately 20 percent of employers in the small size class were sampled.

Address refinement. Prior to the actual conduct of the employer survey, the New York State Department of Labor spent considerable staff time refining contacts and addresses. Of the total of nearly 20,000 targeted firms, address refinement was done on 16,000. It is believed that this process contributed to the relatively high response rate ultimately achieved.

Administration. Data was collected through various modes (mail, online, phone, email and fax) from December 2010 through February 2011. Employers were mailed letters that requested participation in an online version of the survey accessible by a unique survey ID code. In order to increase response rates, two subsequent mailings were sent, each with a print version of the survey enclosed. After all of the mailings were sent, critical non-respondents were identified and called for phone interviews. These additional efforts resulted in a robust 42 percent response rate, with more than 8,000 firms participating statewide. The research partners were assisted by a survey research firm which programmed the online version of the survey and conducted much of the telephone follow-up to non-respondents.

**Example: Definition of green used in the New York State Green Jobs Study
Construction Industry Cluster Survey**

What is a green economic activity?

Green economic activity involves goods or services that increase **energy efficiency** or produce **renewable energy**

This includes:

- *Design and/or construction of new buildings or residences*
- *Energy Retrofitting, improving energy and resource efficiency in existing homes*
- *Retro-commissioning of existing buildings or improving energy efficiency in buildings or facilities*
- *Renewable Energy (solar, wind, biomass, geothermal, hydro) generation, system installation or storage*

Response rates were high enough in four industry clusters to provide reliable findings. These four industries were: Construction, Building Services, Professional Services (ex. Legal) and Manufacturing. For these industry clusters, the NYSDOL prepared a series of statewide and regional research findings and the NYCLMIS prepared the statewide industry profiles found within this report. Response rates were too low in the other three clusters (Legal Services; Financial Services; and Electric Power Generation, Transmission and Distribution) to provide reliable findings.

Data Limitations. As with many surveys, there were limitations. The New York State economy is very large, and it was necessary to focus research efforts in the most efficient manner. The New York State Green Jobs Survey focused only on activities involving energy efficiency and generating renewable energy. It deliberately excluded other green practices, such as pollution prevention and clean-up, and natural resources conservation, leaving those activities for later research. Only companies in industries thought to have higher incidences of green economic activity, as defined above, were selected for the survey. Companies in other industries were not surveyed or assessed as part of this research.

While the survey sample was stratified by three different areas of interest (geographic region, industry cluster, and firm size), analysis was only conducted on groupings where the response was robust enough. Firms self-identified as green: the criteria for self-identification was that one or more of their employee(s) be ‘primarily engaged’ in green economic activities.

There was a delay between when the survey sample was drawn (3rd Qtr of 2010) and when the survey was administered (4th Qtr of 2010). Estimates were subsequently benchmarked to the 2010 employment records, but some information may have been lost. Seasonal or cyclical change was not captured in the survey – the estimates reflect a ‘snapshot’ of the green economy at a particular time. Finally, the research was conducted after the recession during a relatively weak recovery period, which likely influenced results.

Focus Groups and Expert Interviews. In addition to the large-scale employer survey, researchers conducted 18 focus groups with employers in the selected industries. There were nine focus groups conducted by the NYCLMIS in New York City, five conducted by the AEC on Long Island, and four conducted by the E2TAC in upstate New York. All of the groups conducted by the NYCLMIS, and most of those conducted by the other partners were co-sponsored by industry organizations or others playing an instrumental role in the green economy, such as NYSERDA, the NYC Building Trades Employers’ Association, the CUNY Center for Sustainable Energy and the Building Performance Lab, CUNY Institute for Urban Systems. A full list of focus group dates, co-hosts, and target industries can be found in Appendix C. In addition, the research partners interviewed approximately 50 industry experts to gather additional information about the selected industry clusters.

Instrument development. The NYCLMIS took the lead on developing the protocols for both the focus groups and expert interviews and trained the research partners to conduct focus groups and utilize the protocols. The CUNY Graduate Center required approval of the Institutional Review Board (IRB) for the conduct of the focus groups and interviews in New York City. Stony Brook University and the University at Albany received IRB waivers from their institutions. The focus group and expert interview protocols can be found in the Appendices D1 and D2.

The focus group and expert interview protocols included questions that addressed all four key research areas connected with employer demand: green industry background, occupational information, recruitment and retention, and education and training. The protocols were designed to elicit qualitative information to supplement the statistical information secured through the employer survey. The focus groups conducted by the NYCLMIS and Stony Brook University were recorded (with written consent from the participants) and transcribed to facilitate analysis.

Focus group and interview respondent selection. One-on-one semi-structured interviews were conducted with “peak” experts in their respective fields identified through informal conversations with co-hosts and through a journalistic literature review. The intent of the focus groups was to learn about the industries, and their hiring and training needs from employers at the leading edge of green economic activity. As such, the research partners derived participant lists from two sources. Primarily, respondent firms and names were identified by the focus group co-hosts; additional names were culled from survey respondents who a) indicated that they had at least one green employee; and b) gave express permission to the research partners to be contacted for additional questions about their green businesses.

Analysis. As the lead partner in preparing industry profiles, the NYCLMIS read and analyzed all focus group and expert interview transcripts and notes to provide additional depth and nuance to the four industry cluster profiles that were prepared.

Research Methods: Education and Training

The research on education and training included in this study encompassed degree and non-degree programs, in-person and virtual methods of instruction, and offerings of community colleges and universities as well as other types of training providers, such as community-based organizations, BOCES and Career & Technical Education high schools, labor unions, credentialing organizations and private entities. The goal was to identify as many programs and offerings as possible in New York State that prepare individuals for green jobs or upgrade the skills of workers in existing jobs so that they can perform green jobs.

The method of collection was designed to allow comparison by industry and job family with the information collected about employer demand. It was also designed to organize information that could be presented in user-friendly formats for use by:

- ✓ Job seekers
- ✓ Students
- ✓ Workforce members who want to enhance their skills or retrain for green jobs
- ✓ Staff who assist any of the above groups with job search or career development
- ✓ Employers looking to find skilled or trained individuals
- ✓ Policy-makers and researchers

The AEC and the NYCLMIS were involved in this portion of the research. The AEC collected data for all degree programs throughout the State and for non-degree programs outside New York City. The NYCLMIS collected information on non-degree programs in New York City

Non-degree program data collection. The data items collected by the AEC and the NYCLMIS are shown in the box below.

Data items collected by AEC and NYCLMIS for Green Education and Training Programs

- ✓ *Name and contact information for each education/training provider*
- ✓ *Type of provider*
- ✓ *Name and contact information for each green education/training program*
- ✓ *Location(s) of education/training*
- ✓ *Major funding source(s)*
- ✓ *Industry sector(s) for which education/training program prepares students*
- ✓ *Job family(ies) for which education/training program prepares students*
- ✓ *Training type and length*
- ✓ *Estimated tuition/fee per student*
- ✓ *Credentials for which students are prepared*
- ✓ *Program entry requirements*
- ✓ *Target groups, if any*
- ✓ *Capacity and measures of effectiveness*
- ✓ *Inquiry about entrepreneurial programs, clean tech internships, career centers and assistance for displaced workers (AEC only)*
- ✓ *Degree type (for credit based/degree programs only) (AEC only)*

For *New York City* the NYCLMIS collected data through the following methods:

- ✓ Developed a Survey Monkey data collection instrument (Appendix E) to collect information for non-degree programs.
- ✓ Identified green non-degree education and training programs by working with knowledgeable intermediaries who were in the best position to know about these programs. Later, these intermediaries communicated with non-degree education and training program providers to encourage them to complete the Survey Monkey data collection instrument. These knowledgeable intermediaries included:
 - The Director of Green Education and Training Programs at the CUNY Central Office, who communicated with all CUNY campuses and compiled a list of all green CUNY-offered adult and continuing education programs and degree programs.
 - Key Albany-based staff members from NYSERDA, who communicated with all of their education and training grantees and contractors.
 - Staff and officers of the New York City Employment & Training Coalition (NYCETC), a membership organization of 200 education and training providers, including non-profit and community organizations, private proprietary schools, labor unions and others. NYCETC included a link to the Survey Monkey instrument in its weekly newsletter for several months and followed up by phone with all members who offered green education and training programs.

- The Executive Secretary of the Career and Technical Education (CTE) Advisory Council (New York City Department of Education), who identified all green career and technical education programs and communicated with all these high schools and programs.
- ✓ Directly contacted U.S. Department of Labor “Pathways Out of Poverty” grantees in New York City involved in green education and training. These included the Consortium for Worker Education and STRIVE.
- ✓ Directly contacted a number of training programs operated by or in cooperation with labor organizations to gather information on their green training activities. These included SEIU Local 32BJ’s Thomas Shortman Training Fund, the International Union of Operating Engineers Local 94, and several construction trade unions including the New York City District Council of Carpenters, the International Brotherhood of Electrical Workers (IBEW) Local 3, the Laborers’ Mason Tenders Training Fund, the Painters and Allied Trades, and the Plumbers’ Local 1.
- ✓ Compiled information on programs operated or authorized by credentialing organizations such as the Building Performance Institute (BPI), U.S. Green Building Council (LEED), and the North American Board of Certified Energy Practitioners (NABCEP).

A relational database was created containing the fields in the Survey Monkey instrument. It should be noted that some of the items, such as capacity and measures of effectiveness, were requested but not required of education and training providers.

For *New York State outside of New York City*, the AEC at Stony Brook University searched New York State’s Eligible Training Provider database for all green-related training and education programs and performed a wider web search that included identification of education and training providers for green-related degree and non-degree, credit and non-credit programs offered throughout the State. This information was organized into the same categories as those used by the NYCLMIS. In addition, AEC collected information about entrepreneurial programs, clean tech internships, career centers and assistance for displaced workers, especially as it applied to degree granting institutions.

To validate the information collected through the web search, the AEC developed a survey tool with a public portal, which was sent to the contact people for all green programs identified. The survey tool allowed for the addition of new programs as well as validation or updating of known programs (Appendix F).

Data Collection on Degree and Certificate Programs. For degree programs, the research had two primary goals:

- ✓ Identify the **general types of certificate and degree programs** in the state that prepare individuals for the green jobs identified in the employer survey.
- ✓ Identify **new and specialized green-related degree programs** in the state, including those in green industries not covered in the employer demand analysis, such as waste removal and remediation, transportation, environmental science and others.

The employer demand research identified the key occupations in which employers reported green employment. Wherever possible, these occupations were given O*NET-SOC codes, the U.S. Department of Labor’s system for categorizing occupations.

To identify the *general types of certificate and degree programs* related to the key green occupations reported by employers, the researchers looked at awards (certificates and degrees) conferred by colleges, universities, technical and vocational institutions related to green occupations. The main data source for this examination was the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS), which gathers information on the number of certificates and degrees conferred, by instructional area, from every college, university, and technical and vocational institution that participates in federal student financial aid programs. The instructional areas are organized according to the Classification of Instructional Programs (CIP).

The research partners employed the U.S. Departments of Education and Labor’s “CIP–SOC Crosswalk” to link instructional programs to occupations. It should be noted that IPEDS provides information that allows the identification of *all* degrees and credited certificates that align with a particular occupation. Some people in an occupation may work in the green economy and some may not. For example, an architecture degree may be used in green or non-green design.

To identify *new and specialized green-related degree programs* in the state, the AEC at Stony Brook University performed a broad Internet search for green-related degree-granting and certificate programs. The providers of these specialized green-related programs were asked to validate or update the information collected through the web search, and to add any new green-related programs being offered.

Focus Groups and Interviews. In addition to the data collection methods already mentioned, both the AEC and the NYCLMIS conducted selected focus groups and interviews with education and training providers to gather qualitative information. The AEC conducted a focus group of labor union training providers, primarily in the construction trades, and also conducted expert interviews with BOCES and Green Training Academies.

The NYCLMIS, in partnership with the New York City Employment & Training Coalition, conducted a focus group of 20 non-credit green training providers in New York City. The

[Education and Training Research Findings](#) section of this report presents the results of the research on green education and training programs organized by occupational family.

Organization of this Report

The next section this report includes a *Statewide Summary* of findings on employer demand. This is followed by four *Industry Cluster Profiles*, and then by the *Research Findings about Education and Training Opportunities* organized into the six occupational families that most closely align with the green economic activity in renewable energy and energy efficiency and a seventh category for green occupations that do not fit neatly into the first six occupational families.

The report concludes with a *Summary and Implications* for the workforce development system.

This product was partially funded by a grant awarded by the U.S. Department of Labor's Employment & Training Administration. The information contained in this product was created by a grantee organization and does not necessarily reflect the official position of the U.S. Department of Labor. All references to non-governmental companies or organizations, their services, products, or resources are offered for informational purposes and should not be construed as an endorsement by the Department of Labor. This product is copyrighted by the institution that created it and is intended for individual organizational, non-commercial use only.

