

## CHAPTER 7: FINDINGS ABOUT EDUCATION AND TRAINING OPPORTUNITIES

### C. Installation, Maintenance and Repair Occupations – O\*NET-SOC Code 49

#### Overview

This job family includes repairers, mechanics, technicians and installers, and first-line supervisors for these occupations. Green occupations such as wind turbine technicians, geothermal technicians, and air conditioning mechanics and installers are included in this job family.

Skills for these occupations are typically learned through post-secondary training and on the job training.

The research conducted under this grant focused on the 16 green occupations in the Installation, Maintenance and Repair 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 green employment employer survey conducted in late 2010-early 2011.

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

Non-degree and non-credit bearing programs and courses for this job family mainly focus on energy efficiency; electrical power and lighting; renewable or alternative energy technologies; green construction and sustainable building materials and design; and waste management and environmental remediation among other topics.

Topics covered may also include green education and training programs that prepare individuals for credentials from the following credentialing bodies:

- **BPI** (Building Performance Institute)
- **IGSHPA** (International Ground Source Heat Pump Association)
- **NATE** (North American Technician Excellence)
- **GA** (Green Advantage)
- **LEED** (Leadership in Energy and Environmental Design)
- **NABCEP** (North American Board of Certified Energy Practitioners)
- **RESNET** (Residential Energy Services Network)

Other examples of credentials for which students are prepared in this job family are the 40-hour Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), EPA Renovation, Repair and Painting and EPA Universal Recovery Certificate, Lead Renovator & OSHA 10 Certification, the Midwest Renewable Energy Association (MREA) Certification, Pre-Apprenticeship Certificate Training (PACT) and others.

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<sup>1</sup> Dierdoff, 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.

The table below displays the programs and providers that are available in New York State to prepare individuals for these occupations. It also shows the number enrolled and the number of completers in 2010-11.

Installation, Maintenance, and Repair Occupations – Green Non-Degree Programs and Non-credit Bearing Courses				
Region	Number of Providers	Number of Programs	Students Enrolled*	Student Completers*
Hudson Valley	9	62	594	584
New York City	21	48	3760	3271
Western NY/Finger Lakes	7	37	1532	1254
Central NY/Southern Tier	8	24	66	45
Long Island	6	12	346	338
Capital District/North Country/Mohawk Valley	3	6	50	37
Online**	4	7	6	6
<b>Total</b>	<b>58</b>	<b>196</b>	<b>6354</b>	<b>5535</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 has the greatest number of green non-degree and non-credit bearing programs with 62, or 32 percent of total programs in the State. This may be because the Center for Energy Efficiency and Building Science (CEEBS) is located at Hudson Valley Community College in Troy.

New York City has the second largest number of training programs with 48 programs or 24 percent of total programs identified by the research. New York City has the greatest student enrollment, at 3,760, which represents 59% of all reported enrollment in this job family. The Association for Energy Affordability, Solar One, and Forever Green Training and Sustainable Design are major non-credit green training providers in New York City. The Capital District/North Country/Mohawk Valley has the smallest number of programs, offering 6 programs, which represents about 3 percent of total programs identified.

The Western NY/Finger Lakes region had the second largest number of non-credit students enrolled and training completers. Erie Community College and Monroe Community College programs account for 80 percent of the training activity in this region.

***Building Performance Institute (BPI) Credential Preparation Courses offered by the Center for Energy Efficiency and Building Science (CEEBS)\****

The Center for Energy Efficiency and Building Science (CEEBS), a division of the Workforce Development Institute at Hudson Valley Community College in Troy, NY, delivers energy efficiency and building science courses that prepare students for credentials offered by the Building Performance Institute (BPI), a well-known developer of technical standards for home performance and weatherization retrofit work. The CEEBS receives funding from the New York State Energy Research and Development Authority (NYSERDA).

**Basic Air Sealing and Insulation** - Students are introduced to the skills and principles necessary for working in the field of home weatherization. They learn how to install air sealing and insulation treatments that increase a home's energy efficiency. This course teaches the basic skills necessary for weatherizing a building and provides the background necessary to become a qualified entry-level installer.

**Basics of Building Science** - This course provides an introduction to the field of Building Science. Students learn how to analyze the components of a home and how they work as a system. This course teaches the basics of building science and how interacting relationships affect the performance of a home to give the student a foundation upon which to build. The topics covered in this course are a good prerequisite for the advanced Building Analyst certification training course.

**Building Analyst** - This training program helps prepare the student for the Building Analyst online and field tests. Students come to understand how the house works as a system, why some homes fail, and how to use the latest building science technology to help resolve residential heating, cooling, and base load air leakage problems. By using a "whole house" performance-based approach, students address a comprehensive range of interrelated building issues and are able to provide clients with a more comfortable, safe, durable, and energy efficient home.

**Envelope Professional** - Using a "whole house" performance-based approach, this training covers advanced building envelope diagnostic, evaluation, and repair skills to help students prepare for Envelope Professional on-line and field exams.

**Heating Professional** - Using a "whole house" performance-based approach, this training covers advanced heating system diagnostics, evaluation, and repair skills to help students prepare for the Heating Professional on-line and field exams.

**Cooling Professional** - This is a two-day course designed for experienced heating contractors. The training consists of both classroom and field experience and helps to prepare students for the Cooling Professional on-line and field exams. The BPI Cooling Professional designation was developed in collaboration with North American Technician Excellence (NATE).

\*Information taken from the Building Performance Institute website – [www.bpi.org](http://www.bpi.org).

***Building Operator Certification (BOC®): Training and Certification System offered by CUNY Institute for Urban Systems Building Performance Lab\****

The Building Performance Lab at CUNY’s Baruch College, which is part of the CUNY Institute for Urban Systems, is focused on advancing high-performance building operations and practices in the existing commercial and public real estate markets. Among its activities, it promotes workforce development, which it pursues through curriculum development, internships and other technology training. The Building Performance Lab is supported in part by the New York State Energy Research and Development Authority (NYSERDA),

The Building Performance Lab is part of a team, along with the CUNY School of Professional Studies, the New York City public school system, the New York City Department of Citywide Administrative Services, and others, which is offering the nationally-recognized **Building Operator Certification** training to a variety of custodians and maintenance people. The Lab is also partnering with the International Union of Operating Engineers Local 94 to offer a class for union members at the union’s training center. The curriculum introduces the concepts of energy management and green building practices at the facilities level; students have the option of pursuing the Building Operator Certification.

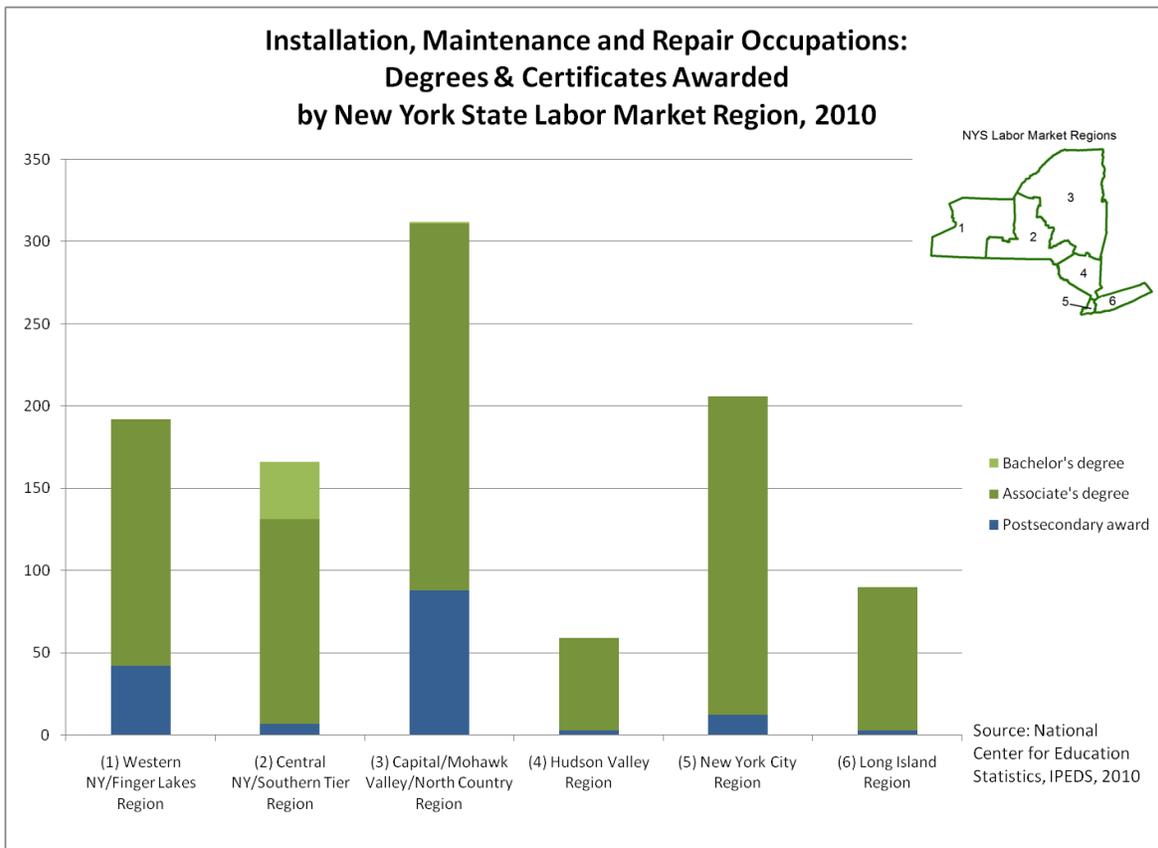
\*Information taken from [www.cunybpl.org](http://www.cunybpl.org)

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

As explained more fully in the “Research Methods” section of this report, the research partners looked at awards (certificates and degrees) conferred by colleges, universities, technical and vocational institutions in fields associated with green employment. This data was derived from the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS). Instructional programs were linked to occupations using the U.S. Departments of Education and Labor’s “CIP–SOC” crosswalk.

This data analysis indicates that in 2010, 1,025 awards were conferred related to the installation, maintenance and repair job family. The bar chart on the next page displays the results.

Almost all -- 96 percent, or 989 awards -- in this job family are post-secondary certificate or Associate degree awards. The Associate degree level represents the largest number of degrees at 834 total awards, or 81 percent of the total.



The Capital District/Mohawk Valley/North Country Region had the largest number of overall awards conferred at 312 or 30 per cent of the total, followed by New York City, which represents 20 percent of all awards conferred. All but one of the 36 Bachelor's degree awards was conferred by institutions in the Central NY/Southern Tier Region. The Hudson Valley Region represents the smallest number of overall awards at 59 awards, or just less than 6 percent of the total.

In addition to the degree and credit-bearing certificates in fields associated with green employment, the research identified specialized green-related degree and credit bearing programs in installation, maintenance and repair occupations through original research validated by the postsecondary institutions.

Relatively few specialized degree and credit based programs were found for this job family, as the skills required for installation, maintenance and repair occupations are learned predominantly through post-secondary non-credit courses and on the job training.

Twenty-six (26) specialized degree and credit-bearing programs were identified for the six labor market information (LMI) regions. In 2010-2011, the Western NY/Finger Lakes region had nearly one-third of all specifically green degree programs or credit bearing courses in the State. The Capital District/North Country/Mohawk Valley region offered

seven programs. Central NY/Southern Tier and the New York City region had the fewest programs with one program each for degree-granting green programs.

<b>Installation, Maintenance, and Repair Occupations – Green Degree Programs and Credit Bearing Courses</b>				
<b>Region</b>	<b>Number of Providers</b>	<b>Number of Programs</b>	<b>Students Enrolled*</b>	<b>Student Completers*</b>
Western NY/Finger Lakes	3	8	516	173
Capital District/North Country/Mohawk Valley	2	7	15	14
Long Island	2	6	40	28
Hudson Valley	2	3	20	20
Central NY/Southern Tier	1	1	36	8
New York City	1	1	n/a	n/a
<b>Totals:</b>	<b>11</b>	<b>26</b>	<b>627</b>	<b>243</b>

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

The Western NY/Finger Lakes region had the highest enrollment at 516 students or 82 percent of total enrollment in the State. This region also had the highest number of student completers reported, at 173 or 71 percent of the total. No enrollment or completion statistics were reported for New York City.

Illustrative “green” degree program names include:

- Advanced Certificate in Facilities Management - credit certificate
- Electrical Construction and Maintenance Electrician AOS (Associate of Occupational Studies)
- Air Conditioning Technology: Heating and Ventilation (AOS and AAS)
- Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R) AAS
- Wind Energy & Turbine Technology AAS
- Energy Utility Technology Credit Certificate B-Tech (Bachelor of Technology)

### **Program Focus**

The table on the next page displays particular program focus areas. As shown, a large number of programs were focused on energy efficiency training. Solar PV and solar thermal installation training were also significant for this job family.

Installation, Maintenance, and Repair Occupations	Degree/ Credit Programs	Non Degree/Non- Credit Programs
Electrical / Power / Lighting	3	3
Energy Efficiency	6	66
Green Construction, Architecture, Design, Sustainable/Green Building (non-LEED)	1	12
Other / Miscellaneous	n/a	20
Renewable / Alternative Energy:		
Fuel Cells / Battery Technology	n/a	1
Geothermal	n/a	10
Multifocal or Other Renewable / Alternative Energy	5	5
Solar PV	3	43
Solar Thermal	n/a	17
Wind	5	12
Waste Management / Environmental Remediation	n/a	1

\*Programs may be counted toward multiple job families.

## Conclusion

Energy Efficiency is an important component of the green economy. Within this category and others, there are a host of programs that prepare workers for Installation, Maintenance and Repair occupations.

A total of more than 200 green programs were identified by the research, located throughout the state. Students may take advantage of the many programs available, whether they are seeking a degree in Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R), or specialized training and certification through one of many programs and courses in energy efficiency.

Nearly 6,000 students have already been trained through these programs, making the Installation, Maintenance and Repair occupations job family the second highest overall in the number of student completers of the six job families selected for analysis.