CHAPTER 3: EMPLOYER DEMAND IN GREEN CONSTRUCTION

Highlights

- *The Construction industry cluster has the largest number of green jobs of the industries studied. There are 76,600 "green" employees, or 34 percent of total construction industry cluster employment in New York State. More than a quarter of firms reported having "green" employees.*
- *The proportion of green employment is highest in the Western NY/Finger Lakes Region (52%) and Capital Region/Mohawk Valley/North Country Region (50%). Because of its sheer size, New York City has the largest number of green employees, although they make up just 27 percent of its construction workforce.*
- *New York's largest commercial construction firms say that energy efficient and sustainably-designed construction is firmly in place, and not a trend waiting to happen at some time in the future. It is being driven both by customer preference and leadership from the public sector, both regulatory and role modeling. Virtually all new major publicly-financed construction projects are being built "green."*
- *The top green occupations, which account for more than half of the state's green jobs in Construction are: Heating and Air Conditioning Mechanics and Installers; Carpenters; Plumbers, Pipefitters & Steamfitters; Electricians; and Supervisors of Construction Workers.*
- *The green occupation for which employers have had the most difficulty finding qualified employees is Plumber and Pipefitter Helpers (32 percent of firms), followed by Heating and Air Conditioning Mechanics and Installers (30 percent).*
- *More than three out of four employers with green jobs require enhanced skills for these jobs, which are mostly learned through on-the-job training, in-house training, training from suppliers, and through professional or trade organizations.*
- *Employers want education and training institutions to offer training that emphasizes quality over speed. They also want more "hands-on" practical experience and more work-study, internship and co-op programs.*
- *Employers say that schools should emphasize teamwork and interpersonal skills and help students to be adaptable to meet employer and industry needs.*
- *Companies want schools to expose students to more interdisciplinary work, for example, between technical training and business/sales skills.*
- *Although demand for green construction has suffered during the recession along with the sector in general, the construction industry has continued to move toward green building even as the recession has persisted.*

Overview of the Industry Cluster

The construction industry builds New York: the firms in this sector build housing, commercial and industrial buildings, hospitals, schools and infrastructure. The construction industry includes firms that engage in constructing, repairing and renovating buildings and engineering works, and in subdividing and developing land. Establishments may operate on their own or

under contract to other establishments or property owners. They produce new construction and undertake repairs and renovations to existing structures.

Many who work in the construction industry are very hands-on and take pride in their accomplishments. As one industry representative said in a focus group conducted for this research, “Look what you have. I think we all get excited when we walk through the city and everybody points to a structure and you say ‘I built that’.” Another said, “It’s definitely a self-satisfaction thing. I think that’s probably the biggest driver in this business – that you’re really part of something.”

Human capital and raw materials are the main inputs in construction. While for many the image of “construction” is the worker in a hard hat, it is important to distinguish construction as an industry or sector from construction as an occupation. Construction firms employ and contract with workers in a wide range of jobs: these include not only skilled and unskilled construction occupations such as plumbers, carpenters and laborers, but also professional service and white collar jobs, like architects and engineers, legal, clerical, and managerial occupations.

Firms specializing in large-scale commercial and residential development, infrastructure, and public buildings tend to be somewhat different than smaller residential construction firms. The large-scale commercial, residential and infrastructure segments are dominated by unionized labor (particularly in commercial buildings and public works), and are made up of somewhat larger firms. The smaller residential segment, which is dominated by very small firms of 4 to 10 employees, is largely non-union.

The construction sector contains both general contractors and trade-specific contractors. General contractors, who make up only a small portion of all construction firms, organize the overall building process. They work with engineers and architects and they coordinate all of the various trade contractors that are involved in a project. The trade contractors specialize in particular functions such as electrical, plumbing, roofing, heating/cooling, or drywall and insulation. Trade contractors are the primary source of employment in construction trades occupations.

Green services in this sector are focused in activities related to constructing new green buildings, retrofitting residential and commercial buildings, and adding green technology to infrastructure. The residential sector includes many different types of contractors, including some that specialize in installation of renewable energy systems and others that perform weatherization of residences.

Distribution of Firms and Employment. In the fourth Quarter of 2010, there were 35,104 firms in the construction industry in New York State, employing 216,030 people. Almost 30 percent of the firms (and 38 percent of the state's construction employment) are located in New York City. Another 24 percent of the firms and 19 percent of the State's employment are located on Long Island.

DISTRIBUTION OF CONSTRUCTION FIRMS AND EMPLOYMENT BY REGION

	Firms		Employment	
	Number	Share of NYS	Number	Share of NYS
New York State	35,104	100%	216,030	100%
Capital/Mohawk/North Country	3,563	10%	20,569	10%
Central/Southern Tier	2,252	6%	14,571	7%
Hudson	5,902	17%	25,846	12%
Long Island	8,270	24%	41,118	19%
New York City	10,109	29%	82,221	38%
Western/Finger Lakes	3,846	11%	26,429	12%
Region Not Classified*	1,163	3%	5,276	2%

SOURCE | 4Q 2010, QCEW

**Note: Refers to firms that do not provide a specific location in New York State.*

Construction represents 3.1 percent of all employment statewide. As shown in the chart below, the share of area construction employment is highest on Long Island (4.1%) and lowest in New York City (2.7%). Nonetheless, several of the country's largest construction firms are headquartered in New York City, and these companies work on projects around the state and around the country.

CONCENTRATION OF CONSTRUCTION EMPLOYMENT BY REGION

New York State Region	% of Total Employment
Capital/Mohawk/North	3.3%
Central/Southern Tier	3.0%
Hudson Valley	3.7%
Long Island	4.1%
New York City	2.7%
Western/Finger Lakes	2.8%

SOURCE | 4Q 2010, QCEW

Of the 35,104 firms in the construction industry in New York State, roughly three-quarters were small businesses with five employees or less although these small firms employed only 19 percent of those working in the industry. On the other end, the largest 6 percent of employers have more than half (52%) of all employees in the industry.

SIZE DISTRIBUTION OF CONSTRUCTION FIRMS IN NEW YORK STATE

			Percent of Total	
Size Class by # of Employees	**Firms**	**Employment**	**Firms**	**Employment**
Total	35,077	219,929	100%	100%
0 to 5	26,854	42,645	77%	19%
6 to 10	3,745	28,333	11%	13%
11 to 20	2,370	34,046	7%	16%
21 to 50	1,478	46,036	4%	21%
51 to 100	428	29,193	1%	13%
101 to 250	165	24,395	1%	11%
251 or more	37	15,281	<1%	7%

SOURCE | 4Q 2010, QCEW.

Residential remodelers made up the largest group of companies, with 8,014 separate firms, or 23 percent of the total. However, since residential construction firms tend to be very small, these firms employed only 23,128 people, or just over 10 percent of total employees. The largest firm types by employment were electrical contractors (47,255 employees), plumbing, heating, and air-conditioning contractors (47,164 employees), and commercial/institutional building contractors (30,937 employees).

Industry Market Drivers. Demand in the construction industry is partly seasonal, highly cyclical and very sensitive to the business cycle, although different segments of the industry respond to the business cycle in different ways. Demand for residential construction is usually closely tied to the overall health of the economy, because it responds to the level of employment, which affects demand, and interest rates, which affect access to credit. Commercial construction responds to these same factors, but it is much less volatile, with large firms maintaining better access to credit. Historically, residential construction is a leading indicator of economic recoveries, while commercial construction lags the overall economy.

The aftermath of the 2008-2009 burst of the housing bubble was been something of an exception, however, as a large oversupply of existing residential housing and commercial office space continued to depress demand for new construction even after the resumption of economic growth. Although public construction projects are usually less responsive to the business cycle, they are not immune, and state and local budgets suffered during the economic downturn. Still, an unusually large share of current demand comes from infrastructure, school construction, and other publicly funded projects.

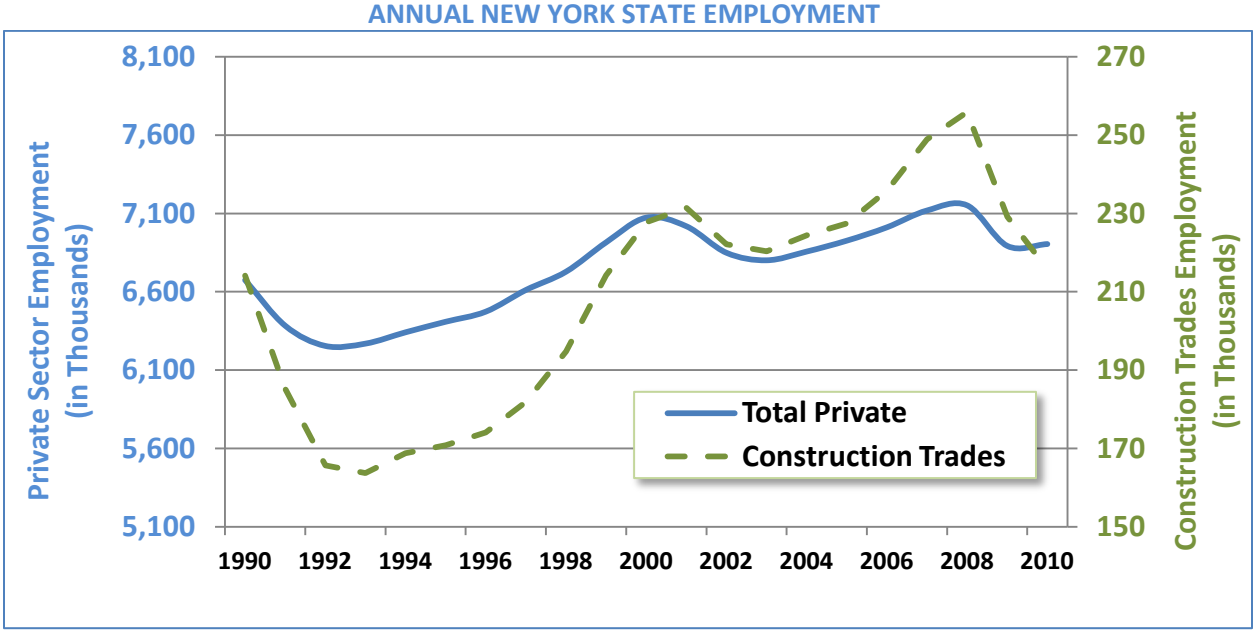
Public sector investment accounted for 53 percent of the value of *all* construction starts in New York City in 2010-2011 (New York Building Congress). The biggest driver of construction starts is the New York City School Construction Authority, followed by the health and hospitals sector.

Colleges and universities have also played a big part, including the City University of New York, the State University of New York, Columbia University, New York University, and Fordham.[1]

More recently (October 2012), the New York Building Congress reports that, "The City's construction industry has experienced a swift and rather remarkable resurgence. From the recently topped out 1 World Trade Center to the Second Avenue subway below, New York's private and public sector is investing heavily in its future. The only disappointment in 2012 is that industry employment has not kept pace with spending due to a number of factors, including a higher prevalence of less-labor intensive construction, improvements in technology and increases in costs."[2]

Recent Developments. As demonstrated in the chart below, statewide employment in this sector has been relatively flat (compared to the whole economy) since 1990.

The recent peak employment occurred in 2008, followed by significant declines in this sector's employment during the most recent recession. The housing bubble that peaked in 2006, and its subsequent collapse have had a profound impact on the construction industry. Prior to the boom of 2002-2006, construction in New York City had been at a modest level for many years. In the 2000s, a huge volume of new commercial and residential construction projects were undertaken, swelling the ranks of construction employees.



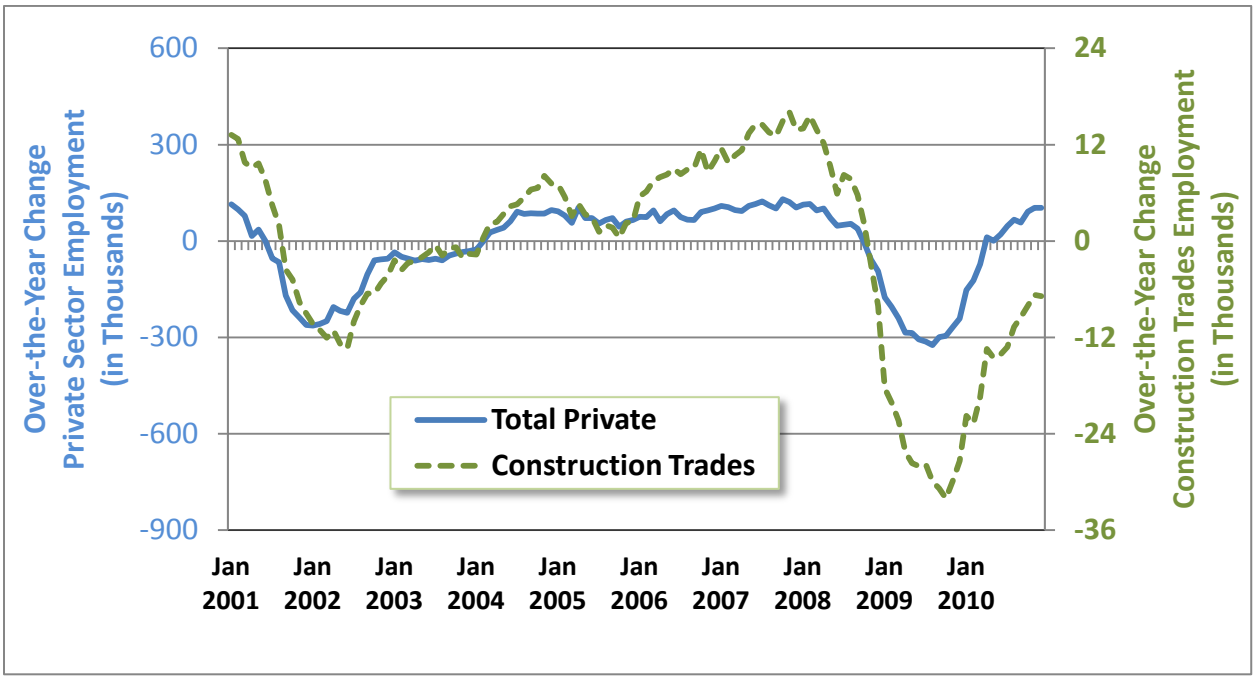
SOURCE | QCEW 1990 to 2010 Annual Average Employment

The collapse of the bubble has produced an enormous surplus of workers – the U.S. Bureau of Labor Statistics reported a national unemployment rate in construction of 21.8 percent in February 2011.[3] As the industry moves toward new green construction standards and practices,

[1] http://www.buildingcongress.com/outlook/, retrieved August 15, 2011.
[2] www. buildingcongress.com/press/2012-10-17.html
[3] www.bls.gov/iag/tgs/iag23.htm, retrieved August 15, 2011.

many of these unemployed workers are likely to be first in line to take advantage of newly created jobs and retraining opportunities.

YEAR-OVER-YEAR CHANGES IN MONTHLY PAYROLLS: TOTAL PRIVATE AND CONSTRUCTION



SOURCE | QCEW Monthly Over-the-Year Change

As the chart above illustrates, construction employment is more cyclical than overall private sector employment – gaining jobs by a higher percentage in good economic times and losing jobs by a higher percentage during more difficult economic times.

Wages. The chart below lists – in descending order by educational requirement – the median annual wages in New York State and typical preparation needed for occupations in the construction cluster. Note that this chart includes only occupations commonly found in the green economy, according to O*NET's *Greening of the World of Work.*[4]

WAGES AND TYPICAL PREPARATION FOR GREEN CONSTRUCTION OCCUPATIONS

Occupation	Median Pay	Typical Preparation
Chief Executives	>$187,200	Bachelor's or higher degree, plus work experience
Construction Managers	$117,710	Bachelor's degree
Electrical Engineers	$83,080	Bachelor's degree
Civil Engineers	$78,570	Bachelor's degree
Architects, Except Landscape and Naval	$78,370	Bachelor's degree
Mechanical Engineers	$74,800	Bachelor's degree
Cost Estimators	$66,190	Bachelor's degree
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	$51,060	Postsecondary vocational award
Structural Iron and Steel Workers	$77,540	Long-term on-the-job training
Electrical Power-Line Installers and Repairers	$74,230	Long-term on-the-job training
Telecommunications Line Installers and Repairers	$69,110	Long-term on-the-job training

[4] 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.* They

Occupation	Median Pay	Typical Preparation
Electricians	$61,120	Long-term on-the-job training
Plumbers, Pipefitters, and Steamfitters	$56,730	Long-term on-the-job training
Millwrights	$50,800	Long-term on-the-job training
Carpenters	$48,520	Long-term on-the-job training
Sheet Metal Workers	$46,770	Long-term on-the-job training
Glaziers	$43,070	Long-term on-the-job training
Solar Photovoltaic Installers	$36,430	Long-term on-the-job training
Cement Masons and Concrete Finishers	$60,900	Moderate-term on-the-job training
Operating Engineers and Other Construction Equipment Operators	$57,360	Moderate-term on-the-job training
Insulation Workers, Mechanical	$52,860	Moderate-term on-the-job training
Hazardous Materials Removal Workers	$46,840	Moderate-term on-the-job training
Construction Laborers	$42,620	Moderate-term on-the-job training
Installation, Maintenance, and Repair Workers, All Other	$39,720	Moderate-term on-the-job training
Roofers	$37,270	Moderate-term on-the-job training
Insulation Workers, Floor, Ceiling, and Wall	$33,100	Moderate-term on-the-job training
Helpers – Electricians	$31,000	Short-term on-the-job training
Office Clerks, General	$27,530	Short-term on-the-job training
Helpers – Carpenters	$26,900	Short-term on-the-job training
Helpers – Pipelayers, Plumbers, Pipefitters, and Steamfitters	$26,700	Short-term on-the-job training
Supervisors of Construction and Extraction Workers	$71,310	Work experience in a related occupation
First-Line Supervisors of Mechanics, Installers, and Repairers	$69,430	Work experience in a related occupation
Sales Representatives, Services, All Other	$64,420	Work experience in a related occupation
Construction and Building Inspectors	$54,130	Work experience in a related occupation
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	$53,840	Work experience in a related occupation

SOURCE | Occupational Employment Survey; O*NET Online

For workers with limited formal education, construction pays better than any other major industry in New York. One reason for this is that construction work is more highly unionized than the New York State average,[5] particularly in the commercial and infrastructure segments of the industry. In addition, New York State Labor Law requires that "prevailing wages" be paid on public works construction projects, and in practice the prevailing wage level is generally established according to the wages among unionized workers. In the segments of the industry dealing with large-scale construction, workers are generally trained through formal, State-approved apprenticeship programs, with built-in career ladders.

Employment Projections. Employment in the construction sector is projected to decline by .1 percent in New York State between 2008 and 2018. This compares to growth of .5 percent in total nonagricultural wage and salary jobs.

Demographic Trends. The following chart displays the demographic characteristics of the construction workforce from 2000 to 2007-2009. With the building boom, the construction workforce ballooned during the first decade of the century, increasing by 28 percent statewide and by 47 percent in New York City. A majority of those working in the industry have a high school education or more, with higher levels of education somewhat more prevalent outside of New York City. The industry has become more diverse ethnically and racially within the last decade. Employment in the construction trades remains overwhelmingly male.

[5] Blanchflower, D. and A. Bryson, The Union Wage Premium in the US and the UK," CEP Discussion Papers, London: Centre for Economic Performance, London School of Economics, 2004.

DEMOGRAPHIC CHARACTERISTICS OF THE CONSTRUCTON CLUSTER WORKFORCE

	New York State		New York City	
	2000	2007-09	2000	2007-09
Total Cluster Workforce	433,643	554,490	168,423	247,257
New York State/City Residents	408,948	519,863	122,273	184,995
Non-New York State/City Residents*	24,695	34,627	46,150	62,262
New York City	32%	38%	*na*	*na*
Long Island	20%	18%	*na*	*na*
Hudson	15%	15%	*na*	*na*
Upstate	34%	30%	*na*	*na*
Bronx	*na*	*na*	13%	14%
Brooklyn	*na*	*na*	33%	34%
Manhattan	*na*	*na*	10%	7%
Queens	*na*	*na*	37%	37%
Staten Island	*na*	*na*	8%	8%
Male	91%	92%	90%	93%
Female	9%	8%	10%	7%
White	73%	64%	41%	33%
Black	8%	8%	18%	16%
Hispanic	13%	22%	28%	39%
Asian	3%	4%	8%	9%
Other	3%	2%	5%	2%
Age 18-34	34%	32%	37%	35%
35-44	31%	25%	28%	26%
44-54	24%	29%	25%	26%
55+	12%	14%	10%	12%
Less than high school or GED	22%	18%	33%	27%
High school or GED	39%	41%	34%	38%
Some college	28%	28%	22%	21%
College	11%	13%	11%	14%

SOURCE | U.S. 2000 Decennial Census and 2007, 2008, and 2009 American Community Surveys public use microdata (PUMS) files. *The remaining counts that appear in the table are of people who both live *and* work in New York State and New York City, respectively. **NOTE|** About 3 percent of employed persons do not indicate a place of work and are not included in this analysis.

Green Economic Activity

For the purposes of this research, "green" economic activity in construction was defined as:

- Constructing energy efficient new buildings, including residential, commercial, institutional, and industrial buildings;
- Remodeling, retrofitting, or retro-commissioning of existing buildings to improve energy or resource efficiency;[6]
- Construction of structures related to generating or transmitting renewable energy, such as solar, wind, biomass, geothermal, and hydro-electric; and
- Installation of renewable energy systems.

During focus group discussions, industry employers also suggested that construction of electric vehicle charging stations and construction of green roofs are considered green construction.

Within the last ten years or so, there has been significant movement in the direction of green practices throughout the construction industry, especially in large buildings and high-end

[6] This category includes weatherization, made up of a large network of non-profit organizations and their contractors that weatherize largely low-income residential properties. Typical weatherization activities include repair, upgrade and replacement of heating systems, water heater installation, wall insulation, window insulation and replacement, repair of minor roof leaks, pipe insulation, replacement of appliances, especially refrigeration, addressing health and safety issues, such as exit signs, mildew, asbestos, mold and poor indoor air quality. Energy audits are performed to determine the type of work needed.

commercial spaces. Some of New York City's largest commercial construction firms say that energy efficient building is firmly in place, and not a trend waiting to happen at some time in the future. It has been driven both by customer preference and leadership from the public sector, both regulatory and role modeling. The Related Companies, one of the largest property management companies in New York City, reports that tenants now expect energy efficiency and environmental sustainability in commercial office space, and that any building that does not have these features will be perceived as "obsolete."

There is movement toward green construction in the residential sector as well, particularly in low-income and affordable housing developments where public subsidies are involved. Increasing energy efficiency is seen as a way to maintain affordable rents for low-income tenants by controlling costs. New York City's Department of Housing Preservation and Development (HPD) has instituted green requirements for new construction and major rehabilitation projects in order for developers to qualify for low-income housing tax credits or HPD financing. As of the first quarter of 2011, HPD-funded projects must achieve Enterprise Green Communities Certification, a national certification designed especially for affordable housing.

The other major area of green investment in the residential sector is weatherization: many small companies and non-profit organizations are involved in performing energy-efficiency remodeling in existing residences of low-income individuals and families. Although some of these organizations have been involved in weatherization for many years, activity in this area greatly increased in the two years after 2009 due to the weatherization grant funding included in the American Recovery and Reinvestment Act (ARRA). Several grantees of this funding emphasized that they had been involved in weatherization well before the funding, noting "We were green before they invented the phrase."

Along with the more general trend toward green construction, renewable energy technologies such as wind and solar constitute a specific green niche within the larger construction sector. Wind is not currently in major demand in New York City, primarily due to the difficulty of meeting building code requirements. Solar, however, has seen increased demand, due to subsidies and to Mayor Bloomberg's promotion of solar panels on city buildings under PlaNYC. Major funding for solar installations has also come from the New York Power Authority (NYPA), which recently announced several new projects. In addition, the Long Island Power Authority (LIPA) and several towns on Long Island have incentives that strongly encourage solar installations.

Although demand for green construction suffered during the recession, along with the sector in general, the construction industry continued to move toward green building. The U.S. Green Building Council (USGBC), which administers the Leadership in Energy Efficient Design (LEED) standard, reported that its membership grew between 2008 to 2009, contrary to expectations. The number of LEED-registered projects (the first step toward certification) continued to grow despite the collapse in new construction, as did the annual number of new certifications. One analyst speculates that this is due to a "lifeboat effect", in which builders attempt to protect themselves from a weak market by jumping on what is perceived to be a marketable trend.

EXAMPLES OF GREEN CONSTRUCTION PROJECTS

Four Times Square (Commercial). Completed in 1999, Four Times Square was a pioneer in green commercial construction. Developed by the Durst Organization, this 48-story building includes many energy efficiency and environmental improvement measures. Measures such as energy-efficient lighting and high-tech heating and cooling systems allow the building to save an estimated $1,760,000 per year in energy costs. Non-toxic, biodegradable and sustainable materials were used extensively in construction, and 65% of construction debris was recycled. Indoor air quality is improved by a high-elevation outside air intake system and special smoking rooms with dedicated exhaust shafts. The building benefited from the assistance of NYSERDA's Technical Assistance Services and New Construction Programs.

Solaire (Residential). Completed in 2003, this 27-story, 293-unit building is located in Battery Park City in lower Manhattan. It achieves a 35 percent reduction in energy demand by using automatic fluorescent lights, photovoltaic panels, high-performance windows and other methods. A roof garden covers 75 percent of the building roof, reducing heating and cooling costs. The building reduces water use by 50 percent by using recycled waste-water for cooling, toilets, and irrigation. 93 percent of the project's construction waste was recycled.

P.S./I.S. 276 (Public). The School Construction Authority's Green Schools Guide, first released in 2007, establishes green standards for school construction projects and ensures compliance with Local Law 86.One of the first schools built under these guidelines was this 8-story school in Battery Park City, which serves 950 K-8 students. Following the guidelines, the building includes such features as a highly insulated envelope, high performance glazing, a highly efficient mechanical plant, CO_2 sensors, and enhanced indoor air quality with mold-resistant and low VOC emitting materials and sustainable materials. The building also goes beyond the guidelines with features such as a photovoltaic array, which supplies energy for one-half to one-third of the building's lighting. Creative design decisions, such as placing the cafeteria and library on the middle floors, save energy by reducing the need for elevators.

General Colin L . Powell Apartments, Morrisania Homes in the South Bronx **(Affordable Housing).** This 50-unit multi-family building was developed in a unique partnership with the City of New York, Blue Sea Development Company and Habitat for Humanity – New York City. The building has a green roof that insulates and reduces storm water runoff, a co-generation system that produces electricity and hot water, a healthy indoor environment through non-toxic materials and controlled filtered ventilation systems, and educational materials for residents on green, healthy lifestyles.[1]

The Family Residence and Essential Enterprise (FREE) Project. The FREE Project recently partnered with EmPower Solar and LIPA to install a large scale multi-site solar energy project at its commercial and residential group home properties across Long Island, NY. The arrays vary in size from a 2.07kW residential system in Patchogue to a 124kW system at their main facility in Old Bethpage. The 45 PV systems total almost 800 kilowatts (kW) and will produce approximately 1,018,000 kilowatt hours (kWh) of electricity annually reducing utility expenses by 27 percent per year that FREE will be reinvesting back into their programs. The project received the 2011 "Photovoltaic Project of Distinction Award" from the Solar Energy Industries Association (SEIA) and the Solar Electric Power Association (SEPA) at the PV America Conference in Philadelphia.

Glass Tower Hall at SUNY Cortland (Residential, Public). SUNY Cortland and the Dormitory Authority of the State of New York (DASNY) completed this LEED-certified building in 2005. In addition to energy-efficient HVAC, windows, and insulation, the building includes bike racks to encourage biking to class, wide sidewalks to encourage walking, and charging stations for renewable energy carts. The building houses 194 students.

How Green Firms Differ. As part of this research, several focus groups were held with industry employers. One of the strongest messages to emerge from a focus group of large New York City construction companies was that sustainable construction has become standard over the last several years for Class A office space, especially in New York City. As one company representative noted, "the big players in the [construction] industry" believe they must be involved in the green movement. At first, developers paid a premium for LEED, but "now, four years later, it's standard practice." The analogy was made to new technology – "the iPad, iPhone comes out, not everybody gets it and then all of a sudden it becomes standard."

Another company representative added that for Class A office construction projects, the cost of construction of a sustainable project is virtually the same as for a non-sustainable one, "unless you're going to [LEED] platinum, but to go for a silver rating, for that middle level, it's really no [additional] cost. If you want to go with co-generation and wind and things like that, that's where you start paying."

The large construction companies involved in LEED and other sustainable construction believe that what sets them apart from others is their knowledge and experience. One company representative said, "We're innovative, we want to push things forward…we're smart, we're curious, we want to know what's out there, where the movement is going…we're leading the charge that maybe some of our competitors are not." Several years ago, the largest construction companies began to see sustainable construction as a growing market and wanted to be "ahead of the curve on the trend." One large construction contractor said, "Everybody seems to be going with either a sustainable building or a LEED certification. The company has embraced it and they're just growing around that market."

For other segments of the construction market, the answers are different. For residential construction, including affordable housing, sustainable construction can be more expensive than standard construction, and one affordable housing developer said that what distinguishes his company from the competition is that, "They [standard developers] make more money – simple fact." Those developers that do become involved in LEED or other sustainable residential construction have a strong interest in undertaking this type of project and tend to work with city and/or state agencies and/or foundations. They generally take advantage of available public incentives.

In yet another segment of the market – weatherization contractors – one contractor said, "Well what I would say is that we benefit a lot by participating in all these programs…we have more work than we would have otherwise." This contractor believes that what sets his company apart is that his workers have been trained and have the experience, and that the work is done professionally "without any problems or consequences." Some weatherization contractors noted that the additional funds provided under the American Recovery and Reinvestment Act (ARRA) have drawn what they believe are less-than-qualified contractors into the business.

Green Market Drivers. Buildings account for 48 percent of energy use and greenhouse gas emissions in the United States and 75 percent in New York City, so, in general, they are an important target for environmental initiatives. Green construction techniques become more

attractive as the price of fossil-fuel energy rises – either due to global economic reasons or to government policies that place a price on carbon. To the extent that energy efficiency translates to cost savings, individuals and businesses will demand green construction. Other reasons individuals and businesses buy green construction include government incentives, philosophical commitments, image, cachet, and consonance with the organizational mission.

Green construction experts and focus group participants cited customer demand and public sector leadership as the main drivers of green construction activity, in addition to the laws, regulations and statutes discussed in the introduction to this report. The following are explanations of the green construction market offered by construction industry employers at one or more focus groups held as part of this research:

> ***Customer Demand***. Large construction companies and the trade contractors they utilize said that, at first, the sustainable building movement was led by certain committed developers, consultants and others who believed that sustainability was good for the environment and the future. The particular focus initially was on sustainable materials and energy conservation. Early on, construction companies were not sure whether this was a "fad" or whether it was "really going to catch on." As time went on, there was "a perception that a LEED certified building was a better place to live and to work. Commercial tenants wanted a better place for their employees." They wanted better indoor air quality and environmental benefits. "Even the [real estate] brokers are now driving the [LEED] certifications. It's a selling tool for higher rents. You've got the brokers pushing on one end, the owners benefiting from that and also benefiting from a more efficient building." A trade contractor observed that, "this is the thing to do today." One trade contractor commented, "This [LEED] is very much a religion as much as a business."
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> ***Cost and return on investment***. One large New York City construction contractor noted that the gap between a LEED-certified building and standard construction in Class A office space is not that great because "You're already at a higher quality level." Also, it appears that high-end commercial and residential tenants want LEED certified space and are willing to pay a premium for it. He continued, "Here in New York, if you're going to build a Class A office building, it has to be a LEED silver or gold building to compete with the others."
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> Cost issues impact different construction markets in different ways. Some companies that participated in focus groups felt that potential energy cost savings will drive greater demand for energy efficiency improvements in other commercial (Class B and below) and residential buildings.
>
> An affordable developer noted to researchers, "In affordable housing especially, you have income limitations and construction costs on the bottom side. And you're always between a rock and a hard place. You can't raise the rent or the price of the unit one penny. In the affordable housing realm, it's extremely difficult. So the incentives are key to us making things happen. In this case, incentives from NYSERDA and others allow the project to be feasible for developers."

Builders and building owners may still be reluctant to invest in energy-efficient building retrofits or technologies because their benefits often accrue over a very long time horizon, or accrue primarily to tenants (in the case of leased commercial space), resulting in what is known in the trade as "split incentives." Getting tenants to pay attention to energy-efficiency can be difficult, as well – in Class A commercial office buildings, energy will typically only account for one to two percent of a tenant's costs. Ironically, however, it is the Class A tenants that appear to be demanding LEED-certified space, and building owners find they can charge a premium for rent for such spaces. On the other side of this issue, some developers are only interested in investments with a relatively short payback period. One company representative observed that some developers feel, "We have a 10 year lease, we're out of here, we're moving somewhere else in 10 years. We don't care. If the payback is not 24 months, we're not interested."

A solar company commented that, "At the end of the day, as much as people want to do green and to do renewable energy, the return on investment is kind of what directs them to go/no go." Another said, citing the difficulty of selling solar thermal systems, "Cash flow is an issue. For solar thermal, the ROI [return on investment] is a couple of years longer than PV [photovoltaic cells] to begin with."

Within the weatherization program, decisions are made on a cost-benefit basis, or as one focus group employer said, "What are you paying for the return on energy conservation?" There is "an iterative process to discover the most effective, cost-effective ways of doing those things."

Impact of financing issues. Financing issues impact the various segments of the green construction industry differently. In the residential and small commercial markets, most private mortgage lenders will not finance the cost of efficiency upgrades or, in the case of new construction, the additional cost of energy efficient materials. Thus, developers must often secure financing through utility or government programs. Currently, New York State has several initiatives but no overarching strategy for this problem, as described in greater detail in the introduction to this report.

In the weatherization of the residences of low-income people, funds are often leveraged from more than one program. In New York City, since 1993, weatherization funds from the U.S. Department of Housing and Urban Development have been combined with Con Edison, National Grid, and NYSERDA programs to both accomplish a more comprehensive scope of work and perform work on more units. ARRA funds have been a boon to this industry, as they have been provided in addition to regular weatherization funds. There have also been changes in the industry over time – upgrades in appliance standards, technological changes in heating, such as the use of condensing boilers; even window technology has changed.

Because weatherization is publicly funded and targeted, income eligibility of the tenants or homeowners is the major consideration. Weatherization industry employers feel that this type of construction has been constrained by its restriction to income-eligible tenants and owners, and by a lack of incentives for owners and tenants in other than low-income properties.

Responsiveness of regulators. One construction industry representative noted that while financing is an issue in the construction market, the City and State can do more to streamline the bureaucracy and expedite the process, making it more conducive to job creation. An example was given of five separate sets of disclosure forms all asking exactly the same questions in slightly different ways. It was felt that the City of New York could do more within its own agencies to streamline the process. The feeling among many companies was that this message had been received "at the top" but that it disappears into the bureaucratic culture and "hasn't quite make it down to the street level."

On a related point, one company noted that "new technology is being developed, advanced and put in the market place faster than the [NYC] building department can analyze it and understand whether or not it's good for the city, good for the environment." This was one of a number of comments about how bureaucracy – or the lack of it – can have a major impact on the amount and type of green construction.

There was praise both for the Con Edison solar representative, who has streamlined the ways in which solar companies interact with the utility, as well as the CUNY Center for Sustainable Energy, which, acting as ombudsman, helped to troubleshoot and resolve solar installation problems with the NYC Buildings Department. Yet even in this case, there were still a number of complaints about the multi-step process and amount of time it takes to get approval.

Availability of roof space was cited by solar installation firms as a primary driver of their business. As one company observed, "Every market is a little different." For example, "you could have a million square foot building [in New York City] but it's got a 40,000 square foot roof with cooling towers, water towers and satellite dishes on them and there is no square footage for [solar]. If you go out to Long Island and do something in Melville where you've got a four story building that's a million square feet and you've got 10 acres of roof you can do a solar installation."

Regulatory and Statutory Drivers of Demand. As noted in the introduction to this report, regulatory mandates and incentives from the federal, state and New York City governments have played a very large role in driving green construction. These range from the federal Energy Policy Acts of 1992 and 2005 that mandated state energy codes for some buildings and provide tax incentives for building owners who increase efficiency, to the Energy Independence and Security Act of 2007, which established a block grant program which provides seed money for local green building and energy efficiency initiatives. Additionally, the American Recovery and Reinvestment Act of 2009 provided the Department of Energy with $16.8 billion for energy efficiency and renewable energy programs. This money was directed toward greening federal buildings, funding local block grants, and weatherizing the residences of low-income families.

In New York City, government initiatives have increased demand for green construction. The Green Building Law (Local Law 86), passed in 2005, requires that many city-funded construction projects achieve certification under the LEED or LEED-equivalent green building standards and meet energy and water efficiency targets.

Another set of laws encourages private energy efficiency under the umbrella of the city's "Greener, Greater Buildings Plan". These laws require the creation of energy and water efficiency benchmarks for buildings (Local Law 84), more stringent energy efficiency standards for new construction and renovations (LL85), energy audits and retro-commissioning for large buildings (LL87) and upgrades to lighting systems (LL88). There are also a number of state programs that promote green building and retrofits, under the umbrella of NYSERDA.

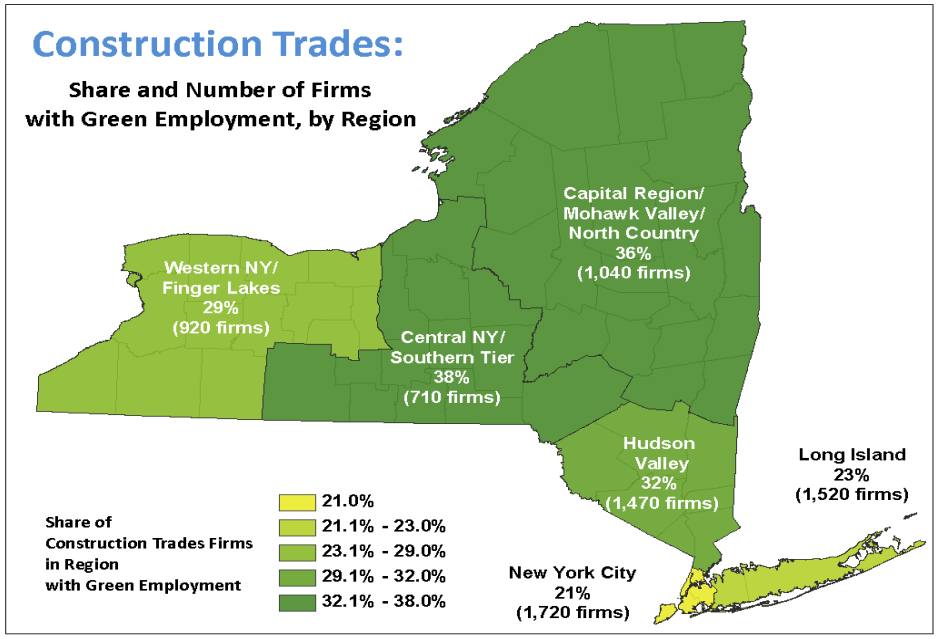
In the course of focus groups with construction industry employers, a number commented on their experience with laws, mandates and incentives:

- "Subsidies and incentives and tax incentives are very important to our developers. When they're putting together a complete pro forma, every little bit helps the bottom line and I think most of the major developers are looking to those incentives at least to put a piece of their financing together."
- On NYSERDA incentives – "Sometimes it's easy, sometimes not so much."
- "The law says they're not going to make incandescent light bulbs anymore in a short amount of time so you're going to be compelled to make some of these changes. As you renovate spaces you must now comply with the latest energy codes."
- On utility incentives – "I know developers now putting in cogen[eration] plants that they wouldn't have if there wasn't an incentive there."
- On Con Edison's incentives – "65% of their incentives have to do with lighting retrofits."
- For solar, "Incentives are complicated and specific to the locations that you operate in. With commercial, you have the federal 30% tax credit grant. 100% depreciation the first year. And if you're in NYC, you've got a NYSERDA rebate, which is upfront. You've got a property tax abatement."
- "The weatherization program drove a lot of improvements in energy efficiency industry-wide in this country. We were kind of a testing ground for all these things, and I think we can take credit for that." The NYC Department of Housing and Community Renewal has been an innovator and leader, for example, in the use of energy efficient boilers.

Green Employment in Construction

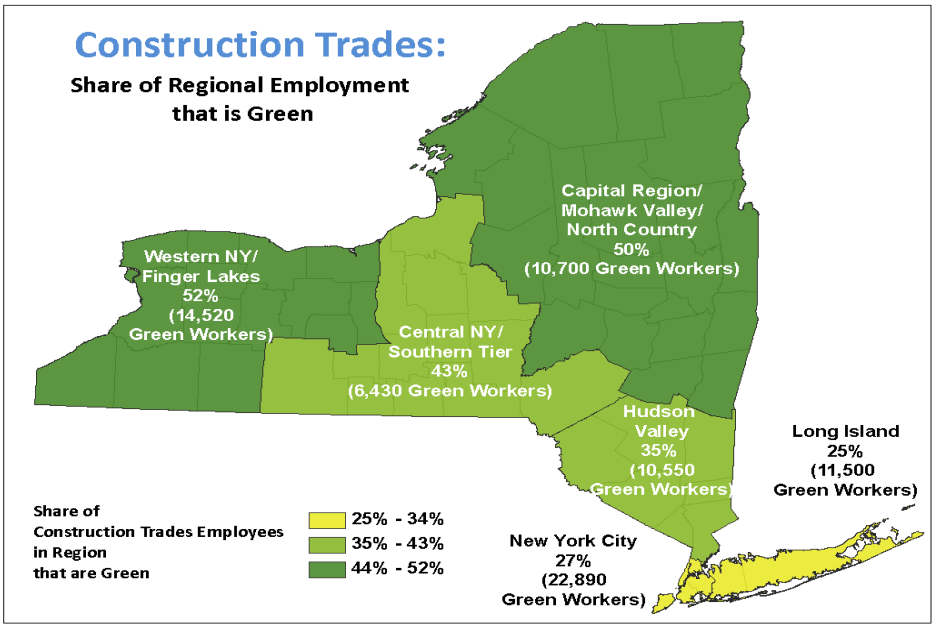
Firms and Employment: Survey Results

Statewide, 27 percent of firms in the construction industry cluster reported that they had one or more green employees. The map and chart below display the findings by region of New York State. The upstate areas had higher percentages of firms with green employment, but fewer construction companies.



Firms	New York State	New York City	Long Island	Hudson Valley	Capital Region/ Mohawk Valley/ North Country	Central NY/ Southern Tier	Western NY/ Finger Lakes
Number with Green Employees	7,370	1,720	1,520	1,470	1,040	710	920
Total Number in Cluster	26,980	8,020	6,510	4,570	2,850	1,850	3,170
Percent with Green Employees*	**27%**	**21%**	**23%**	**32%**	**36%**	**38%**	**29%**

As the next map and chart display, the survey results indicate that 34 percent of the total employment in the sector is green. The proportion of green employment in construction is highest in the Western NY/Finger Lakes Region (52%) and Capital Region/Mohawk Valley/North Country (50%) areas of the state. Because of its sheer size, New York City has the largest number of green employees, although they make up just 27 percent of its construction workforce.



	New York State	New York City	Capital Region/ Mohawk Valley/ North Country	Hudson Valley	Central NY/ Southern Tier	Long Island	Western NY/ Finger Lakes
Green Employment	76,600	22,890	10,700	10,550	6,430	11,500	14,520
Regional Employment	226,020	83,880	21,600	29,870	14,990	45,730	27,880
Percent Green*	**34%**	**27%**	**50%**	**35%**	**43%**	**25%**	**52%**

Firms with green employees were asked whether they expected their green employment to grow larger, smaller, or remain unchanged a year later. Of the 7,340 firms with green employment, 72 percent expected that their green employment would remain the same (42%) or grow larger (30%). Only seven percent of those with no green employees expected to have green employees a year later.

Composition of the Green Workforce. As of this writing, the green economy exists within a very slowly growing overall economy. The construction industry in particular has not recovered from the recession to any great extent, and unemployment among construction workers remains high. In addition to the special incentives and calculus of constructing renewal energy and energy efficient projects, reviewed below, the green construction industry is also subject to the same economic pressures as the industry in general.

As one construction company representative noted, “I just think it’s the environment that we’re in right now, I don’t think anybody is overstaffing and bringing new people in. Everybody is doing more with less.” A developer said, “Personally I think it’s volume-driven. You look around New York City and everything is for the most part, ground to a halt. And so the demand for new jobs in any construction field is extremely limited.”

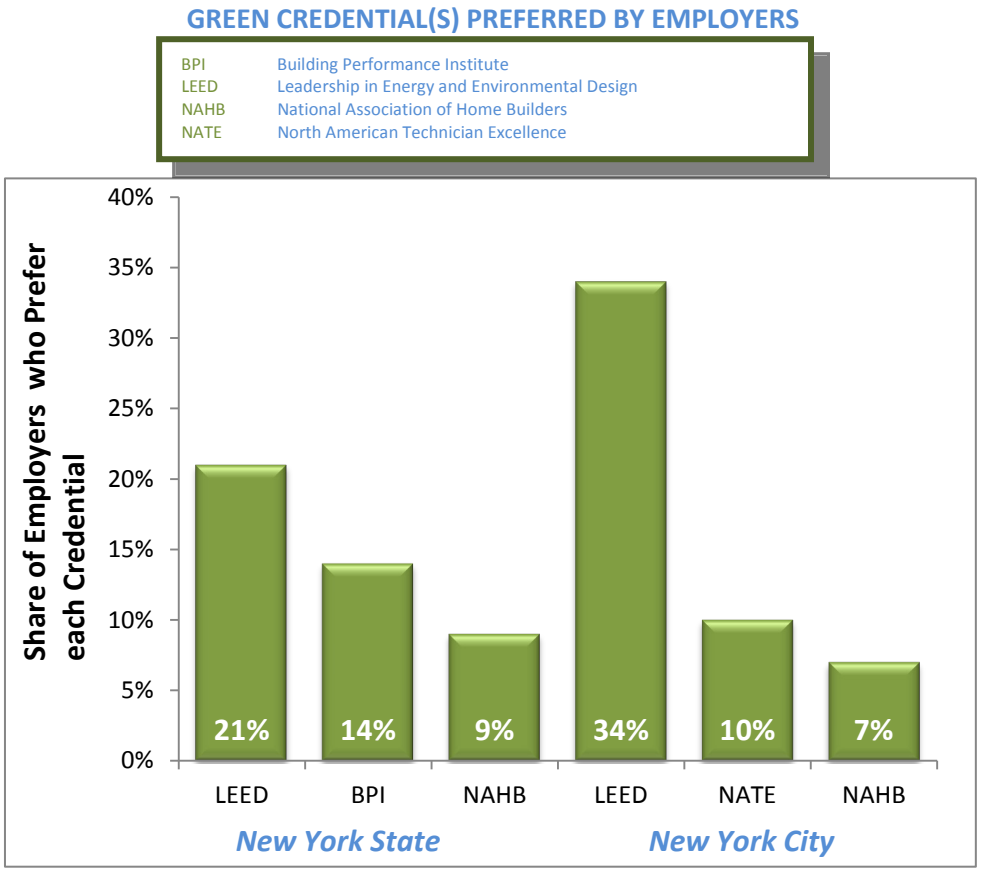
In general, employers in the focus groups felt that they were not hiring new employees as much as they were offering “retraining or continuous education to current employees.” Another said, “It just becomes another fact of what our ‘boots-on-the-ground guys’ have to do. It’s like safety…it’s not like you’re bringing an extra person in to do it.” It is “more of a shifting and training our people.” Trade contractors reported that they are retraining their own staff and are

preparing union members to receive similar education "getting ready for the future green economy."

Construction companies noted that many college graduates have already learned about "green" and sustainability. They added, "The younger folks coming out of school, they know this already. This is already taught in your construction management program, it's taught in architecture programs, it's taught in engineering programs so it's really the people at our level that require the retraining."

However, some employers, especially those performing energy audits and installing energy efficiency products, including weatherization contractors, emphasized the need to hire people with specialized skills and experience. This was felt to be critical with energy auditors and quality assurance inspectors. One noted that, "The work must be done correctly." Several weatherization contractors agreed that, "You have to have somebody that has some construction experience to actually do this work properly."

Employers were asked in the survey what if any "green" credentials they preferred their employees to have. As shown in the chart below, 21 percent of Construction industry employers with green employees in New York State – and 34 percent in New York City – prefer that their employees have a Leadership in Energy and Environmental Design (LEED) credential, 14 percent prefer they have a Building Performance Institute (BPI) credential and 9 percent prefer a National Association of Home Builders (NAHB) credential.

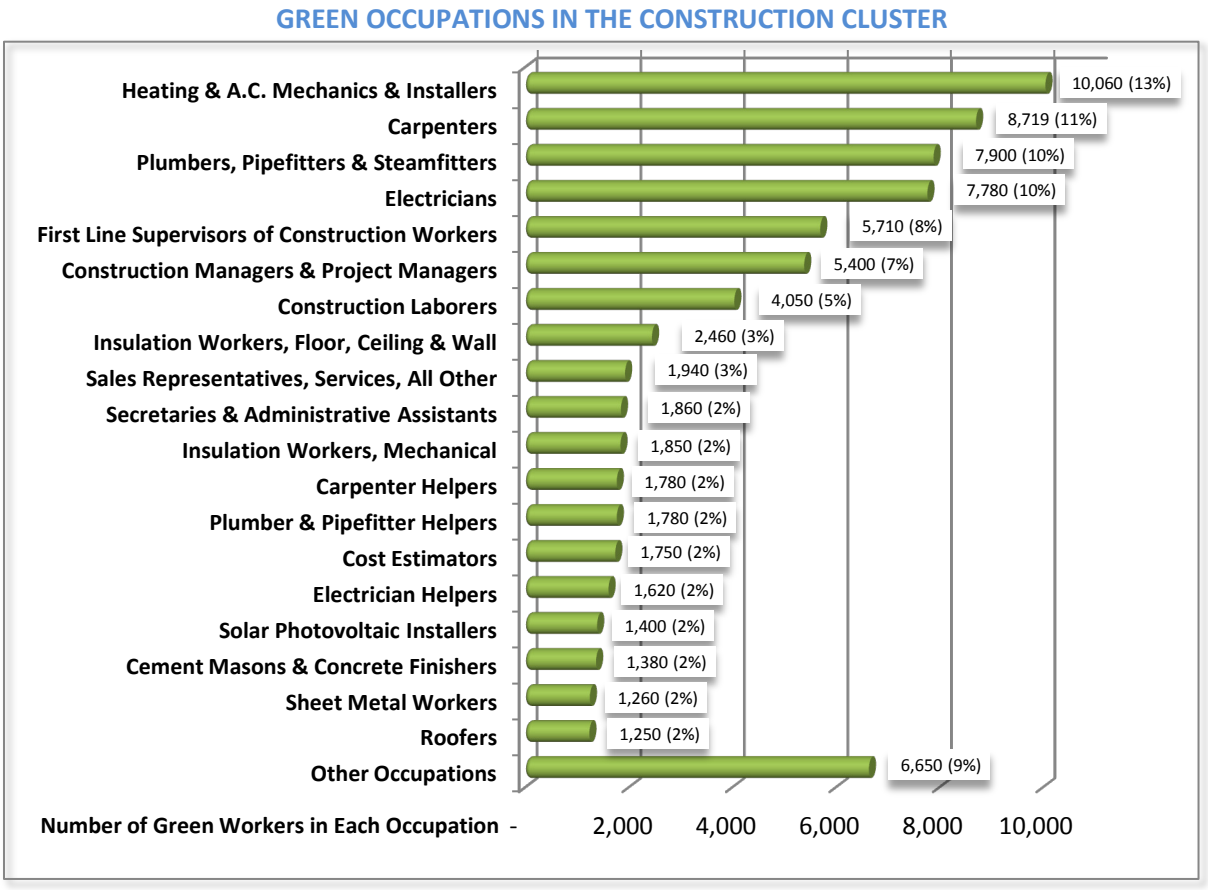


The industry focus group discussions reinforced the survey findings. Both large construction contractors and the smaller trade contractors mentioned LEED accreditation for staff. Company representatives in the residential construction and weatherization focus groups mentioned BPI. Some of the companies in the solar focus group mentioned the North American Board of Certified Energy Practitioners (NABCEP) certification.

Occupational Information

Key Occupations. As shown in the chart below, the statewide employer survey found that five occupations provide over 50 percent of this industry's green employment. They are:

- Heating and Air Conditioning Mechanics and Installers
- Carpenters
- Plumbers, Pipefitters & Steamfitters
- Electricians
- Supervisors of Construction Workers



In the focus groups with construction employers, other jobs mentioned included:

- *LEED Supervisor or LEED Coordinator*. This would be someone who understands the requirements of LEED Certification in detail and serves as a point person. This person must be able share information and coordinate people across all disciplines, from consultants to project managers to trade contractors.
- *Job Estimators*. Some employers mentioned that they need people who have an understanding of the costs of a green versus traditional project.
- *BPI-certified Energy Auditor*. It was felt that energy auditor is a specialized occupation, usually but not always requiring a bachelor's degree and hands-on experience.
- *Field technicians*. These are generalist technicians or laborers who assist energy auditors in the field in the data collection process.
- *Weatherization "crew" members*. These are workers who can air seal; make heating distribution repairs; install weather-stripping, compact fluorescent light bulbs, carbon monoxide detectors and smoke alarms; repair doors and windows; and mix cement to patch up something in a courtyard or boiler room.
- *Expeditors.* These are individuals who shepherd solar installations through the regulatory process.

One industry employer said that, while many occupations have the same name as in the general construction industry, the job is done differently in the green economy: "It's just what equipment and to what level of detail and quality do they go in." He said that his company is paying much more attention to detail. "So it's really about how practices are done."

Another employer made the same point, saying that green practices require greater care: "It brings an awareness to the labor force that yes there is another source, yes there is another method, yes there is another way of doing things so that awareness by itself is going to be very valuable for a greener future."

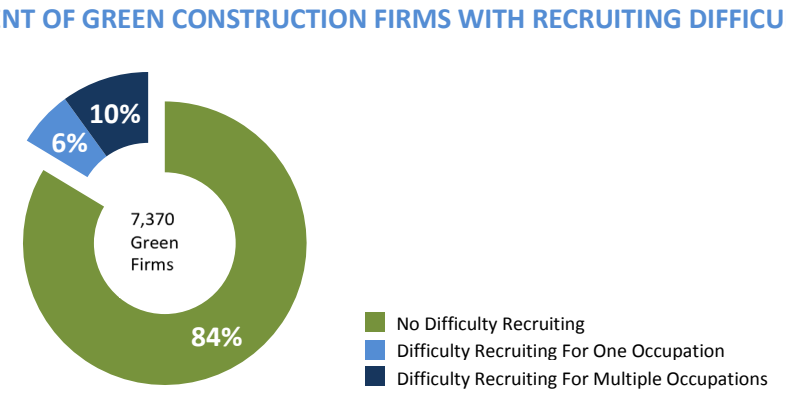
In one focus group, employers mentioned jurisdictional issues among unions, or "gray areas" that they believed needed to be "fought and figured out." These include such areas as the roles of roofers versus electricians installing solar photovoltaic panels, or the roles of roofers versus boilermakers installing solar thermal heating systems.

Another comment made by focus group members, especially those involved in smaller organizations that provide weatherization services was, "many of our staff wear multiple hats."

Career Pathways. The general feeling among industry experts and focus group participants was that people do well and move up based on their skills sets, their social and workplace skills and because they performed well in their jobs. One industry employer said, "Some project laborers have moved up to project supers, not because they got trained in green jobs or anything like that, but just because they excelled at what they were doing." Within the solar industry it was noted that people move from roofer to solar photovoltaic installer; from field to office or from office to field, and sometimes to supervision. Within the weatherization section of the industry, individuals can move from being a crew person to assisting an energy auditor, and occasionally to construction manager. One representative from a large construction company said that "someone without a college degree is maybe not going to hit a dead end but they're going to hit a *cul de sac* and just get stuck there. It's not like 50 years ago where a guy could drop his

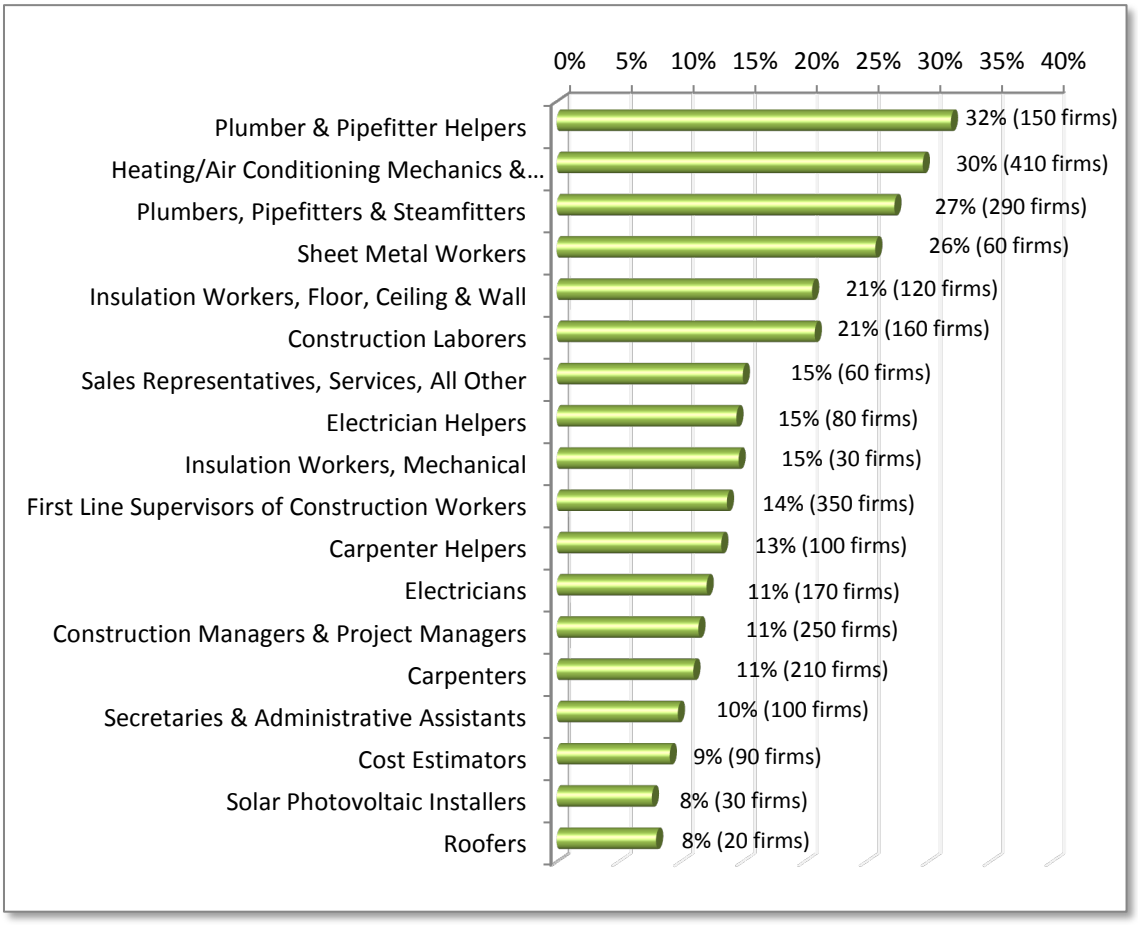
tool belt on the ground and become a supervisor and learn the trade and become a career senior manager. The industry has become too sophisticated and it needs to be learned in a classroom setting."

Recruitment, Retention, and Turnover. As part of the employer survey, construction firms with green employment were asked whether they have difficulty recruiting qualified workers. Of the 7,370 firms with green employment in construction in New York State, 16 percent (1,210) had difficulty recruiting qualified green workers. Ten percent had difficulty recruiting for more than one occupation



The occupation for which employers had the most difficulty finding qualified employees was plumber and pipefitter helpers, with 32 percent of firms reporting this issue. The second most frequent occupation – with 30 percent reporting difficulty – was for Heating and Air Conditioning Mechanics and Installers.

DIFFICULT TO RECRUIT OCCUPATIONS IN GREEN CONSTRUCTION



Recruitment difficulties varied by region, however. The three most difficult to recruit occupations in each region were as follows:

- Capital District/ Mohawk Valley/North Country: Construction Managers, Secretaries and Administrative Assistants, and First-Line Supervisors of Construction Workers.[7]
- Central New York/Southern Tier: Construction Managers, Secretaries and Administrative Assistants, and First-Line Supervisors of Construction Workers
- Hudson Valley: Construction Managers, Cost Estimators, and Architects
- Long Island: Construction Managers, Cost Estimators, and First-Line Supervisors of Construction Workers
- New York City: Construction Managers, Cost Estimators, and Sales Representatives
- Western New York/Finger Lakes : Construction Managers, Cost Estimators, and Sales Representatives

In focus group discussions, all of the employers said that they were looking for the best people and, even with a high unemployment rate, perceived themselves to be in competition with one

[7] This was reinforced during a focus group with construction firms in the Albany area, where employers reported difficulty finding Purchasing Agents and Construction Managers hard to fill because they are looking for people with experience, not just a certification. They were also looking for Job Estimators who know how to project the costs of green construction.

another for talent. The main retention issue mentioned across the board was "keeping enough business on the books to keep the people employed that we have identified as people that we want for the long term." Larger construction firms mentioned that they retained as many people as possible whom they regarded the "A team," laying less productive staff off when the economic downturn began. Of course, most agreed that individuals with poor work habits generally do not remain in construction jobs for very long. On the other end, firms reported losing some of their better workers who leave construction to become more involved in the financing aspect of the industry.

Recruitment Practices. Focus groups revealed that different parts of the industry recruit new candidates differently although almost all companies post jobs on their websites. Many attend job fairs, especially green jobs fairs. Another point made by several companies is that there are workforce ebbs and flows in construction depending on what is happening in different parts of the country. The construction workforce is highly mobile, moving to parts of the country where there is more construction work.

Employers in the unionized (generally commercial/infrastructure) sector of construction industry recruit two types of workers: management (highly technical people, generally college graduates) and trades people (usually trained through Joint Apprenticeship Committees). In recruiting managers, one employer in this sector noted, "We've got a lot of talent in the industry and I just think, when you look at the high school graduate versus the college graduate, the college graduate knows how to learn." The feeling was that the college graduate has "learned to solve problems and how to work in a team." Also, interpersonal skills were felt to be important, as "90 of business is dealing with people." Some employers mentioned that with the construction slowdown, there are a lot of qualified people available on the management side. Interestingly, unionized trade contractors reported that college-educated candidates are now interested in union apprenticeships, such as electrician, HVAC mechanic and roofer.

Employers in residential construction recruit through local colleges, at job fairs and from non-profit training providers. One employer said that his company has difficulty "all the time" finding qualified employees. He said that "it's not about any particular skill set because we'll train them to do what needs to be done. It's really about whether they come with the work skills. Getting to your job on time and being presentable, putting in a good day's work, not having to be reminded of things." Some employers described: "These days every program has a workforce development requirement whether it's happening from the community or whether it's happening from an outside agency. So we're working most of the time with predefined or already structured organized programs."

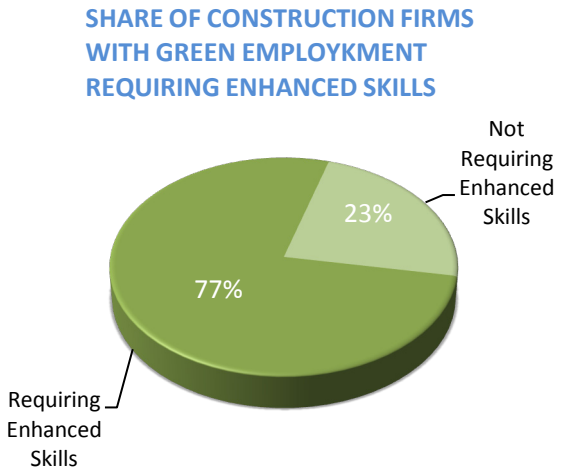
Solar companies find that many people want to work for them, "It's an industry that everybody wants to be in. They're smart enough to get on the web and find companies and call them up. When I get the 10th email and the 12th call from the same person, that's usually when we meet, and hopefully at some point we have a position." They feel that there is no shortage of qualified people. People "like renewable energy and think it's more of a look to the future." Although it is still a small industry, employers report that the talent pool is growing.

Weatherization grantees and subcontractors do a lot of hiring through word of mouth and through the local community. They also report that many of the best people in the industry have construction experience." "They're either carpenters or masons or handymen or general contracting guys or whatever." When asked what they value and look for in employees, employers mentioned:

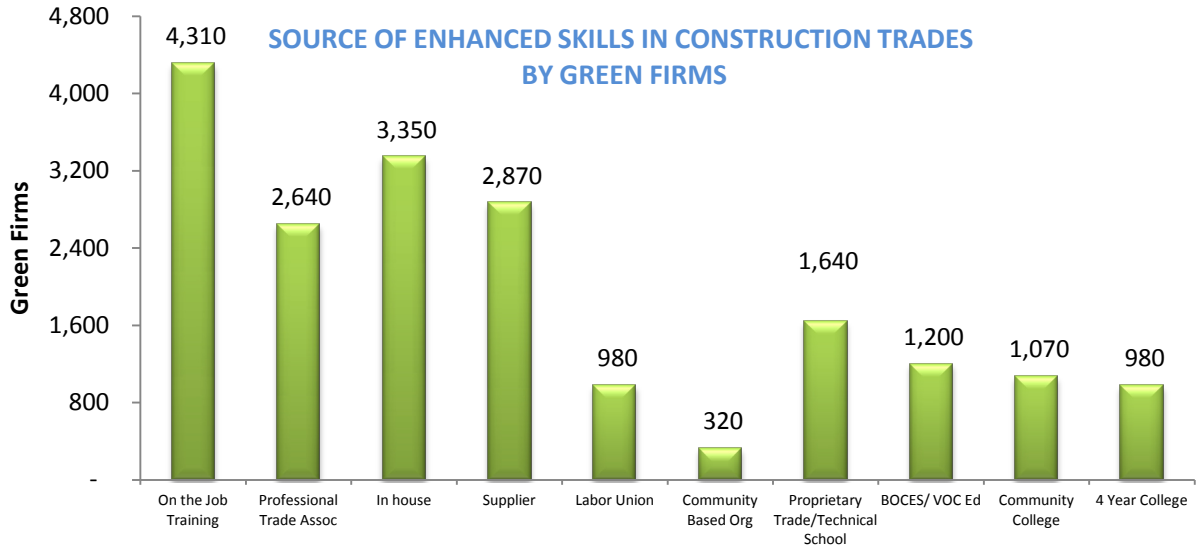
- Timeliness
- Loyalty
- Ambition
- Work ethic
- Integrity of character

They reported that their least effective employees are "the people that don't want to deal with change … the industry is constantly changing and if you don't adapt you get left behind."

Education and Training. As part of the statewide Employer Survey, firms were asked to indicate whether the occupations they indicated were "green" required enhanced skills, and if so, the source of training for these enhanced skills. As indicated in the pie chart below, approximately 77 percent (5,660) of construction firms with green employment indicated that their green occupations required enhanced skills.



The sources of enhanced skills can range from 'On-the-Job Training' to '4-Year College'. As shown in the bar graph on the next page, the most common sources of training for enhanced skills are 'On-the-Job Training' (4,310) and 'In-house' (3,350). The least utilized sources are 'Community Based Organization' (320), 'Labor Union' (980), and '4-Year College' (980).



The focus group discussions reinforced and elaborated on the information collected in the survey:

- "A lot of it is OJT," and "It doesn't happen in a classroom – it's usually on-the-job training."
- People are trained by mentors or bosses. "They get out onto projects, cycle through different aspects of the business." One contractor said that, "the way to be trained is to be assigned next to an expert that is teaching day-by-day, step-by-step, until they get to that level. So they can start doing work themselves." A solar contractor said that "… people learn on the job and you have to have the right people supervising them and making sure everyone's safe. But this stuff isn't difficult, and if you find people with the right skills, they can easily transition."
- "There's not a lot of time for construction workers to go to training, so we bring training in-house if it's something they really need to know, such as safety. The whole training at night kind of stuff when you have a day job can be a real problem."
- Training of electricians has changed – "they [the Electrical Workers unions] are incorporating training in solar photovoltaics, electrical vehicles, giving apprentices the chance to have hands on and play with it."
- "Roofers are just using different materials. We used to put gravel in, now we put pavers in and now we put a pedestal underneath so we can level it off … we are applying new technology, not creating it – we're installing it."
- "Unionized trades are providing the training necessary. Unions have applied pressure to provide training for green initiatives. As the unions started to increase their awareness and demand they began to provide and generate LEED certified workers."
- "All of the big players in the industry have similar programs and also have commitment to education –tuition reimbursement or in-house training."
- There are a lot of "lunch and learns" at smaller firms.
- "There are good training programs, accredited training programs, like NABCEP, but people need both – hands-on and NABCEP."

- Apprentice programs – combination of training and OJT.
- "There's a need to mix the type of training. Some people do well with web based on their own time. Some people thrive in an environment of a training room."
- "We rely on LEED training to some extent."
- "So there's a certain amount of retraining that generally happens with all of the trades. All our subcontractors – the ones that were not familiar with it, become familiar with it after they're told to do things over once or twice. They get the picture pretty quick." "Subcontractors really have been trained and they've taken what they've seen and it's really passing down."

Recommendations for Education and Training Providers. Focus group employers were asked what they would change about the way colleges, community colleges and training institutions prepare students for the workforce. Their suggestions were:

- *Education and training should be more hands-on and practical*. Most employers agreed that getting people out into the field should be part of the curriculum. Both hands-on training and the opportunity to work in the field before course completion were seen as very important.
- *College internships and co-op programs* are very popular with employers. One employers said, "Take college sophomores, juniors, bring them in for the summer (paid). It's a great opportunity to really put these young people to the test of what their capabilities are and then the best and the brightest of the interns will go back to college knowing that they have an opportunity to come to work for us upon graduation. It works out very well for both of us, particularly in a down market." Another said," You just see such a difference in these kids that have had real world application." A related suggestion was to have mentors for students.
- *Communication skills.* One employer said that "communication skills are a huge, huge, huge problem" and that in order to have teamwork, people must communicate well with each other. This issue was mentioned for both the non-college and college-educated populations. Educational institutions should emphasize verbal and written communication on the job.
- *Soft skills are key*. In addition to communication skills, other soft skills mentioned were work ethic and willingness to learn. Employers want someone "who finishes a task and knows to go on to the next one, who doesn't stand around waiting for someone to tell them what to do next, that kind of self-starter mentality."
- *Combine technical training with sales skills*. Within training for solar occupations, there was praise for some training courses, for example, "There are great teachers, hands-on" but "you're not going to work if you can't sell the project. So sales could be another aspect of the training programs, you know, how to go out and sell a job."
- *Real world experience among the teaching staff in higher education*. This was felt to be critical – that educators have current real world knowledge, or as one employer said, "not academia since 1962."
- *Quality counts.* One employer raised a concern about the "volume [of training] that's currently being done [related to weatherization]. There seems to be a mad rush to get

people 'trained' to be green for whatever the capacity is.… I'm finding that the quality of their training isn't up to what I consider the value that it needs to be. And that gives me concern. Because we're doing work on people's houses, potentially we're talking about health and safety issues. We can do harm to these homes if we're not being careful how we're building and sending people to family buildings." He added "there needs to be some amount of experience that goes hand-in-hand with the training."

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