

CHAPTER 5: EMPLOYER DEMAND IN GREEN BUILDING SERVICES

Highlights

- *The Building Services cluster has a substantial amount of green employment. A total of 65,770, or almost one-third of employees in this cluster, are considered green by their employers.*
- *Because of the concentration of buildings in New York City, 58 percent of the state’s green labor force in Building Services is in New York City; 14 percent is on Long Island.*
- *The industry’s greening trend is most pronounced in high-end commercial office buildings and very large residential buildings, where tenants increasingly demand sustainable and efficient spaces. There has been rapid growth in the use of advanced Building Management Systems (BMS) or Energy Management Systems (EMS).*
- *Increasingly, building owners and managers are recognizing the importance of integrating sustainability into their regular practices as a means of decreasing operating costs and protecting the environment. The owners of large buildings recognize the long-term cost savings possible with high-tech systems, and are therefore willing to invest in large-scale automation of heating, cooling, lighting, and other buildings systems.*
- *The most common occupation with “green” employment is Janitors and Cleaners, who are responsible for green cleaning and recycling. The other common occupations in this industry cluster are: First-Line Supervisors of Building and Grounds Cleaning and Maintenance Workers, Maintenance and Repair Workers, General and Operations Managers, Stationary Engineers and Boiler Operators, Landscaping and Groundskeeping Workers and Property, and Real Estate and Community Association Managers.*
- *Industry employers report that some of their most critical green employees are Operating Engineers (the common title for Stationary Engineers and Boiler Operators in New York City) and professionals in new energy and sustainable services departments. These professionals might include engineers and architects as well as people who procure energy and those who handle retro-commissioning.*
- *Employers would like education and training institutions to offer more “nuts and bolts” practical experience, including more mentoring, co-op and internship programs.*
- *Employers, especially in New York City, would like more attention paid by higher education institutions to career paths in the real estate/building operations industry.*
- *Companies would like a way to share information about what techniques and products work well, and would like case studies about how different “shops” within companies work together to achieve energy efficiency.*

Overview of the Industry Cluster

The “built environment” is a term that suggests the man-made surroundings that provide the setting for human activity, ranging from personal shelter to neighborhoods to office buildings to large-scale civic surroundings. By this definition, New York City – and other selected cities in New York State – can be considered predominantly built environments. As noted in PlaNYC

2030, New York City’s plan for the sustainable future, “Buildings dominate New York City’s carbon footprint. Approximately 75 percent of New York City’s carbon emissions stem from energy used in buildings, and today’s existing buildings will make up 85 percent of all real estate in 2030” (PIANYC).

The building services sector examined in this research includes major portions of the State’s real estate industry -- firms and workers involved in leasing, managing, and maintaining both residential and commercial properties. It includes both owners who lease and manage their own buildings as well as firms that manage buildings for others. Building services firms may lease buildings to tenants, provide day-to-day upkeep of buildings, and provide building security. This cluster also includes services provided to buildings, such as janitorial, landscaping, pest control, and waste disposal. Some building owners employ workers directly; others hire maintenance contractors.

Green services in this sector are focused on activities that help buildings and facilities achieve greater energy efficiency, utilize new energy technologies, reduce waste or achieve other environmental sustainability goals.

Distribution of Firms and Employment. In the fourth Quarter of 2010, there were 27,552 firms in the Building Services industry cluster in New York State, employing 194,691 people. New York City dominates this cluster, with 62 percent of the firms and 64 percent of the jobs.

DISTRIBUTION OF BUILDING SERVICES FIRMS AND EMPLOYMENT BY REGION

	Firms		Employment	
	Number	Share of NYS	Number	Share of NYS
New York State	27,552		194,691	
Capital / Mohawk Valley /North Country	1,319	5%	8,511	4%
Central/Southern Tier	964	3%	6,875	4%
Hudson Valley	3,015	11%	16,633	9%
Long Island	3,094	11%	20,137	10%
New York City	17,207	62%	124,791	64%
Region Not Classified*	326	1%	4,174	2%
Western NY/Finger Lakes	1,846	7%	14,122	7%

SOURCE | 4Q 2010, QCEW

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

Within New York City, slightly more than 25 percent of the Building Services workforce resides in each of the boroughs of Queens, Manhattan and Brooklyn, 17 percent reside in the Bronx and 5 percent in Staten Island. (Source: U.S. 2000 Decennial Census and 2007, 2008, and 2009 American Community Surveys public use microdata (PUMS) files.)

Building Services represents 2.8 percent of all employment statewide. As shown in the chart below, the share of area employment is highest in New York City (4.1%) and lowest in the upstate areas.

CONCENTRATION OF BUILDING SERVICES EMPLOYMENT BY REGION

New York State Region	% of Total Employment
Capital/Mohawk/North	1.4%
Central/Southern Tier	1.4%
Hudson Valley	2.4%
Long Island	2.0%
New York City	4.1%
Western/Finger Lakes	1.5%

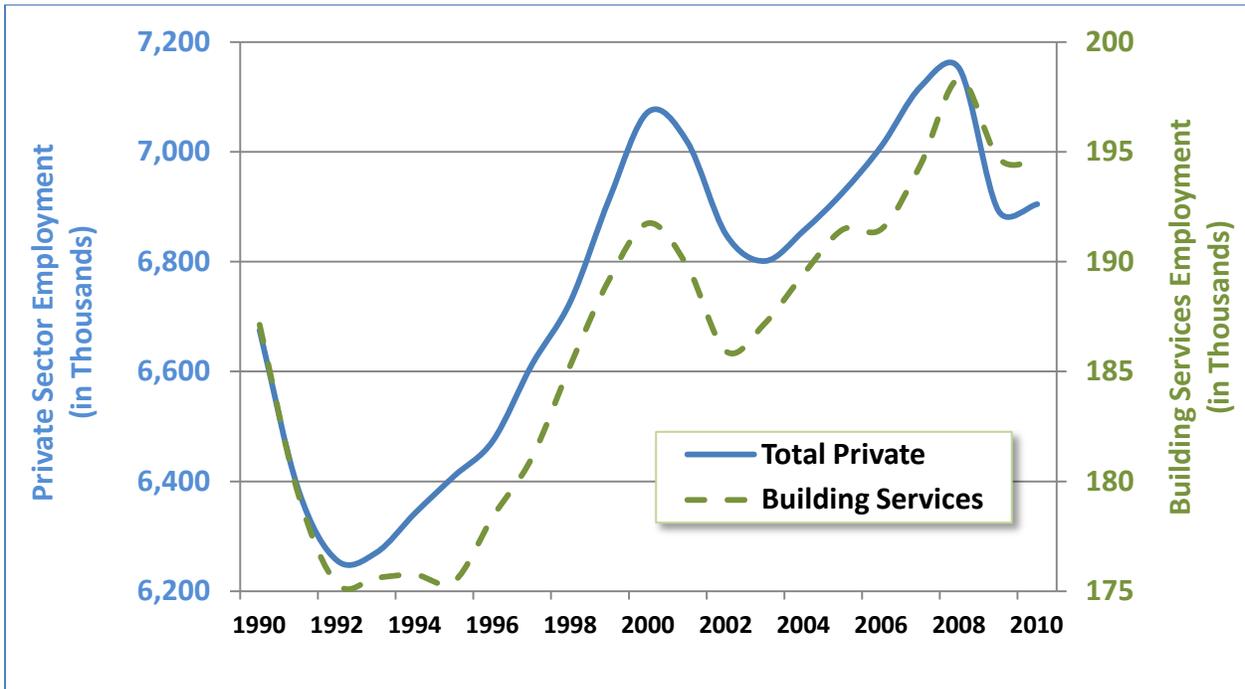
SOURCE | 4Q 2010, QCEW

Lessors of residential buildings made up the largest group of companies, with 13,740 separate firms, or nearly half of the total, which employed 63,595 people (one-third of total employees), or more than any other type of business in this cluster. This category includes operators of residential buildings, including apartment buildings, retirement housing and other types of housing. These firms average less than five employees each. Janitorial service companies are also a major source of employment, and tend to be larger, with an average employment of 20 per firm and total employment of 58,765, or 30 percent of the total. There is also significant employment with operators of commercial buildings and with residential property management firms. These firms typically contract with building owners or managers. Within New York City, the greatest concentration of building services employment is in Manhattan.

Industry Market Drivers. Since much of the work in building services is related to managing and maintaining rental properties, demand in the sector tends to fluctuate less than the economy overall. However, there is some responsiveness to the economy: changes in rental vacancy rates and in the volume of new construction - both effects of economy downturns – also tend to affect the demand for building services. With the downturn in the real estate market over the last several years and the tightness of credit, financing for energy efficiency still represents a barrier for building owners seeking to retrofit their properties, especially in the residential sector.

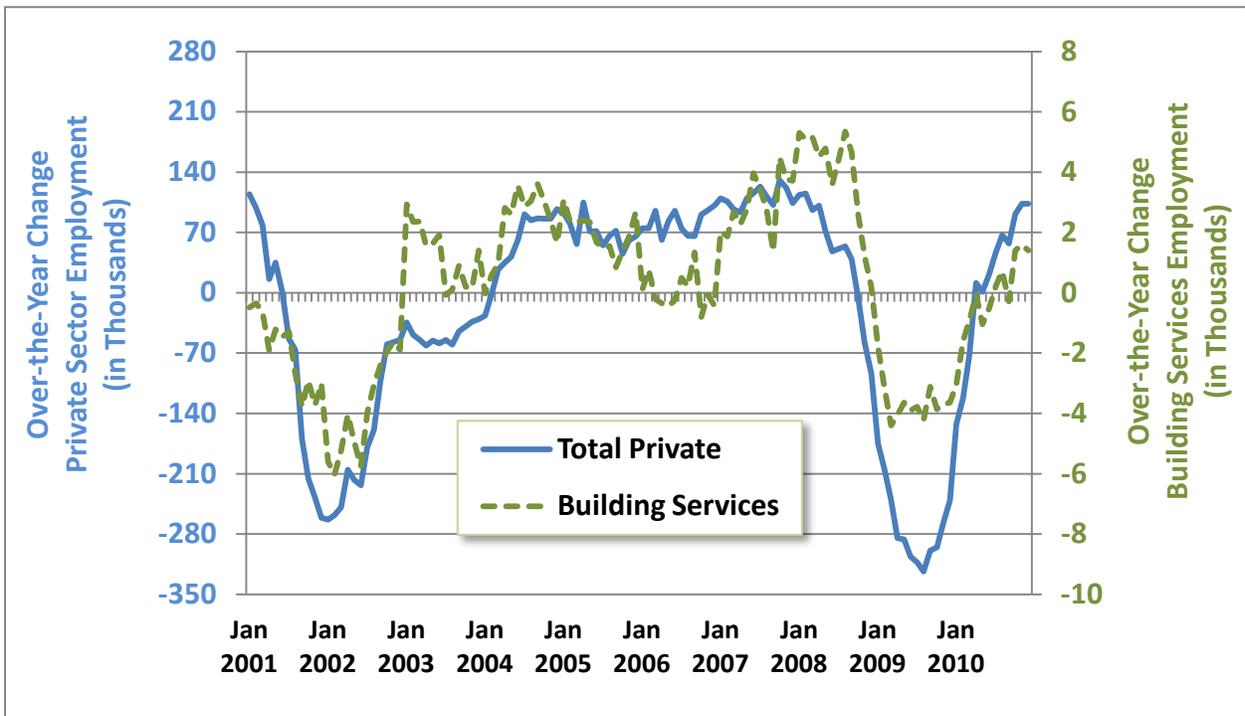
Recent Developments. As demonstrated in the charts on the next page, employment in this sector is generally cyclical. During the most recent recession, employment in this sector performed better than the average for private sector employment.

**ANNUAL PAYROLL EMPLOYMENT IN NEW YORK STATE
TOTAL PRIVATE SECTOR AND BUILDING SERVICES**



SOURCE | QCEW 1990 to 2010 Annual Average Employment

YEAR-OVER-YEAR CHANGES: TOTAL PRIVATE AND PROFESSIONAL SERVICES



SOURCE | QCEW Monthly Over-the-Year Change

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 Building Services 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*¹ and jobs mentioned by employers in response to the green jobs employer survey conducted in late 2010-early 2011.

WAGES AND TYPICAL PREPARATION FOR GREEN BUILDING SERVICES OCCUPATIONS

Occupation	Median Pay	Typical Preparation
General and Operations Managers	\$116,950	Bachelor's or higher degree, plus work experience
Accountants and Auditors	\$76,110	Bachelor's degree
Property, Real Estate, and Community Association Managers	\$79,420	Bachelor's degree
Appraisers and Assessors of Real Estate	\$57,960	Associate degree
Real Estate Sales Agents	\$57,550	Postsecondary vocational award
Stationary Engineers and Boiler Operators	\$58,690	Long-term on-the-job training
Installation, Maintenance, and Repair Workers, All Other	\$39,720	Moderate-term on-the-job training
Maintenance and Repair Workers, General	\$39,510	Moderate-term on-the-job training
First-Line Supervisors of Building and Grounds Cleaning and Maintenance Workers	\$47,230	Work experience in a related occupation
First-Line Supervisors of Mechanics, Installers, and Repairers	\$69,430	Work experience in a related occupation
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	\$27,250	Short-term on-the-job training
Landscaping and Groundskeeping Workers	\$27,040	Short-term on-the-job training

SOURCE | Occupational Employment Survey; O*NET Online

The industry includes employment in many different types of occupations, from low-skilled jobs, such as janitors and cleaners, to technical jobs, such as stationary engineers (called operating engineers in New York City), to professional jobs, such as property managers, as well as highly skilled jobs in energy management. Building services is an important source of employment for workers with limited English, particularly in janitorial jobs. Over half of the building services workforce in New York City is unionized, and pay and benefits in this sector are high relative to workers of similar educational levels in other industries. SEIU Local 32BJ, which represents employees in many residential and some commercial buildings, has 80,000 members in New York City. Local 94 of the International Union of Operating Engineers represents more than 5,800 employees, primarily in commercial buildings.

Employment Projections. Employment in the Building Services cluster is projected to increase by 0.2 percent in New York State between 2008 and 2018. This compares to growth of 0.5 percent in total nonagricultural wage and salary jobs.

Demographic Trends. The following chart displays the demographic characteristics of the Building Services workforce in 2000 and in 2007-2009. The New York State Building Services workforce grew by almost 30 percent to almost 200,000 workers in 2007-2009; employment grew at a slightly faster pace in New York City during the same time period. The workforce is ethnically diverse, especially in New York City, and most workers are male. The workforce appears to be aging, as 60 percent are 45 years of age or older and almost 30 percent are 55 or

¹ 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

older. Although this is still an industry where many people have a high school diploma or less, the educational attainment of the industry’s workforce increased between 2000 and 2009. The vast majority of those who work in this industry cluster in New York State (95%) live in the state. More than 80 percent of those who work in the sector in New York City live in the City.

DEMOGRAPHIC CHARACTERISTICS OF THE PROFESSIONAL SERVICES CLUSTER WORKFORCE

	New York State		New York City	
	2000	2007-09	2000	2007-09
Total Workforce	154,654	199,133	96,409	127,159
New York State/City Residents	147,284	188,152	79,521	105,164
Non-New York State/City Residents*	7,370	10,981	16,888	21,995
New York City	56%	58%	<i>na</i>	<i>na</i>
Long Island	14%	14%	<i>na</i>	<i>na</i>
Hudson Valley	12%	12%	<i>na</i>	<i>na</i>
Upstate	18%	77%	<i>na</i>	<i>na</i>
Bronx	<i>na</i>	<i>na</i>	17%	17%
Kings	<i>na</i>	<i>na</i>	26%	25%
New York	<i>na</i>	<i>na</i>	28%	26%
Queens	<i>na</i>	<i>na</i>	25%	26%
Richmond	<i>na</i>	<i>na</i>	5%	5%
Male	61%	62%	68%	68%
Female	39%	38%	32%	32%
White	62%	58%	44%	42%
Black	13%	13%	19%	17%
Hispanic	19%	21%	29%	31%
Asian	4%	6%	5%	8%
Other	2%	2%	3%	2%
Age 18-34	23%	20%	25%	22%
35-44	25%	21%	24%	22%
45-54	28%	31%	28%	31%
55+	25%	29%	23%	26%
Less than high school or GED	16%	11%	22%	15%
High school or GED	25%	27%	26%	29%
Some college	29%	28%	26%	24%
College or More	29%	34%	26%	33%

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 City, respectively.

Green Economic Activity

For the purposes of this research, green economic activity in Building Services was defined to include activities that help buildings and facilities achieve greater energy efficiency, utilize new energy technologies, reduce waste, or achieve other environmental sustainability goals. These include:

- Operations, such as meter reading/reporting, performance monitoring/optimization, retro-commissioning, and utilization of energy efficient new technologies;
- Maintenance, such as maintaining renewable energy systems, green roofs/landscaping and indoor air quality; and
- Other green activities, such as green cleaning and recycling.

Companies involved in Building Services report that there is a greening trend throughout the industry. Increasingly, businesses are recognizing the importance of integrating sustainability into their normal operating practices as a means of decreasing operating costs and protecting the environment. This is most pronounced in high-end (i.e., Class A²) commercial office buildings and very large residential buildings. Office tenants increasingly demand sustainable and efficient spaces. The owners of large buildings recognize the long-term cost savings possible with high-tech systems, and are therefore willing to invest in large-scale automation of heating, cooling, lighting, and other building systems. Firms that manage smaller buildings, such as residential buildings of fewer than 150 units, tend to lag behind in the move to green. This is often because owners are unwilling or unable to make large investments that may take many years to pay for themselves. However, even in this subsector, firms are making small-scale improvements such as upgraded hallway lighting or non-carbon-based roofing materials.

The growth of LEED- and LEED-equivalent construction and renovation in recent years has had an impact on Building Services as well. There has been rapid growth in the use of advanced Building Management Systems (BMS) or Energy Management Systems (EMS). A BMS uses computers to collect “real-time” data on buildings and automatically manages the building’s electrical and heating/cooling systems to optimize energy efficiency. Operating such systems requires building staff to possess more sophisticated skills, such as computing and quantitative analytical skills that were not needed in the past. The U.S. market for these systems generated \$900 million in revenue in 2010, and is forecast to grow to \$2.4 billion by 2018, according to a 2010 report by a private research firm (Pike Research). Health care, university, and high-rise commercial office buildings are the leading source of demand. Industry experts in New York City note that full automation of energy systems in commercial buildings is increasing. Full BMS is still very rare in residential buildings. There is also a trend towards more centralized control and remote monitoring of building management systems.

According to industry experts, the most common types of retrofits in New York City have been lighting technology, heating, ventilation and air conditioning (HVAC)-related systems and technologies for building management systems. Building owners and managers have also invested in co-generation. Many try to accomplish as much as possible in-house, and if this is not possible, they contract out to the trades or other vendors with expertise.

² Commercial real estate practitioners determine Class A+/A buildings based on prime location, full-service amenities, and other guidelines and label other buildings relative to those results.

VORNADO'S ENERGY INFORMATION PORTAL¹

Vornado Realty Trust, a publicly traded real estate investment trust with over 20 million square feet of space in New York City, employs a dedicated team of professionals in energy management and sustainability. After the deregulation of New York electricity markets in 1998 and the ensuing competition among utility generation companies, Vornado and other landlords became increasingly aware of the market cost of the energy supplying their properties. Vornado transitioned its tenants' electricity submeters to "smart" meters with funding from NYSERDA. This type of submetering enables Vornado to accurately measure and determine each tenant's portion of electrical costs for the building in which it is located. The smart meters allow energy information to be read on a constant "real time" basis.

In 2009, Vornado contracted with Syntonic Data Management (SDM), Inc. to develop a user-friendly Energy Information Portal (EIP) that would allow tenants to see their energy usage on an hourly, daily, weekly and monthly basis. The EIP has enabled tenants to implement ways to conserve energy and immediately translate their efforts into money saved. Building managers can monitor their building equipment and see how slight adjustments in the scheduling, heating or cooling of the machinery can yield dramatic results in conservation. Anthony Campbell, VP of Energy and Sustainability at Vornado, described the EIP as a "convergence of IT, telecommunications and energy data management, meeting a world with a need for lower carbon footprints and higher energy efficiency standards." The EIP is a significant development in transforming "green" aspirations into real change.

How Green Firms Differ. Buildings account for a large share of energy use and greenhouse gas emissions in the United States and an even greater share in New York City, so in general they are an important target for environmental initiatives. Companies heavily involved in green Building Services believe they differ from others in the following ways:

Involvement in data collection on energy use. As noted in the profile on Vornado's Energy Information Portal, Vornado has been involved in a vast amount of installed submetering of commercial tenant spaces. This large base of meters has allowed Vornado and others to measure and document energy usage and identify waste. One company representative in a focus group said, "There is a tremendous amount of waste. You can see it in high usage when they [commercial tenants] leave for the day."

Expertise with achieving energy efficiency. Some building services firms have built an expertise in improving the energy efficiency of their own or clients' spaces. One large firm has a dedicated energy services group. Others manage buildings that are applying for LEED Existing Building (EB) status, which requires more attention to energy management.

Understanding how to change behavior to achieve energy savings. One industry expert said that "conservation is behavioral change" and that her company has found that they "need a total concept program to engage the tenants."

Commitment to the cause. Several focus group participants noted their commitment to energy efficiency and/or their organizations' mission-related reasons for being involved in this area. One energy contractor expressed the belief that "going green" is not only

the right thing to do but promises better quality craftsmanship in the work. One industry expert mentioned that corporate social responsibility also plays a role.

Access to capital. A number of industry experts have noted that the industry is currently in a “capital-constricted market” with a general shortage of investment dollars. The Empire State Building (ESB) energy efficiency retrofit, which is profiled in this section, was self-funded by the building owner, who noted that not many buildings have the ongoing source of revenue of the ESB’s observation deck. Several experts have observed that the industry needs to document energy efficiency savings from retrofits, proving a return on investment, in order to spur investment. Another industry expert said that “financial markets will get on board when there is enough volume.”

EMPIRE STATE BUILDING SUSTAINABILITY RETROFIT

The Empire State Building is currently undergoing a well-publicized \$110 million sustainability retrofit that is part of a \$550 million renovation of the building. Consulting, design, and construction partners [Clinton Climate Initiative](#), [Johnson Controls Inc.](#), [Jones Lang LaSalle](#), [NYSERDA](#), and [Rocky Mountain Institute](#) completed an eight-month modeling and analysis project which will ultimately save 38 percent of the building's energy and \$4.4 million annually.

There are several parts to the sustainability retrofit, including:

1. *Windows* -- All 6,514 windows were remanufactured within the building into insulated glass units. This facet was completed by October 2010, ahead of schedule.
2. *Radiative barrier* – The project installed insulation behind 6,514 radiator units located on the perimeter of the building. This was also completed by October 2010.
3. *Chiller plant retrofit* – Because of the energy savings generated by the new windows, the building needed a smaller chiller plant than originally thought. This was completed by April 2010
4. *The Building Management System (BMS)* – The building automation and controls system was upgraded and submeters were installed on each floor and completed by December 2010.
5. *Tenant energy management* -- The Tenant Energy Management Program was completed in December 2010. This program gives tenants information on a variety of energy measures.

There are additional parts to the retrofitting plan, including, among others, reduced lighting power density in tenant spaces, addressing the variable heating/cooling problems in different parts of the building, and improving air quality in the building by introducing outside air into the building. The plan also includes 24/7 “real-time” commissioning, which is monitored from outside the building by Johnson Controls, which contacts managers in the building when something needs adjustment or attending to.

One goal of this project was to create an example for the design of commercial retrofits. In the process of developing specific project recommendations, the team uncovered several key lessons for the retrofit of large multi-tenant commercial office buildings.

Green Market Drivers. There have been a number of initiatives that have had an impact on the Building Services industry, particularly in New York City, where employment in this industry is concentrated. New York City began a voluntary recycling program in 1986. In July 1989, with the passage of Local Law 19, recycling became mandatory. Collection of required materials was phased in, district by district, and by 1997, all 59 districts in the five boroughs were recycling the same materials. In addition to recycling, a number of laws have revised New York City's energy code and have required energy-conservation-related activities for buildings over a certain size. For 24,000 of the City's largest buildings, these laws require energy audits and retro-commissioning, benchmarking of energy and water use, and lighting upgrades and sub-metering to measure the flow of electricity in tenant spaces. This represents a major shift because the laws impose significant obligations on *existing* buildings, which had previously been grandfathered or exempt under the New York State Energy Code and prior amendments to New York City's codes.

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

In addition to the New York City laws, there are a number of public sector incentive programs that have an impact on this industry. These include:

- Federal tax credits. There is a federal tax deduction available for envelope, lighting, and mechanical system upgrades.
- ARRA Stimulus Funding. The Recovery Act made funding available for energy efficiency improvements through the Energy Efficiency & Conservation Block Grants which were intended to finance energy efficiency upgrades in buildings 50,000 square feet or larger that have completed an energy audit, but are either financially distressed or unable to finance energy efficiency projects in traditional ways.
- NYSERDA Incentive Programs for energy efficiency upgrades.
- Utility Incentive Programs from Con Ed and National Grid for electricity and gas efficiency measures

The U.S. Department of Energy and the U.S. Environmental Protection Agency jointly operate the Energy Star program, which encourages energy efficient choices for homes and offers businesses an energy performance measurement and tracking system.

Green building services experts and focus group participants mentioned these and other drivers for the green Building Services market. One real estate company representative made the point that there are many different types of owners: individuals, companies, Real Estate Investment Trusts (REIT's) and others. He observed that "different reasons appeal to different people." Some respond to the "carbon footprint" argument, while financial people tend to respond to increased operational savings. On said, "Income tax incentives do not work if you're not paying

taxes, which is the case with REIT's." Each audience needs to be approached in a different way. Some of the major drivers mentioned by industry experts and companies that participated in focus groups conducted for this research are:

Tenant Interest. Company representatives said that in the Class A commercial market in New York City, tenants demand sustainability and feel that buildings or spaces that are not green will be "obsolete." Tenants and tenant employees want to live in healthier buildings. One industry expert noted that the appraisal community has found that energy efficiency adds value. In this market, a company's commitment to sustainability is a "driver of value in the asset." It is a "value enhancement." This is true in a number of areas of the country, including Boston, Chicago, Dallas, San Francisco and New York. They noted that Class B tenants are beginning to expect amenities associated with environmental sustainability, such as bicycle access.

Cost and return on investment. As one focus group participant summarized this issue, "economics need to drive." Companies that participated in focus groups for this research made such statements as:

- "People want to see a return." A main difficulty is selling building owners on the monetary return to retrofitting their buildings. "They look at the easy things first," which generally includes lighting retrofits and retro-commissioning (essentially a facility "tune-up" that restores and optimizes the building's energy-using equipment back to its peak performance). Many smaller residential buildings, such as co-ops and condos, respond to real estate (not income) tax incentives. In many cases, solar power has not been found to make sense in residential buildings because most electricity use is at night.
- "Landlords are looking to recover the costs of investing in green technology." A commercial real estate person reported that because "more than 60 percent of energy use in buildings is by tenants, it's important to find a way to incentivize them to save energy." He said that this can be difficult because electricity is a small proportion of overall tenant costs, especially in high-end commercial buildings.
- "Cost-effectiveness is the issue." Another industry representative said that cost-effectiveness is the main selling point for "green." His company primarily manages many buildings constructed before World War II.
- "It is difficult to sell smaller (40-60 unit) buildings on the cost of major retrofits. As an alternative, they pursue smaller programs such as upgrading hallway lighting, which have shorter (1-3 year) payback times. They look for simple paybacks."
- "The savings-to-income ratios aren't significant enough for the end users." There was the feeling that many homeowners, especially upstate, are not reaping the financial rewards they expected.

- “The payback is huge for hospitals and health centers, which often have huge campuses.”

One industry expert observed that there are different levels of sophistication in understanding the cost and return on investment issue. He said that owners of small buildings often do not want to spend the money, while institutional investors and other owners of large buildings are often more sophisticated and understand “present value” and other calculations. A related issue is how long owners/investors plan to keep a property (the “hold period”), which has an impact on the length of their time horizon for recouping costs. Another related issue is the “end-of-life” scenario for major building systems, meaning whether the system is at or near the end of its useful life and needs to be replaced soon anyway. Still another is whether there are vacancies or whether the property is being refinanced. All of these issues -- and more -- have an impact on the cost vs. return on investment issue.

One challenge mentioned is that of convincing owners that energy efficient technologies can increase a property’s value in addition to reducing operating costs. Often, finance departments “are an obstacle because they are ignorant of the benefits of newer technologies. It is hard to convey the message to finance departments.”

Several company representatives said that it is good that appraisers are “beginning to get it.” Others mentioned that, with a new tenant or lease, the owner can finance energy improvements with the new lease. There is a new movement towards “green leases” which provide a “split incentive” for both building owners/managers and tenants to save on energy costs.

Technology. Industry employers said that there is a huge demand for building automation systems, or “actionable energy overlay systems.” One industry representative explained that technology, including high speed Internet and other IT capabilities, have set the environment to use information technology to collect efficiency data. Owners/managers want to fully utilize new energy dashboards. Another industry representative said that there are a number of “small, smart firms” developing building management software.

Laws and Incentives. A number of industry representatives in focus groups said that the NYC Greater Greener Building laws “are having a huge impact” and provide credibility when selling products to building owners, who are often reluctant to make investments when they are not mandatory. These laws require, among other things, benchmarking energy use. One representative said that “data helps identify problem areas.” Several New York City real estate management companies, especially those that work with smaller buildings, have had positive experiences with Con Ed’s incentives. One is considering the use of Con Ed’s incentive to switch from #6 heating oil (which will soon be outlawed) to gas. Another mentioned Con Ed’s lighting incentives.

Industry representatives in upstate New York expressed the opinion that there should be more incentives, especially from NYSERDA, for customers to go green. They reported that the funds available through the American Recovery and Reinvestment Act (ARRA)

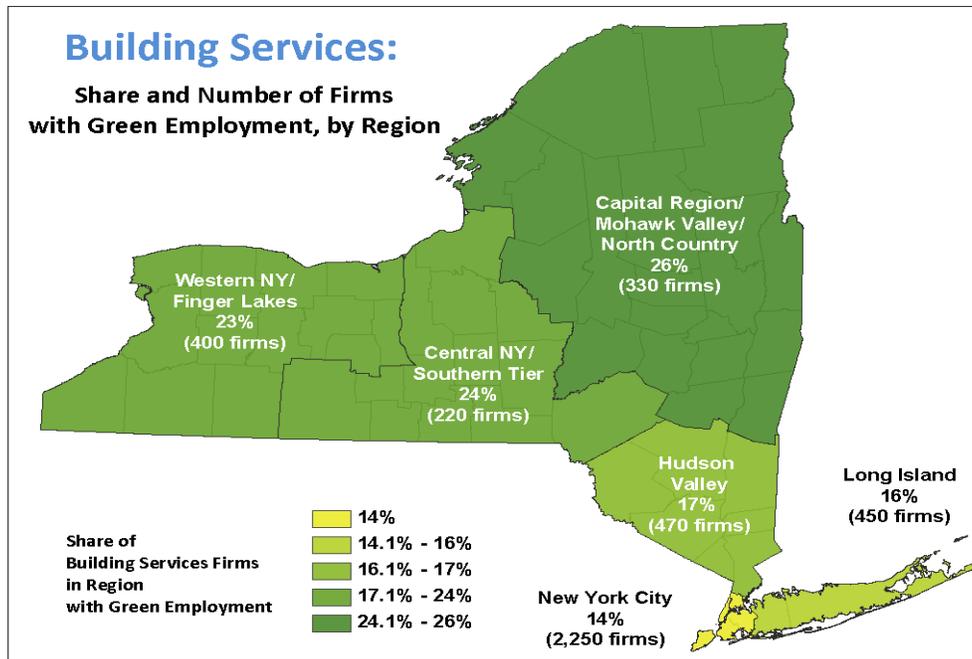
provided a tremendous boon to their businesses, and were concerned about what would happen to their businesses when that source ends.

To promote economic growth in New York City's clean technology and real estate sectors, the City has partnered with Columbia University, the Polytechnic Institute of New York University, and City University of New York to create the New York City Urban Technology Innovation Center (NYC UTIC). One of the key goals of this partnership, established in January 2011, is to promote best-practices sharing among building management stakeholders.

Green Employment in Building Services

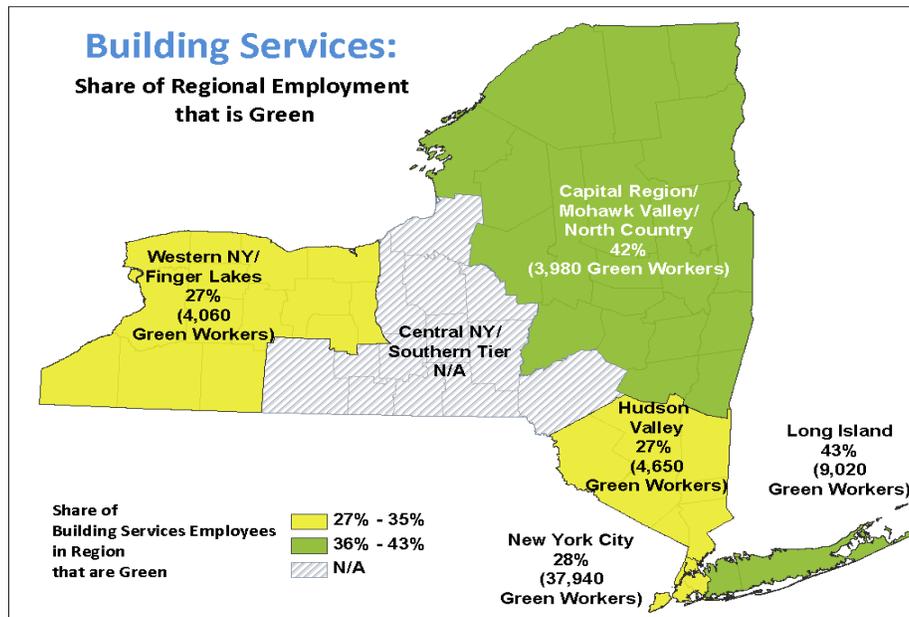
Firms and Employment: Survey Results

Statewide, 16 percent of firms in the Building Services industry cluster report that they have one or more green employees. The map and chart below display the findings by region. As shown, the proportions of green firms in the industry cluster are higher in the upstate regions, but New York City firms account for more than half of all green firms statewide.



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	4,110	2,250	450	470	330	220	400
Total Number in Cluster	25,540	16,190	2,740	2,750	1,250	910	1,710
Percent with Green Employees*	16%	14%	16%	17%	26%	24%	23%

In terms of the “green” share of total Building Services employment in the state, survey results indicate that 31 percent of total employment in the sector is green. As the map and chart on the next page indicate, green employment in the Building Services cluster is heavily concentrated in two regions. New York City has 37,941 green business services workers – 58 percent of all workers in the cluster -- and Long Island has 9,016 green Building Services workers. Green Building Services workers in these two regions combined account for more than 70 percent of statewide green employment in the cluster.



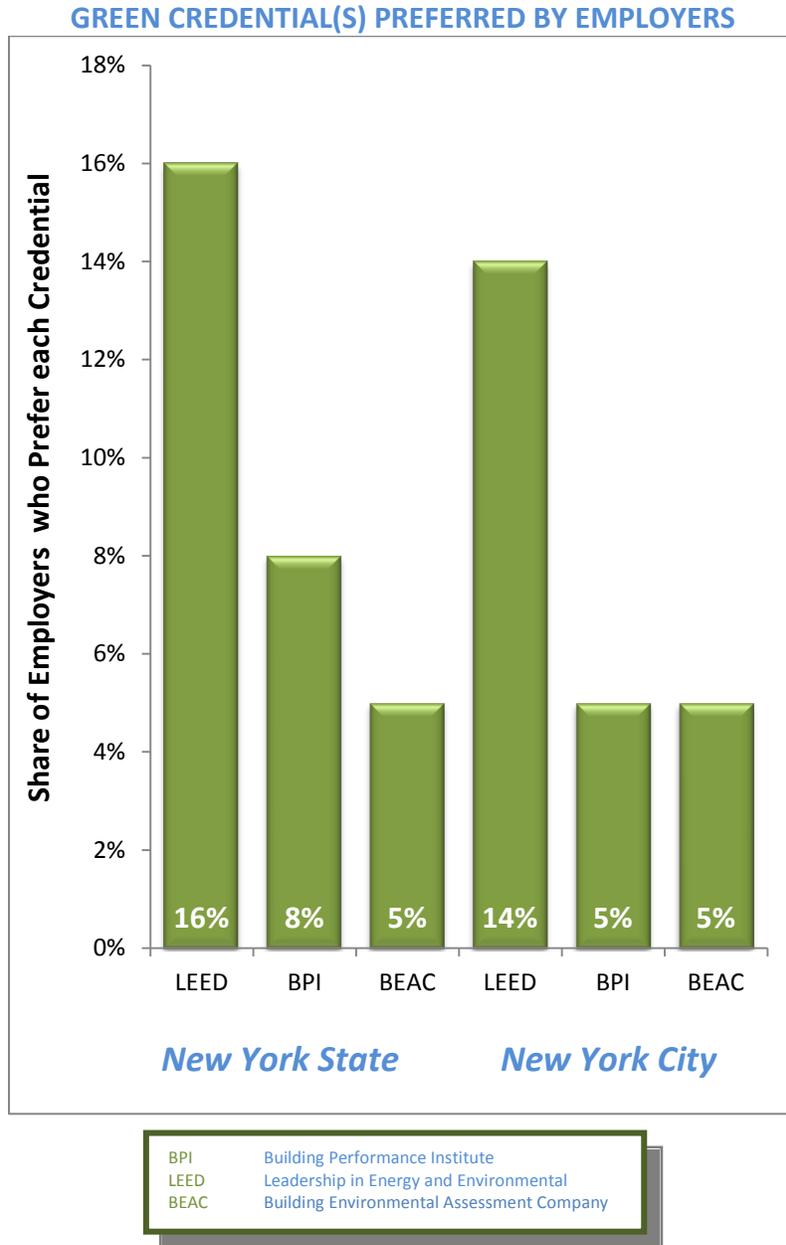
	New York State	New York City	Capital Region/ Mohawk Valley/ North Country	Hudson Valley	Central NY/ Southern Tier	Long Island	Western NY/ Finger Lakes
Green Employment	65,770	37,940	3,980	4,650	N/A	9,020	4,060
Regional Employment	211,460	137,840	9,430	17,420	7,420	21,050	15,260
Percent Green*	31%	28%	42%	27%	N/A	43%	27%

Firms with green employees were asked whether they expected their green employment to be larger, smaller or unchanged a year later. Of the 4,112 Building Services firms with green employment, 76 percent expected their green employment to grow larger (26%) or remain unchanged (50%).

Firms without green employees were asked whether they expected to have green employment a year later. In answer to this question, 71 percent of the 21,430 without green employment said they did not expect any change, 4 percent expected to have green employees a year later, and 25 percent were not sure.

Credential Preferences. Employers were asked in the survey what if any green credentials they prefer their employees to have. As shown in the chart on the next page, 16 percent of the

employers with green employees in New York State preferred a Leadership in Energy and Environmental Design (LEED) credential, eight percent preferred a Building Performance Institute (BPI) credential, and five percent preferred a Board of Environmental, Health and Safety Auditors (BEAC) credential. The proportions are similar for New York City.

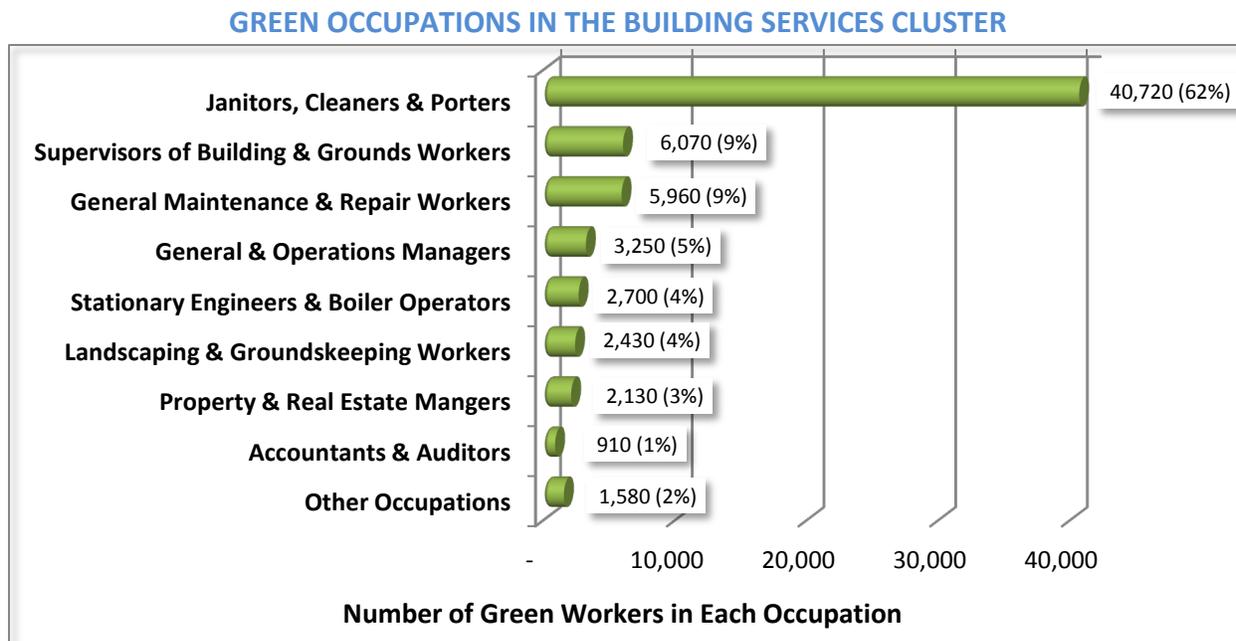


During focus groups, industry employers indicated that LEED credentialing is desirable for managers and engineers so that they can sharpen their skills. There was also praise of training conducted by SEIU Local 32BJ for building superintendents and other building staff, by Local 94 for Operating Engineers, and by the CUNY Institute for Urban Systems Building Performance Lab. These training programs prepare individuals for the Building Operator Certification (BOC)

credential and/or the BPI credential, both of which are supported by the New York State Energy Research and Development Authority (NYSERDA).

Occupational Information

Key Occupations. As shown in the chart below, the statewide employer survey found that the most common occupation with green employment in Building Services was Janitors and Cleaners, who are responsible for green cleaning and recycling. The other common occupations in this industry cluster are: First-Line Supervisors of Building and Grounds Cleaning and Maintenance Workers, Maintenance and Repair Workers, General and Operations Managers, Stationary Engineers and Boiler Operators, Landscaping and Groundskeeping Workers and Property, Real Estate and Community Association Managers. Together, these seven occupations account for 97 percent of the cluster’s green employment. All of these occupations are involved in helping buildings and facilities achieve greater energy efficiency, utilize new energy technologies, reduce waste or achieve other environmental sustainability goals.



While building superintendents and porters (this is the job title used in New York City residential buildings for cleaners) were mentioned by industry employers in focus groups held for this research, they felt that some of their most critical “green” employees were Operating Engineers (the common title for Stationary Engineers and Boiler Operators in New York City) and professionals in new energy and sustainable services departments. These professionals might include engineers and architects as well as people who procure energy and those who handle retro-commissioning.

- *Operating Engineers* need to have the skills to operate high tech building performance systems. There is a demand for data and technical skills among these staff. The analogy was made to skills needed in the automotive industry – mechanics now need to know how to use computerized diagnostic systems.
- *New types of positions are being created – new opportunities in energy and sustainability services, and in areas such as engineering, architecture, procurement of energy and retro-commissioning.* The overall scope of “building performance” goes beyond energy efficiency to include financial analysis, broader benchmarking and related areas. As one industry representative reported, “The field has gone from non-professional to professional to sophisticated – it didn’t used to be that way.” Some property management companies have hired professionals that specialize in energy efficiency and renewable energy to oversee projects in buildings. One real estate management company hired someone “to keep on top of things” because “the world is changing.” This company said that substantial work is needed to find suitable solutions and reliable contractors for greater energy efficiency or renewable energy undertakings.
- *There is increased accountability for upper management.* In the past, managers may have had an energy budget, whereas now their actual energy use is monitored. This has created a new culture.

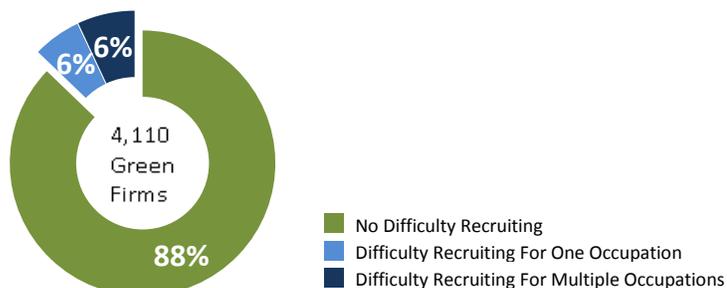
Career pathways. Within residential buildings, many of which are covered by labor agreements with SEIU Local 32BJ, there are career pathways from porter to doorman or handyman, and then potentially to building superintendent. Building staff are able to move up, but need additional technical, language and interpersonal skills in order to make these transitions. There is no formal apprenticeship program, but after individuals have worked for 30 days in a building that is covered by a labor management agreement, they are covered by Local 32BJ and are generally eligible to take training courses offered through the Thomas Shortman Training Fund. Employers indicated that “finding someone with a good work attitude is most important; they can then get the necessary schooling or training for jobs. The most important thing is to want to learn.”

Within the commercial real estate sector, entry into the field and progress within it varies considerably. People come from a diversity of educational backgrounds. One focus group participant studied architecture for two years, then worked as an intern for a real estate management company and was hired by the company. Another had been an electrician, then a City inspector. Others have trade or technical backgrounds. Individuals can move from mechanical areas such as electrical, plumbing, heating, refrigeration or elevator maintenance to managerial positions in energy and sustainability. On the professional level, there are very few specific degrees for property management, although both Baruch College and NYU were mentioned. Employers said that “there is a need for constant learning on the job” and “There are still a lot of things that can’t be taught, they must be shown.”

Recruitment, Retention and Turnover. As part of the employer survey, firms with green employment were asked whether they have difficulty recruiting qualified workers. Of the 4,112 firms with green employment in this cluster, 12 percent (227) had difficulty finding qualified green workers. Six percent had difficulty recruiting for more than one occupation. This varied

significantly by region of the state. In the Central NY/Southern Tier area, 23 percent of employers had difficulty finding qualified green workers, while in the Capital Region/Mohawk Valley/North Country, New York City and Western NY/Finger Lakes regions, this proportion was less than 10%.

PERCENT OF BUILDING SERVICES FIRMS WITH RECRUITING DIFFICULTIES



- The occupation for which employers have the most difficulty finding qualified candidates is Stationary Engineers and Boiler Operators (known as Operating Engineers in NYC), where 17 percent of firms report this issue. The second most frequent occupation with recruiting difficulties was Janitors and Cleaners, where 10 percent report this difficulty. Occupational recruiting difficulties varied by region, however. The occupations where 15% or more of employers had difficulty finding qualified “green” workers were:
 - Capital Region/Mohawk Valley/North Country: Landscaping and Groundskeeping Workers (17%) and Janitors and Cleaners (15%)
 - Central New York/Southern Tier: Landscaping and Groundskeeping Workers (25%), Property, Real Estate, and Community Association Managers (19%), Maintenance and Repair Workers, General (17%), Stationary Engineers and Boiler Operators (16%), First-Line Supervisors of Building and Grounds Cleaning and Maintenance Workers (16%) and General and Operations Managers (16%).
 - Hudson Valley: Janitors and Cleaners (20%)
 - Long Island: Installation, Maintenance and Repair Workers (67%) and Stationary Engineers and Boiler Operators (28%)
 - New York City: Appraisers and Assessors of Real Estate (41%), Stationary Engineers and Boiler Operators (16%), Real Estate Sales Agents (15%)
 - Western New York/Finger Lakes: none over 15%

Many employers that participated in focus groups mentioned the Stationary Engineers and Boiler Operators, which in New York City are commonly known as Operating Engineers (many are represented by Operating Engineers Local 94). One company representative said that “there is a perception among Operating Engineers that they will not be needed, but this is not the case.... External diagnostic software (remote) systems management is increasingly important, but is not replacing building staff.” Another made the same point, “Operating Engineers worry that new technologies will make them obsolete, and worry about how many will be needed.

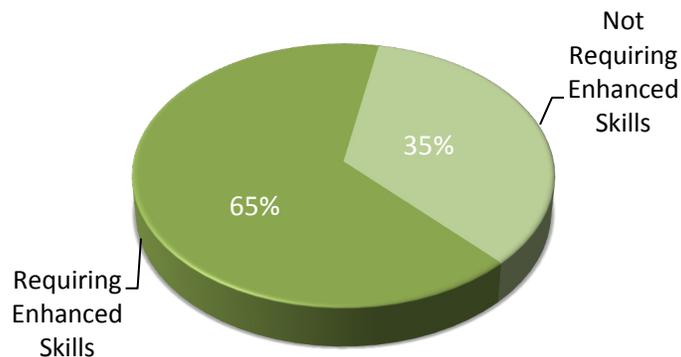
They perceive this as a threat, but this is not the case. Personnel are still necessary in the buildings – they just require new skills to operate high-tech systems.”

The major sources of recruitment reported by employers in focus groups and interviews were word of mouth (“least expensive and safest recruitment effort”), “cross recruits from other companies” and recruitment through the Building Operators and Managers Association (BOMA) and universities. They also “poach” from engineering companies, retro-commissioning agents and contractors. Some larger management companies now have a team with people who specialize in such area as HVAC, utilities, compliance, etc.

Employers noted that flexibility and adaptability skills are “key” and that “a lack of adapting to change is fatal.”

Training and Educational Preparation. Employers were asked in the statewide survey how many of their employees required new skills to be able to perform their work in a green economy, and of those that required skills, where they were acquired. A strong majority, almost two out of three employers with green employment required employees to have enhanced skills to produce green products or services.

PERCENTAGE OF EMPLOYERS REQUIRING ENHANCED SKILLS FOR GREEN WORKERS



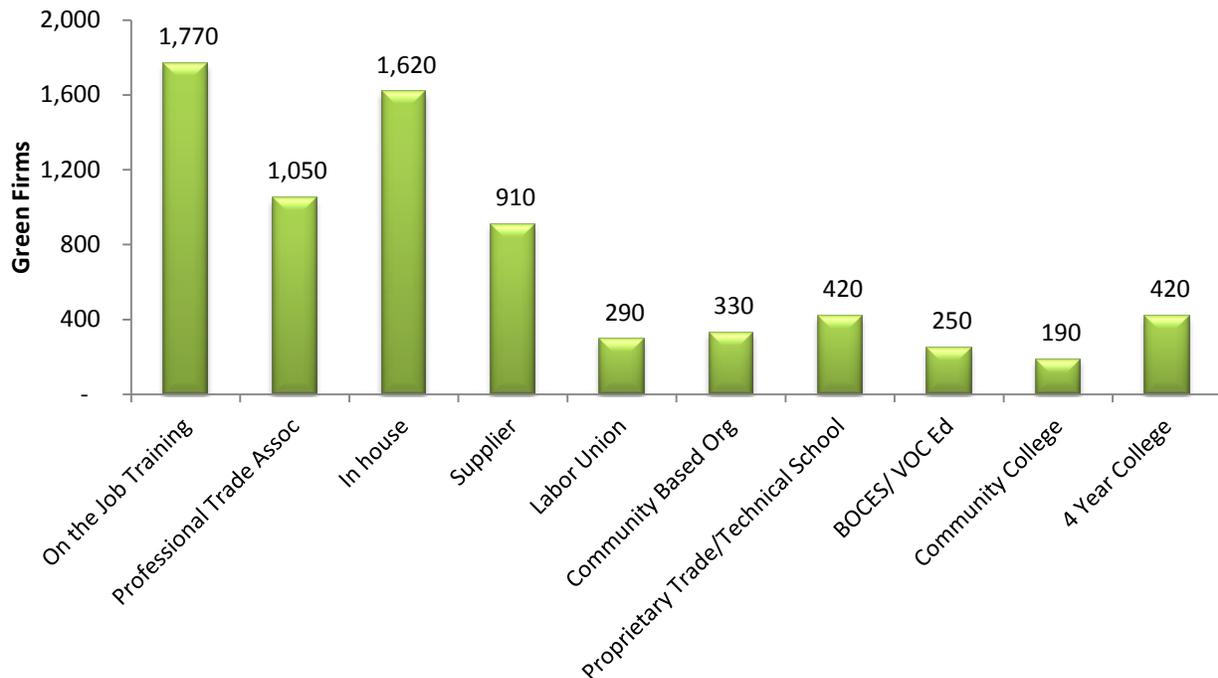
Employers that took part in focus groups believed that the entire building workforce needs training – “every single part” – cleaners, electricians, lighting, maintenance, managers, engineers and that everyone needs to “sharpen their skills.” They said that green practices are affecting all types of jobs – “top to bottom,” and that the entire hierarchy of occupations needs skill upgrades. One said, “This goes from owners to contractors to operating engineers and even down to cleaners, who must be trained, for example, on using green cleaning products correctly.” One employer encourages LEED credentialing for people in management and engineering positions. Some expressed the opinion that training the older workforce on new technologies can be a problem and conversely that newer workers are not familiar with the old technologies, and that this knowledge is necessary for making the transition. There is a potential problem and “gap” between new employees who are more technically savvy, and

older employees who know the building systems very well, including all of the adjustments that have been made over the years.

Employers are training their workforces to adopt green practices. In some cases, new types of positions are needed, many of which are involved in installing or utilizing building performance technology that increases energy efficiency. Most provide training on-the-job to make sure that employees have the green skills they need to perform effectively although some take advantage of specialized formal programs to upgrade the skills of employees.

As the chart below illustrates, the most common sources of training mentioned by employers in the survey were On-the-Job Training, In-house Training, Professional Trade Association, and Supplier.

SOURCES OF ENHANCED SKILLS TRAINING



This information was validated by focus group discussions and expert interviews with industry employers, who emphasized the importance of learning on the job. One said that on-the-job learning is important because many of the older building systems have idiosyncrasies that need to be learned.

Companies in upstate New York reported utilizing NYSERDA-funded training programs. Companies in New York City said that some labor unions in New York City, such as Operating Engineers Local 94 and SEIU Local 32BJ are “highly sophisticated” and work closely with management to make sure their workers are trained on the new technologies. One said that

Local 32BJ has been “exceptionally active.” Another commented that the “bigger [training] problem is in residential non-union buildings in NYC and buildings outside of New York City.”

Some companies mentioned the Building Performance Toolkit developed by the CUNY Institute for Urban Systems Performance Lab, which offers on-line training for building operators, building managers, property owners and other real estate professionals as a guide to reducing energy costs and energy consumption. It is primarily geared toward large commercial property owners in New York City but can also be helpful to other sustainability professionals. One company reported that it brings in trainers to provide some of the training for building staff, and that they need to supplement the training provided by the union. Another commented that products and equipment are constantly changing, and that staff training is very important. Another company said that after the installation of building performance software, the software contractors trained the building staff.

Recommendations for Educational Institutions and Training Providers. Employers that took part in focus groups were asked what they would change about the way colleges, community colleges and training institutions prepare students for the workforce. Their suggestions were:

- *More hands-on training and mentoring.* One employer praised the training done by SEIU Local 32BJ, saying that “hands-on is the way to go,” and “mentoring is the key.” However, this “hands-on” experience also applies to engineering students. One employer said that students should get hands-on experience with building systems, e.g. mechanical engineers need to see more “nuts and bolts.”
- *More experience in the field before graduation.* Employers suggested that colleges should institute co-op and internship programs that “put people in the field getting work experience for part of their training.” At the same time, one employer has had experience with college interns who felt that some of the tasks they were asked to perform were “beneath them” and were unwilling to do “grunt work.” In the property management field, it was felt that it is a team effort with everyone pitching in. Employers also suggested that BOCES programs should implement internships at the high school level to create a more valuable workforce.
- *More attention to career paths in the real estate/building operations industry.* Several employers thought that students need to get a better understanding of the different career paths in the industry and how different educational programs can lead to careers, such as in property management. Another mentioned that there are very few schools with real estate programs. Still another said that there is no good alternative to the unions as far as paths into the mechanical jobs in the industry are concerned.
- *More information sharing and a more unified avenue* so that building operators could share knowledge about what techniques and products work well. They would like case studies about how different “shops” within companies work together to achieve energy efficiency.
- *Less fragmentation among educational institutions.* Several employers complained that institutions of higher education are “doing their own thing,” “wasting a lot of time,” and

“not helping me.” Others said that certification programs and degrees are “highly fragmented and incoherent.” They suggested that the industry would be more willing to support them if the different educational institutions could get together and come up with something more unified to meet the staffing needs of the industry.

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

