

## CHAPTER 7: FINDINGS ABOUT EDUCATION AND TRAINING OPPORTUNITIES

### A. Construction and Extraction Occupations – O\*NET-SOC Code 47

#### Overview

This job family includes construction trades workers, construction trades helpers, first-line supervisors of construction trades workers, and closely related occupations. “Green” occupations such as solar photovoltaic installers, solar thermal installers and technicians, and weatherization installers and technicians are also included in this job family. Many people in the trades maintain that the difference between a “green” tradesperson and a tradesperson in general depends on the construction project and that the basic preparation is the same (i.e. carpentry training for a carpenter) regardless of the application of these skills. On the other hand, the Urban Green Council believes that individuals with green skills will build greener buildings, no matter what the project is. They maintain that workers who understand green work practices and concepts will build better, higher-performing buildings.

Skills for construction trades occupations are normally learned through pre-apprenticeship training, apprenticeship training, post-secondary education or on-the-job training. The research conducted under this grant focused on the 22 green occupations in the construction trades job family in O\*NET’s *Greening of the World of Work*<sup>1</sup> as well as occupations that were reported by New York State employers in the large employer survey conducted in late 2010 - early 2011.

#### Non-Degree/Non-Credit Bearing Programs

Green training in construction trades occupations is unique compared to other job families in that much training for the construction trades in New York State is provided by Joint Apprenticeship & Training Committees. As expressed by a union representative during a focus group discussion conducted as part of this green jobs research, “This new-labeled ‘green’ collar job is really a blue-collar worker coming back for some enhancement training. It’s the work that we have always been doing. This isn’t a new occupation. “The same representative continued, “All of our [Joint Apprenticeship & Training] programs are constantly evolving. They change based on market conditions, based on technology changes, this one [green] being a tremendous one. Green technology...was a door opened to us a few years ago that, you know, suddenly we all had to get reeducated in how to train for it.”

As noted in the Research Methods section of this report, the researchers reached out to Joint Apprenticeship and Training Committees (JATCs) as well as other types of education and training entities to gather information for this report. The response rate from the JATC’s was very low. We have presented narrative information on both pre-apprenticeship and apprenticeship programs in the construction trades, but because of the low survey response rate there is little statistical information in the table below for JATC programs and the

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<sup>1</sup> Dierdorff, E., J. Norton, D. Drewes, et al., *Greening of the World of Work: Implications for O\*NET-SOC and New and Emerging Occupations*, National Center for O\*NET Development, 2009. They are listed in Appendix Table “G”.

information presented on the chart under-represents their role in training the “green” construction trades workforce.

The non-degree and non-credit bearing programs and courses identified for this job family may focus in such areas as background skills and general information; energy efficiency; electrical power and lighting; energy, environmental, sustainability or facilities management; renewable or alternative energy technologies; green construction and sustainable building, materials and design; and waste management and environmental remediation amongst others.

They may also include “green” education and training that prepare individuals for credentials from the following credentialing bodies:

- **AEE** (Association of Energy Engineers)
- **BEAC/CESB** (Board of Environmental, Health & Safety Auditor Certifications/Council of Engineering and Scientific Specialty Boards)
- **BPI** (Building Performance Institute)
- **GA** (Green Advantage)
- **UGC’s GPro** (Urban Green Council)
- **LEED** (Leadership in Energy and Environmental Design)
- **NABCEP** (North American Board of Certified Energy Practitioners)
- **NAHB** (National Association of Home Builders)
- **OSHA** (Occupational Safety and Health Administration)
- **RESNET** (Residential Energy Services Network)

Additional examples of credentials for which students are prepared in this job family include Certified Green Professional (CGP), certification for 40-hour HAZWOPER (Hazardous Waste Operations and Emergency Response); International Ground Source Heat Pump Association (IGSHPA) installer certification; BPI Cooling Professional, Envelope Professional and Heating Professional; Environmental Protection Agency (EPA) Renovation, Repair and Painting certification; 8-hour Lead Renovator certification; Pre-Apprenticeship Certificate Training (PACT) Certification; and preparation for the LEED Green Associate among many others.

#### **Examples of “Green” Non-Degree Training:**

The chart below displays the number of specifically “green” non-degree programs or non-credit bearing courses identified in the Construction and Extraction occupations by labor market region of New York State. Examples of these courses and programs include:

- Building Maintenance and Weatherization
- Construction Management for Green Building
- Electrical Installation
- Fundamentals of Building Green
- GPRO
- Green Building for Contractors
- Green Roofs and Living Walls
- Introduction to Photovoltaic Design and Installation

- LEED AP Building Design and Construction
- Solar Hot Water Systems
- YouthBuild program

The specific providers and programs can be found in Appendix “H” to this report.

Construction and Extraction Occupations – Green Non-Degree Programs and non-Credit Bearing Courses				
Region	Number of Providers	Number of Programs	Students Enrolled*	Student Completers*
Hudson Valley	12	93	753	738
New York City	31	90	4096	3353
Central NY/Southern Tier	11	59	66	45
Long Island	9	34	566	546
Western NY/Finger Lakes	9	33	1585	1282
Capital District/North Country/Mohawk Valley	10	25	602	536
Online**	11	25	43	41
<b>Total</b>	<b>93</b>	<b>359</b>	<b>7711</b>	<b>6541</b>

\* Enrollment and completion data were not reported by all training/education providers.

\*\*Online designation is for web based programs and is not one of the LMI Regions.

\*\*Blended format programs are included within the 6 LMI Regions.

The Hudson Valley region offers the largest number of non-degree programs in the Construction and Extraction Job Family and represents almost 26 percent of the training programs offered. Within the Hudson Valley region, SUNY Ulster County Community College accounts for 34 programs in this job family and is one of the partner organizations with the Hudson Valley Community College (HVCC) Center for Energy Efficiency and Building Science (CEEBS) programs, which has other partners in this region as well. New York City has the second largest number of programs and represents about 25 percent of the total.

The New York City region has the highest reported enrollment and completion rates for all regions representing just over one-half of all enrollees (53%) and completers (51%) for the state. Solar One and Forever Green Training and Design are the largest contributors accounting for more than half of the total enrollment and completion reported for the New York City region. The Western NY/Finger Lakes region has the second highest reported enrollments and completions, representing about 21% and 20% respectively. Alfred State College and Erie Community College account for approximately two-thirds of the enrollment and completion in this region. The Central NY/Southern Tier region has the lowest reported enrollment with 66 enrollees and 45 completers, representing less than one percent of the statewide total for both.

Twenty-five “green” Online training programs were found for this job family.

### Spotlight on Green Professional Building Skills (GPRO) Training

Many construction trade unions have participated actively with the Urban Green Council (the New York City affiliate of the US Green Building Council) to develop the Green Professional Building Skills (GPRO) program, which is intended to teach experienced construction workers the principles of sustainability as well as trade specific green construction knowledge.

The program helps these workers incorporate green practices into the core knowledge of their trade.

#### The GPRO training program includes:

- **Fundamentals of Building Green:** 4-hour course covers sustainability as it relates to the construction industry and defines the work practices and concepts relevant to green building. This course is prerequisite to all other GPRO courses.
- **GPRO Construction Management:** 6-hour course that fills the “green gap” for individuals with construction experience such as: CM or GC Site Superintendent, Project Manager, Executive Project Manager, Project Engineer/Clerk, Sustainability Manager, experienced tradesperson, tradesperson with site supervision or management responsibility, facilities manager or building owner, owner’s representative or project manager, project architect, professional engineer, or commissioning agent.
- **Electrical Systems:** 6-hour course designed for electricians and workers in the electrical industry.
- **Plumbing:** 6-hour course designed for plumbers and workers in the plumbing industry.
- **Mechanical Air:** 6-hour course in sustainable construction practices for HVAC mechanics and workers in the heating and air conditioning industry.
- **GPRO Operations & Maintenance Essentials:** 8-hour course intended for a wide variety of professionals who work on-site in building operations and maintenance.

In New York City, GPRO courses are currently being delivered through three partner colleges: Medgar Evers in Brooklyn, Hostos Community College in the Bronx, and LaGuardia Community College in Queens. Students who live or work in New York State are eligible to apply for a 50% reimbursement for course and exam fees through NYSERDA through May 31, 2012. Several construction trade unions are actively promoting GPRO to their memberships.

#### Pre-Apprenticeship Training Programs:

Several areas of the state have either pre-apprenticeship programs or transition programs that prepare individuals for entry into any of the construction trades. Some work with under-represented populations, others with high school students, and others with returning military personnel. Some pre-apprenticeship programs operated in New York City and Long Island include:

- Building & Construction Trades Council of Nassau and Suffolk County Workforce Development Program
- Edward J. Molloy Institute for Construction Skills (New York City)
- Non-traditional Employment for Women (New York City)
- Helmets-to-Hardhats (nationwide program for returning military personnel, with locations in New York City and elsewhere in New York State)

## Construction Trade Apprenticeships and Training Programs

Within the construction trades in New York State, there are many different union locals, of varying sizes and covering different geographic areas. The following chart is not a complete list, but displays some of the construction unions most involved in green construction in the downstate areas of New York. More information on apprenticeship programs and apprenticeship occupations can be found on [www.labor.ny.gov/apprenticeship/appindex.shtm](http://www.labor.ny.gov/apprenticeship/appindex.shtm).

Type of Labor Organization	Area of Coverage	Nature of Trade	Involvement in Green Construction	Apprenticeship Duration
Boilermakers Local 5	NYC, Long Island, lower Hudson Valley	Construction boilermakers	Several areas	4 years
Northeast Regional Council of Carpenters	New York State	Carpenters, cabinetmakers, millwright, pile drivers, construction divers	Carpentry, cabinetry	4 years; 5 years for cabinetmakers
Electrical Workers – IBEW Local 25	Nassau & Suffolk	Electrical, Construction, Maintenance, Communication	Several areas	5 years
Electrical Workers – IBEW Local 3	New York City & Westchester County	Electrical, Construction, Maintenance, Communication	Several areas	5½ years
Laborers: Locals 79 (Building Construction Laborers), 78 (Environmental Remediation Laborers) and 10 Home Performance Laborers); training handled by the Mason Tenders Training Fund	NYC & Long Island	All aspects of construction: masonry, plastering, scaffolding; Environmental remediation; Home performance laborers	Weatherization of residential homes; Remediation of hazardous materials	3 years for Locals 78 and 79
Steamfitters Local 638	NYC, Nassau, Suffolk	Installation of Steam or Hot Water Piping	Heating, air conditioning, ventilation, air conditioning and refrigeration (HVAC/R)	5 years.

Plumbers Local 1	New York City	Installation, repair and maintenance of piping systems	Several areas	5 years
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Some construction trade apprenticeships now offer an Associate’s Degree as part of the apprenticeship, through articulation agreements with colleges. One example of this is Local 3 of the International Brotherhood of Electrical Workers, based in New York City, which has an articulation agreement with Empire State College.

### Pathways out of Poverty “Green” Training Grants

Pathways out of Poverty Grants, funded through the American Recovery and Reinvestment Act of 2009, were awarded by the U.S Department of Labor’s Employment and Training Administration through a competitive procurement process. The purpose of these grants is to teach workers the skills required in high growth and emerging industries, including energy efficiency and renewable energy. The programs are designed to help individuals to learn new skills and competencies, gain employment, and advance along career pathways.

Focused on Public Micro Data Areas (PUMAs) where poverty rates were 15% or higher, the grants are targeted to individuals who may lack basic literacy and job readiness skills, and may also face other barriers to employment.

There are four Pathways out of Poverty grants operating in New York State:

- **The Consortium for Worker Education ([www.cwe.org](http://www.cwe.org))**, along with service partners SoBRO, Sustainable South Bronx, the Osborne Association, the Association for Energy Affordability and Nontraditional Employment for Women, is establishing the **Center for Environmental Workforce Training (CEWT)** to recruit, train and identify employment opportunities for Bronx residents in city-wide emerging Green industries and transitioning sectors. These include Green Building Construction and Retrofit, Energy Efficiency Assessment, Deconstruction and Materials Use, and Sustainable Manufacturing.
- **STRIVE ([www.striveny.org](http://www.striveny.org)) in East Harlem operates a Green Construction Program** that trains students in carpentry, electrical, and plumbing and prepares them for handling hazardous materials and energy efficient building and retrofitting techniques. The program includes instruction in four Brownfield Remediation certifications that are industry-recognized within New York State. In addition, the program includes classes in weatherization, energy auditing and solar panel installation.
- **Pathstone Corporation ([www.pathstone.org](http://www.pathstone.org))** runs the **“Green for Gold”** program in Rochester, New York, which focuses on deconstruction, specifically on city properties slated for demolition in Rochester.

- **Central New York (CNY) Works** ([www.cnyworks.com](http://www.cnyworks.com)) is coordinating the "eCUSE" grant which provides low-income jobseekers living in the City of Syracuse with access to green employment and training assistance.

For more information about Pathways out of Poverty grants visit [http://www.doleta.gov/pdf/Pathways\\_Poverty\\_grants.pdf](http://www.doleta.gov/pdf/Pathways_Poverty_grants.pdf).

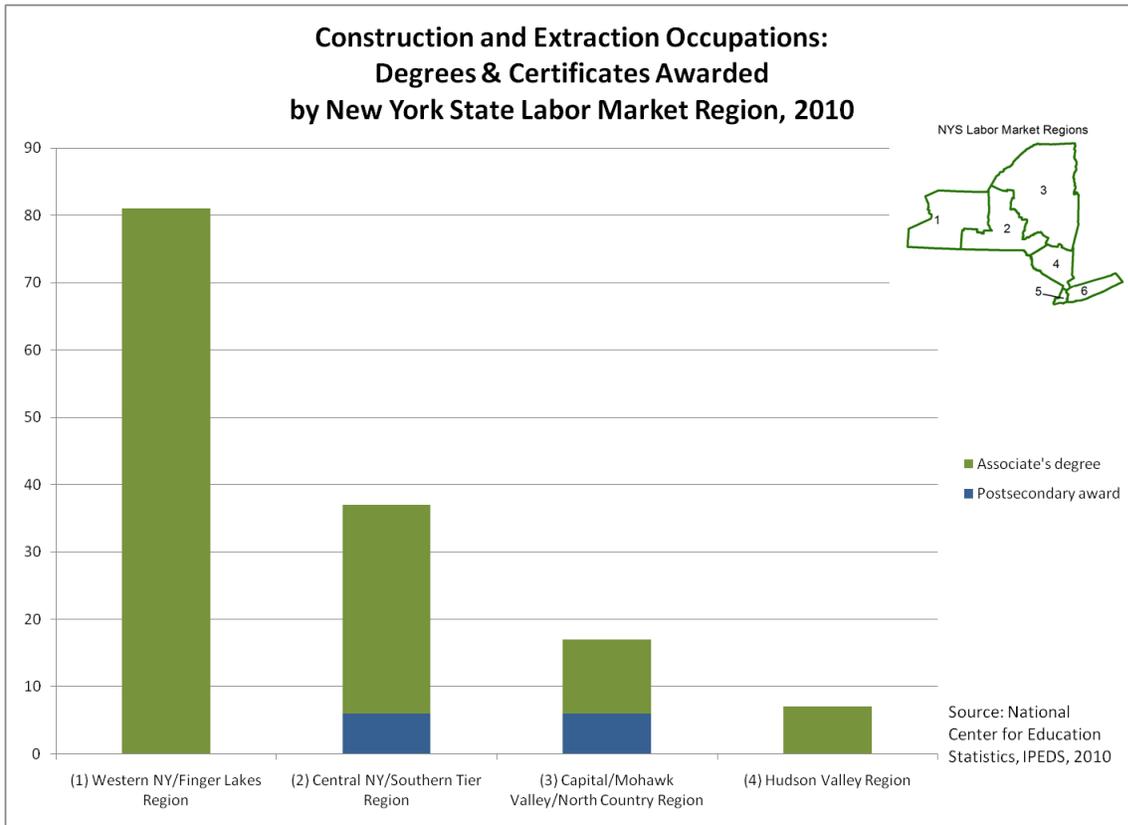
## **Degree and Credit-Bearing Certificate Programs**

### *General Degree and Credit-Bearing Certificate Programs*

As explained more fully in the "Research Methods" section of this report, as part of its research on "green" jobs, the New York State Department of Labor and its research partners looked at awards (certificates and degrees) conferred by colleges, universities, technical and vocational institutions related to green jobs. The information below was derived from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS), which gathers information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. IPEDS data, which is organized by instructional program ("CIP" codes) was "crosswalked" to occupations using 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 job family but may not pertain to the occupation as it relates to the green economy.

IPEDS data indicates that in 2010, 142 awards were conferred related to the Construction Trades job family.

Only four of the six NYS LMI Regions have awards in this Job Family. These regions include the Western NY/Finger Lakes, Capital District/Mohawk Valley/North Country, Central NY/Southern Tier and Hudson Valley regions.



130 awards conferred were at the Associates degree level, with 81 Associates degrees or 57% of awards in the Western New York/Finger Lakes region, followed by 31 or 26% in the Central NY/Southern Tier Region. The Associate’s degree is the highest award level for this Job Family.

*Green Degree and Credit-Bearing Certificate Programs*

The chart below summarizes the number of *specialized* green-related degree and credit bearing programs in Construction Trades that the research partners identified through original research, which was then validated by the postsecondary institutions.

Relatively few degree and credit based programs were found for this job family, as the skills required for Construction Trades occupations are learned predominantly through pre-apprenticeships, apprenticeships, post-secondary non-credit courses and on the job training.

Construction and Extraction Occupations – Green Degree Programs and Credit Bearing Courses				
Region	Number of Providers	Number of Programs	Students Enrolled	Student Completers
Long Island	3	4	275	104
Western NY/Finger Lakes	2	4	99	97
Capital District/North Country/Mohawk Valley	3	3	n/a	n/a
Central NY/Southern Tier	2	2	66	14
New York City	1	1	n/a	n/a
<b>Totals:</b>	<b>11</b>	<b>14</b>	<b>440</b>	<b>215</b>

\*Enrollment and completion data were not reported by all training/education providers.

Three providers were identified on Long Island offering four programs, which represents 29% of all programs in the identified regions. The Western New York/Finger Lakes region also has four programs, which are offered by two providers.

The Long Island region has the highest number of students enrolled and completed, representing 63% and 48% respectively of enrollees and completers in the state.

Illustrative “green” degree program names include:

- Building Trades-Building Construction AOS (Associate of Occupational Studies)
- Construction and Environmental Technology AAS
- Construction Management Engineering Technology BS
- Green Building Technology – One year credit certificate
- Sustainable Urban Environments BS
- Alternative and Renewable Energy Systems B-Tech (Bachelor of Technology)

### Program Focus

The following chart displays particular program focus areas for Construction and Extraction programs. “Program focus” categories are assigned with the intention to align programs with categories of economic activity included in the employer survey, such as energy efficiency and renewable energy (e.g. solar PV, solar thermal, wind, biomass, geothermal, hydro). In other cases, they are descriptive identifiers used to group similar programs together.

In construction and extraction occupations, a large number of “green” programs identified are focused on energy efficiency, green construction/sustainable building, materials and design, and renewable energy. Of note is the significant number of LEED programs offered. In addition, solar programs comprise a large percentage of the programs in renewable energy offered across the state.

Construction and Extraction Occupations – Program Focuses	Degree/ Credit Programs	Non Degree/ Non- Credit Programs
Background Skills / General	n/a	16
Electrical / Power / Lighting	n/a	5
Energy Efficiency	n/a	107
Green Construction / Sustainable Building, Materials and Design:		
Green Construction, Architecture, Design, Sustainable/Green Building (non-LEED)	5	55
LEED Programs	n/a	23
Other / Miscellaneous	3	35
Renewable / Alternative Energy:		
Biomass / Biofuels / Bioenergy	n/a	1
Fuel Cells / Battery Technology	n/a	1
Geothermal	n/a	10
Multifocus or Other Renewable / Alternative Energy	2	9
Solar PV	2	63
Solar Thermal	n/a	16
Wind	1	9
Waste Management / Environmental Remediation	1	9

\*Programs may be counted toward multiple job families

## Conclusion

Green training in the construction trades job family is unique compared to other job families. Construction skills are learned predominantly through on the job, pre-apprenticeship or apprenticeship types of training. Basic training for a “green” tradesperson is largely the same as for the trade in general. This is reflected in the relatively low occurrence of “green” degree or credit related educational and training programs found for this job family. In many cases, pre-apprenticeship, apprenticeship and training for union workers has been updated to include content required for green or sustainable construction.

Many “green” non-degree and non-credit based programs have been identified by the research for Construction and Extraction occupations. A large number of these programs provide specific credentials that are recognized by credentialing bodies such as the Green Building Certification Institute (GBCI), which administers the LEED credential, Building Performance Institute (BPI), the North American Board of Certified Energy Practitioners (NABCEP) and many others to provide the “green” skills and training workers may need to enhance existing skills or to provide new skills, training and specializations within their occupations. These programs are focused in

multiple areas including energy efficiency, renewable energy, green construction and sustainable building, amongst many others.

Overall enrollment and completion data for Construction and Extraction occupations is the highest of the six job families analyzed. The Hudson Valley region has the largest number of “green” training programs, while New York City and the Western NY/Finger Lakes region account for approximately two-thirds of the enrollment and completion for the state.