CHAPTER 4: EMPLOYER DEMAND IN THE PROFESSIONAL SERVICES (EXCEPT LEGAL SERVICES) CLUSTER

Highlights

- *Professional Services is one of the greenest industry clusters in New York State. Almost one-third of firms in this industry report having green employees.*
- *New York City has half of all green employment in the cluster, with 15,050 out of 31,490 green employees statewide.*
- *The top green occupation is Architect, followed by Civil Engineer, Drafter and Mechanical Engineer. Newer green occupations include Energy Auditor and Energy Engineer.*
- *New York City and State law and guidelines related to construction and building operations have increased the demand for green professional services such as architecture, engineering and information systems.*
- *The demand for sustainable design has been driven over the last ten years by commercial customers, especially those involved in high-end Class A and B+ office space in New York City, who have been interested in building and retrofitting sustainably, usually with LEED® certification.*[1]
- *Demand for green design and engineering has also come from colleges and universities, healthcare facilities and non-profit organizations, all of whom aspire to high levels of sustainability as part of their missions*
- *Nine in ten professional services employers require enhanced skills for green jobs and 57 percent (74 percent in New York City) prefer that green employees have a Leadership in Energy and Environmental Design (LEED) credential.*
- *Employers want education and training institutions to offer more "hands-on"* practical *experience and more work-study and internship programs.*
- *Employers say that schools should emphasize teamwork and interpersonal skills more than they do now.*
- *Companies want schools to expose students to more interdisciplinary work, for example, between architects and engineers.*

Overview of the Industry Cluster

The professional services industry includes firms that specialize in performing professional, scientific, and technical activities for others. The jobs in this industry normally require a high degree of knowledge and training. The establishments in this sector specialize according to expertise and provide services to clients in a variety of industries and, in some cases, to households.

Professional services includes such activities as: accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and

[1] Commercial real estate practitioners determine Class A buildings based on prime location, full-service amenities, and other guidelines and proceed to label other buildings relative to those results.

interpretation services; veterinary services; and other professional, scientific, and technical services.

Green services in this sector are focused in the architecture, engineering, management, scientific, and technical consulting services industries. Environmental consulting firms identify and evaluate environmental problems and offer solutions. They may advise clients about controlling harmful emissions, cleaning up contaminated sites, establishing recycling programs, and complying with government environmental laws and regulations. Architects and engineers are involved in both the design of new construction projects and retrofits to existing buildings, including the design of electrical and heating/cooling systems. Engineering firms have been very involved in offering the energy audits and retro-commissioning plans required by the December 2009 NYC Greener, Greater Buildings Plan legislation, Local Laws 84, 85, 87 and 88.

Also included in this industry, energy consultants may advise clients on how to reduce costs by utilizing energy-efficient machinery. Green chemists and chemical technicians are involved in the design, development, and implementation of chemical products and processes that reduce or eliminate substances hazardous to the environment.

Distribution of Firms and Employment. In the fourth Quarter of 2010, there were 14,416 firms in the professional services (ex-legal services) industry in New York State, employing 138,556 people. Thirty-five percent of the firms and 37 percent of the jobs were located in New York City, while another 31 percent of the firms and 27 percent of the jobs were located in the other downstate regions of Long Island and the Hudson Valley.

DISTRIBUTION OF PROFESSIONAL SERVICES FIRMS AND EMPLOYMENT BY REGION

	Firms		Employment	
	Number	Share of NYS	Number	Share of NYS
New York State	14,416		138,556	
Capital / Mohawk Valley /North Country	1,100	8%	16,451	12%
Central/Southern Tier	710	5%	11,625	8%
Hudson Valley	1,922	13%	14,992	11%
Long Island	2,523	18%	21,542	16%
New York City	5,030	35%	50,794	37%
Region Not Classified*	1,790	12%	5,512	4%
Western NY/Finger Lakes	1,341	9%	17,639	13%

SOURCE | 4Q 2010, QCEW

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

There is a strong regional concentration of architecture, engineering and consulting jobs in New York City, and firms that are located in the City work on projects around the state and around the world. New York City is the headquarters of several top-50 design firms, and six of the top 50 green design firms (McGraw-Hill Construction).

Roughly three-quarters of the firms in this industry are small businesses with five employees or less. While there are many small firms employing architects, engineers, and consultants,

billings are dominated by a smaller number of large firms. In architecture, for example, the two percent of firms with 100 or more employees account for 36 percent of total billings (American Institute of Architects). Likewise, although there are 60,000 engineering services firms in the United States (including the engineering divisions of major construction companies), the 50 largest firms account for 35 percent of industry revenue (First Research). In the New York City region, there are 2,595 engineering services firms; those with over 100 employees make up 3 percent of the total number of firms but 36 percent of employees and 54 percent of total sales (C. Barnes and Co.).

DISTRIBUTION OF PROFESSIONAL SERVICE FIRMS (EX-LEGAL SERVICES) IN NEW YORK STATE

			Percent of total	
	Firms	Employees	Firms	Employees
ALL EMPLOYEES	14,509	141,102		
0-5 EMPLOYEES	11,062	16,323	76%	12%
6-10 EMPLOYEES	1,359	10,289	9%	7%
11-20 EMPLOYEES	958	13,844	7%	10%
21-50 EMPLOYEES	694	21,706	5%	15%
51-100 EMPLOYEES	243	17,357	2%	12%
101-250 EMPLOYEES	140	21,390	1%	15%
250+ EMPLOYEES	53	40,193	0%	28%

SOURCE | QCEW, 4Q 2010.

Industry Market Drivers. Architecture and engineering firms are typically hired by property or building owners before they hire a general contractor for a new construction or remodeling project. For this reason, demand for architectural and engineering services is tied to the cyclical factors affecting construction demand, and employment in the sector tends to suffer when investment in new construction declines, as it did in the early 1990's and again since 2008. (American Institute of Architects) (Dunlop). Consulting firms advise businesses on a wider range of practices, so demand for them is less tied to business cycle dynamics.

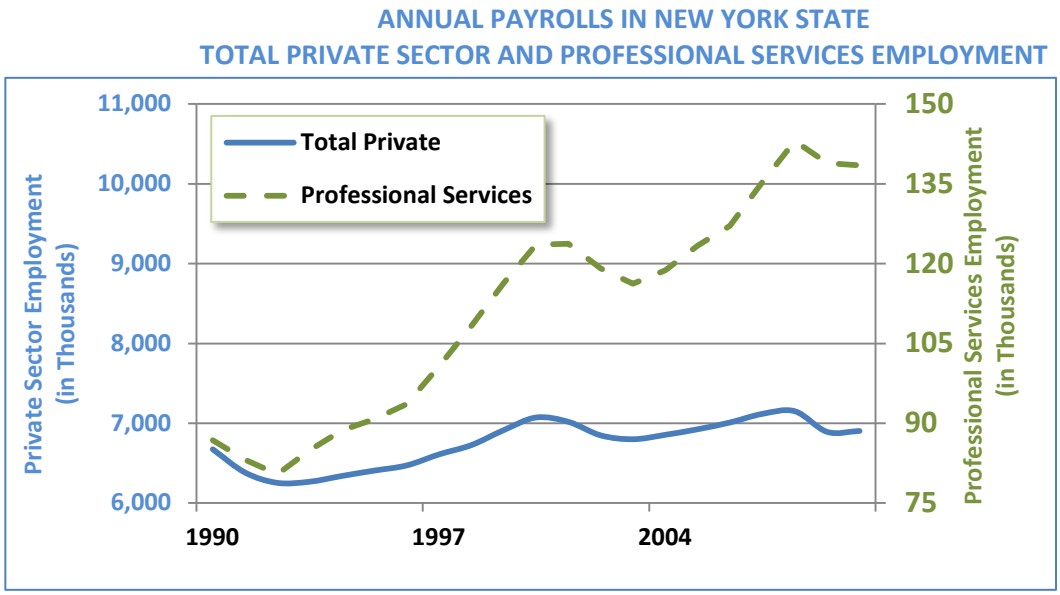
Architects are particularly important on non-residential construction projects. Architects design about 75 percent of such projects, and are involved in reviewing or approving a larger share beyond that. Because the architect is involved at the very beginning of a project, architectural billings are a leading indicator for the construction market: the architectural planning and design phases precede the beginning of the construction phase by around a year (Saltes). The phases of professional architectural services span from planning to design & documents through on-side observation during construction. Due to this longer duration, architectural services can be studied as a barometer of the construction industry.

Because demand for architects and engineers is tied to demand for construction, employment in the sector was strongly affected by the recent housing boom and the subsequent recession. Between 2005 and 2008, gross billings at architecture firms rose more than 50 percent, according to the American Institute of Architects. The industry then suffered due to the recession and the decline in construction, although declines in employment lagged declines in

the construction sector. After peaking in 2008, payrolls at architecture firms declined by over 12 percent. Although residential activity increased dramatically during the housing boom, by 2008 it had declined substantially even as commercial and institutional activity increased. In 2008, institutional projects as a share of billings were at the highest level in 15 years. This share may have increased further since then, as government spending on infrastructure remains one of the major drivers of demand for construction. (American Institute of Architects).

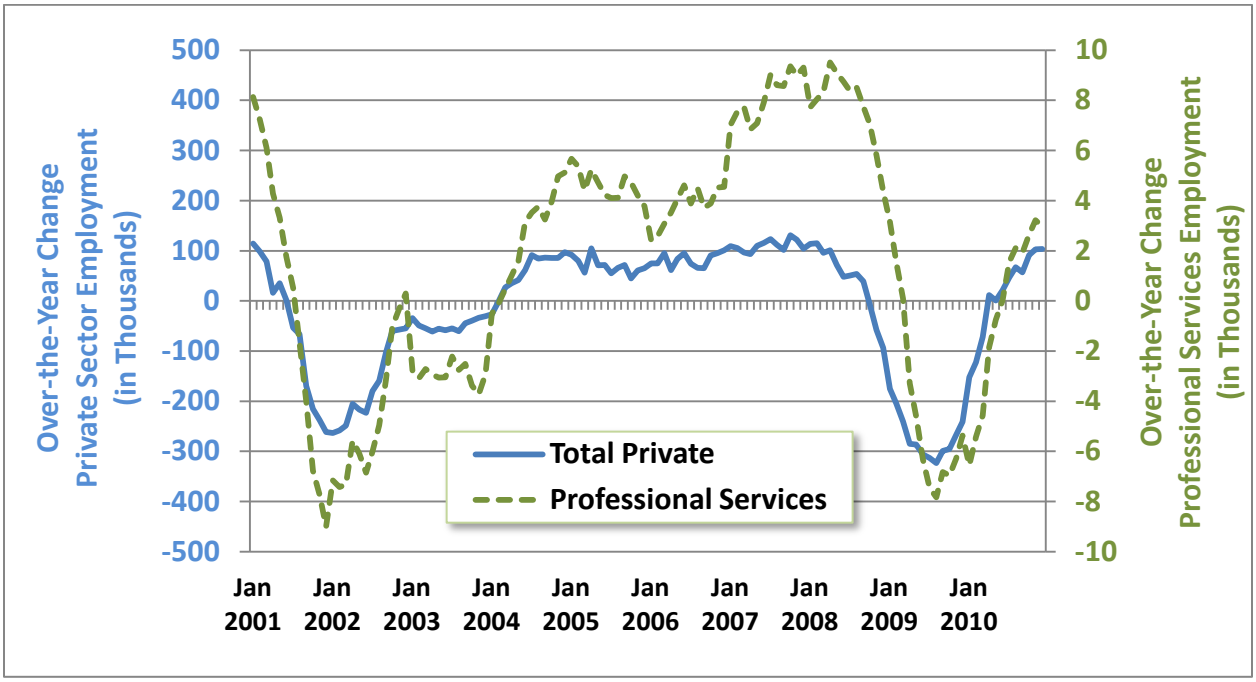
The downturn in construction has been felt strongly. Many projects have been put on hold or stopped; new commissions have not been plentiful. Many architecture firms have downsized and new architects are not being hired as readily. (AIA)

Recent Developments. As demonstrated in the charts below and on the next page, employment in this sector is generally cyclical but has grown more quickly than private sector employment overall. During the most recent recession — and the prior two — there were significant declines in this sector's employment.



SOURCE | QCEW 1990 to 2010 Annual Average Employment

YEAR-OVER-YEAR CHANGES IN MONTHLY PAYROLLS: 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 professional 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.*[2]

WAGES AND TYPICAL PREPARATION FOR GREEN PROFESSIONAL SERVICES OCCUPATIONS

Occupation	Median Pay	Typical Preparation
Environmental Scientists and Specialists, Including Health (Climate Change Analysts, Environmental Restoration Planners, Industrial Ecologists)	$68,100	Master's degree
Social Scientists and Related Workers, All Other (Transp. Planners)	$68,040	Master's degree
Advertising and Promotions Managers (Green Marketers)	$129,520	Bachelor's or higher degree, plus work experience
Engineering Managers	$124,290	Bachelor's or higher degree, plus work experience
Natural Sciences Managers	$116,220	Bachelor's or higher degree, plus work experience
Computer Software Engineers, Systems Software	$93,350	Bachelor's degree
Financial Analysts	$90,500	Bachelor's degree
Electrical Engineers	$80,440	Bachelor's degree
Architects, Except Landscape and Naval	$79,280	Bachelor's degree
Environmental Engineers	$78,580	Bachelor's degree
Civil Engineers	$76,920	Bachelor's degree
Mechanical Engineers (Fuel Cell Engineers, Automotive Engineers)	$73,250	Bachelor's degree
Chemists	$70,580	Bachelor's degree
Business Operations Specialists, All Other (Energy Auditors, Sustainability Specialists)	$67,400	Bachelor's degree
Public Relations Specialists	$61,660	Bachelor's degree
Commercial and Industrial Designers	$58,190	Bachelor's degree
Life, Physical, and Social Science Technicians, All Other (Precision	$42,960	Bachelor's Degree

[2] 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
Agriculture Technicians)		
Chemical Technicians	$42,450	Associate degree
Production, Planning, and Expediting Clerks	$45,050	Moderate-term on-the-job training
Customer Service Representatives	$33,190	Moderate-term on-the-job training
Laborers and Freight, Stock, and Material Movers, Hand	$24,460	Short-term on-the-job training
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (Solar Sales Representatives and Assessors)	$79,320	Work experience in a related occupation
Sales Representatives, Services, All Other (Energy Brokers)	$61,340	Work experience in a related occupation
Construction and Building Inspectors	$53,230	Work experience in a related occupation

SOURCE | Occupational Employment Survey; O*NET Online

Employment Projections. Employment in the professional services cluster is projected to grow by 2.6 percent in New York State between the years of 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 professional services (ex-legal services) workforce in 2000 and in 2007-2009.

DEMOGRAPHIC CHARACTERISTICS OF THE PROFESSIONAL SERVICES CLUSTER WORKFORCE

	New York State		New York City	
	2000	2007-09	2000	2007-09
Total Workforce	**137,895**	**163,340**	**71,951**	**88,025**
New York State/City Residents	121,276	144,542	48,832	60,942
Non-New York State/City Residents*	16,619	18,798	23,119	27,083
New York City	42%	44%	*na*	*na*
Long Island	16%	16%	*na*	*na*
Hudson Valley	13%	12%	*na*	*na*
Upstate	28%	27%	*na*	*na*
Bronx	*na*	*na*	6%	6%
Kings	*na*	*na*	24%	26%
New York	*na*	*na*	45%	46%
Queens	*na*	*na*	21%	17%
Richmond	*na*	*na*	5%	5%
Male	64%	64%	50%	53%
Female	36%	36%	50%	47%
White	79%	78%	65%	64%
Black	6%	6%	12%	11%
Hispanic	6%	7%	11%	13%
Asian	7%	8%	9%	10%
Other	2%	1%	3%	2%
Age 18-34	35%	31%	44%	38%
35-44	25%	22%	23%	24%
44-54	23%	26%	20%	21%
55+	16%	21%	13%	16%
Less than high school or GED	2%	1%	2%	2%
High school or GED	8%	7%	9%	8%
Some college	22%	19%	18%	14%
College or More	69%	73%	71%	76%

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.

Employment in professional services in New York State grew by 18 percent to over 160,000 workers in 2007-2009; employment grew by 22 percent in New York City during the same time period. In 2007-2009, New York City represented more than half of the total cluster employment in the State. About two out of five professional services workers in New York City commuted in 2007-2009. Four out of five of the State's professional services workers lived within state borders.

Women were better represented in the cluster in New York City than in the State as a whole, as were Black, Hispanic, and younger workers. A large majority of the workers held a four-year college degree and slightly more did so in 2007-2009 than in 2000.

Green Economic Activity

For the purposes of the research, green economic activities in Professional Services were defined as those associated with energy efficiency and renewable energy, such as**:**

- consultation
- design
- production
- distribution
- construction
- installation
- assessment services

During focus group discussions conducted as part of this research, industry employers refined the concept of consultation to include energy management consulting and green building consulting, which included assisting clients to secure LEED or other green building certification. Employers also suggested that green economic activity in the industry includes evaluation, such as quality assurance and quality control, and marketing, construction management, planning, and commissioning. Commissioning generally means validating that building systems are functioning optimally according to design. Additional areas of professional services mentioned by focus group participants included project management, software development and research and development.

Architecture firms reported that until recently, green design was being pioneered by a small number of firms that were early advocates of environmental responsibility in architecture. Today, however, green design has become more mainstream, especially as new laws and government initiatives create incentives for green design. According to industry experts, architectural services in New York City have moved quickly in the direction of sustainability. The first green skyscraper in New York City – 4 Times Square – was completed only 12 years ago. Since that time, the industry in New York and other major cities has "greened up significantly." In the last five years, almost all major commercial construction projects in New York City have been designed to be LEED-certified or to an equivalent sustainable standard.

How Green Firms Differ. Many professional services firms believe that they are sought after because of their particular expertise in green or sustainability and their access to people who are trained to design sustainable spaces.

Although sustainability may now be the norm for many architecture firms, some have more of a track record than others. Engineering and consulting firms report that clients hire them because they have a different perspective – they look at buildings in a different way. Firms may also have sub-specializations within sustainable architecture and engineering. For example, some are experts in photovoltaics, others in computerized energy modeling, commissioning, project management or particular software, such as high performance building management systems. In many cases, these firms are building on prior expertise garnered over a period of time. For example, engineering firms that previously specialized in heating, ventilation and air conditioning (HVAC) systems are more likely to specialize in energy efficient HVAC management systems.

The following are direct quotes from representatives of professional services firms on the topic of what sets them apart from other firms:

- "I think that part of our *modus operandi* is the sustainable term … we're carbon-neutral and we practice green, sustainable activities within the firm and within our parent firm. That promotes what we believe in and with virtually all of our clients…. One of the reasons they come to us is because our sustainable expertise is a value-added. The corporate image now is to be green. So our firm provides consulting and design services to help our clients become greener and more sustainable."
- "We also try to be practical because it … should also make practical economic sense to provide the best value to the customer…. You need to look at what the capital budget is for the client and make sure that what you're promoting makes economic sense. But you also want to make sure that if they want to promote a new technology, that you have the expertise to design it and have it implemented."
- "I would say that most engineering firms in our business are familiar with the products and are familiar with energy conservation as a concept and practice it every day. I think the distinction that can be made is the expertise in-house to conduct special studies and evaluations.… Computerized energy modeling is a specialty. It takes a long time to train somebody to do that. Not all firms have that capability."
- "Commissioning is another thing that people offer, but to do it over a long term, you have to develop an expertise in it and you have to train people. I think the distinction between firms is a question of expertise. Having done something over and over again, it becomes not a unique service but something that you do every day."

Some focus group participants noted that some firms have been drawn into the sustainable building design field that have less than adequate experience in their fields. One business person went so far as to say that "garbage firms" and "schlockmeisters" have been attracted because of public funding and utility funding, and that these firms may sometimes "low-ball" their competitive bids. In general, however, it was felt that firms that already have the expertise are poised to take advantage of new, green professional service opportunities.

In addition to the laws, regulations and statutes driving the green economy discussed in the introduction to this report, experts and focus group participants cited the following supply and demand dynamics as distinct to green professional services:

- ***Market forces***. Over the last ten years, many commercial customers, especially those involved in high-end Class A and B+ office space in New York City, have been interested in building and retrofitting sustainably, usually with LEED certification. High-end Class A and B+ tenants appear to be demanding LEED-certified space, and building owners find they can charge a premium for rent for such spaces. However, the general economy and downturn in construction have slowed the pace of design activity in this portion of the industry.
- ***Demand from colleges and universities***. More than 670 college and university presidents have signed The American College and University Presidents' Climate Commitment. Some have set the goal of "carbon neutrality" by 2030. This commitment is having an impact on all major new building projects. One firm that participated in a focus group noted that it has many clients in the university and non-profit sectors that were interested in sustainability, and commented that the movement is in part student-driven. The Climate Commitment is having an impact on signatories' building projects as well as operations, maintenance, policies, practices and academic curriculum. Demand is also often driven by an educational institution's mission – creating excellence in education focused on relevant curriculum for the next generation.
- ***Demand from healthcare facilities***. Because hospitals and health centers are big energy and water users as well as waste producers, they stand to gain a great deal from sustainability. This sector currently offers a major opportunity for energy savings and sustainable design. The nature of the healthcare industry influences its commitment to a healthier environment and lifestyle.
- ***Demand from non-profit organizations that aspire to high levels of sustainability as part of their missions***. An example of this is the Audubon Society, which redesigned and renovated its World Headquarters' rental space at 225 Varick Street in Manhattan. (National Audubon Society)
- ***Cost of energy***. Several industry experts reported that if and when the price of conventional fuel increases, there will be more incentive to save on energy costs. One said that "we may not be able to count on a passion for green, but we can count on the economics, on the payback of energy efficiency improvements."

In focus group discussions conducted as part of this research, many firms discussed how regulatory forces either have had or are expected to have an impact on demand for their services. In New York City, many felt that the new local law 84 mandating benchmarking in large buildings with at least 50,000 square feet would stimulate the green architecture and engineering industries.

An industry expert noted that incentives can "sweeten the pot" but are not "make or break." The same expert said that incentives sometimes require a fair amount of effort in the application process, and that organizations/companies sometimes use up a good portion of the value of the incentive in the time it takes to apply for them. On a similar note, another focus group participant said that his firm helps clients "wade though" the complex requirements and procedures involved in obtaining public sector incentives.

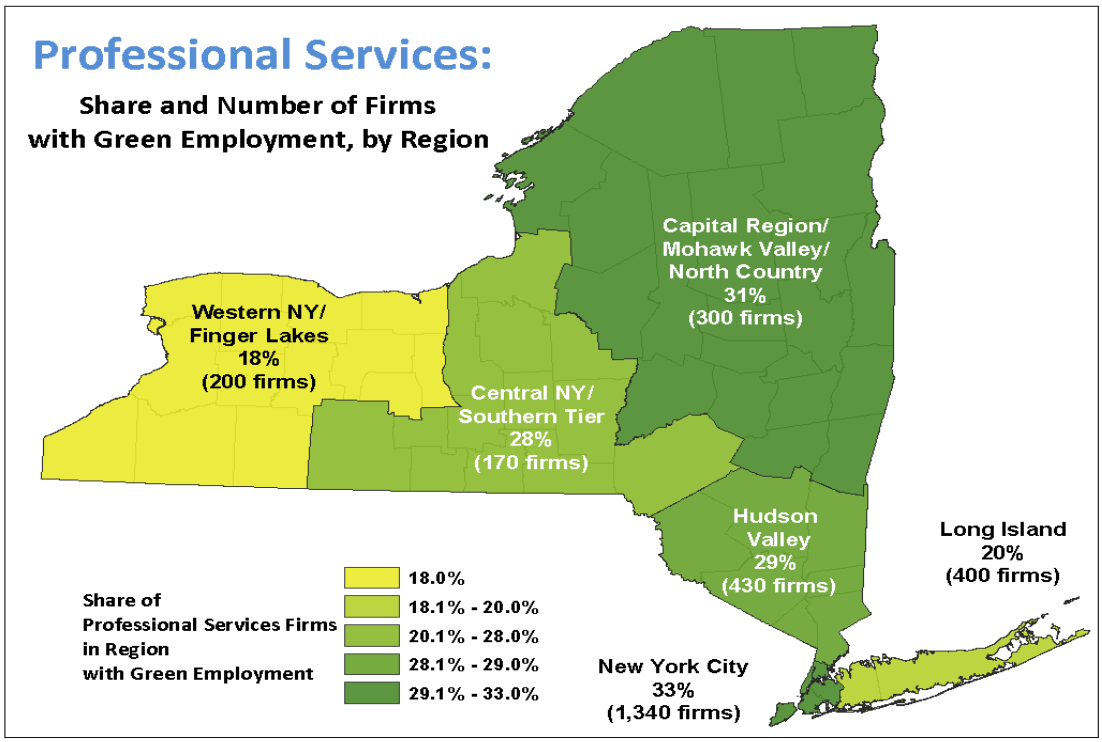
Green Employment in Professional Services

Firms and Employment: Survey Results

Statewide, 28 percent of firms in the professional services industry cluster report that they have one or more green employees. The map and chart below display the findings by region.

In professional services, firms in the five boroughs of New York City dominate the green labor market in New York State. One-third of all professional services firms in New York City have green employment – the highest regional share. Also, green New York City firms account for nearly half of all green firms in the industry cluster statewide.

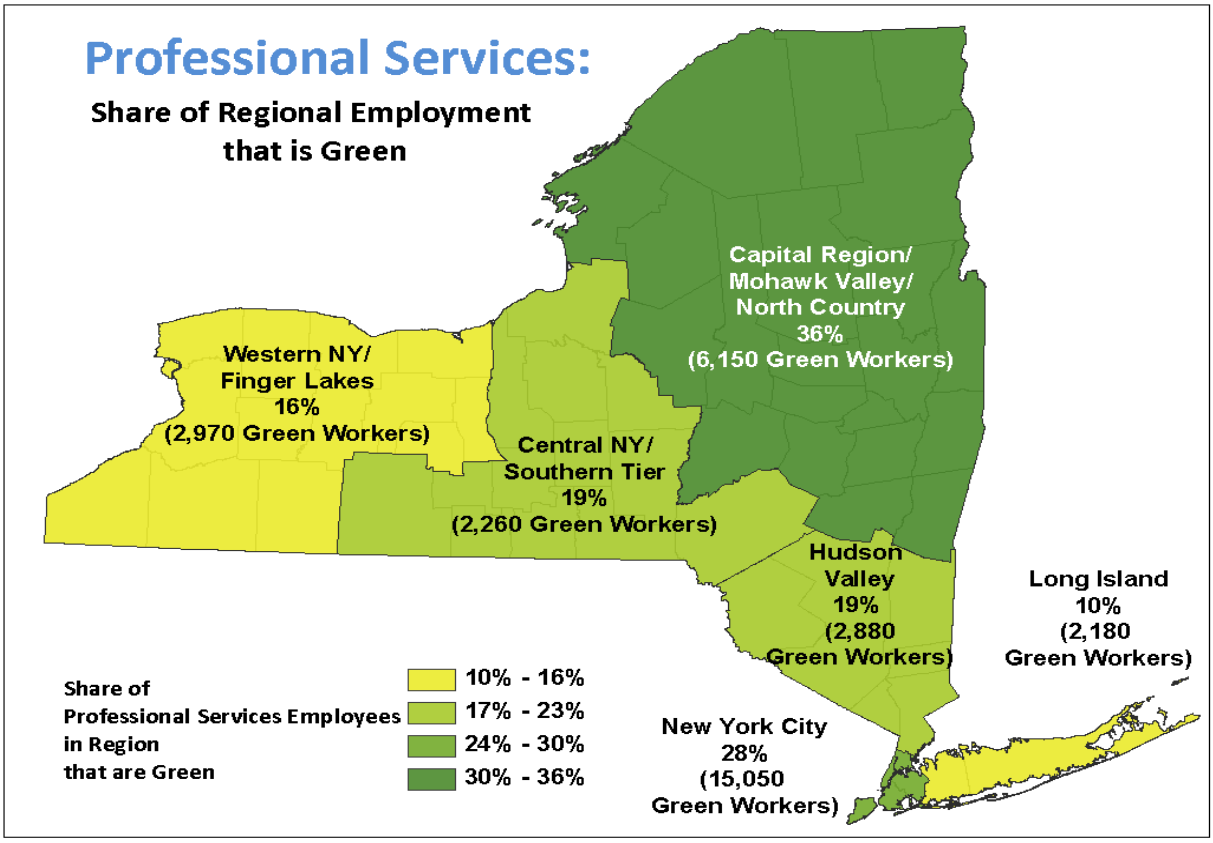
In regions outside New York City, there are fewer professional services firms with green employment but some regional shares are high. For instance, 300 green professional services firms are located in the Capital Region/Mohawk Valley/North County, and comprise 31percent of all professional services firms in the region.



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	2,840	1,340	400	430	300	170	200
Total Number in Cluster	10,300	4,080	2,060	1,510	950	610	1,100
Percent with Green Employees*	**28%**	**33%**	**20%**	**29%**	**31%**	**28%**	**18%**

In terms of the green share of total professional services employment in the state, survey results indicate that 23 percent of the total employment in the sector is green.

As the chart below indicates, green employment in the professional services cluster is heavily concentrated in two regions. New York City has 15,500 green professional services workers – 28 percent of all workers in the cluster – and Capital region/Mohawk Valley/North Country has 6,150 – 36 percent of all workers in the region. Green professional services workers in these two regions combined account for over two-thirds 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	31,490	15,050	6,150	2,880	2,260	2,180	2,970
Regional Employment	138,600	52,910	16,900	15,240	11,620	22,200	18,040
Percent Green*	**23%**	**28%**	**36%**	**19%**	**19%**	**10%**	**16%**

Firms with green employees were asked whether they expected their green employment to be larger, smaller or unchanged a year later. Of the 2,840 Professional Services firms with green employment, 83 percent expected their green employment to grow larger (38%) or remain unchanged (45%).

Firms without green employees were asked whether they expected to have green employment a year later. In answer to this question, 74 percent of the 74,600 without green employment

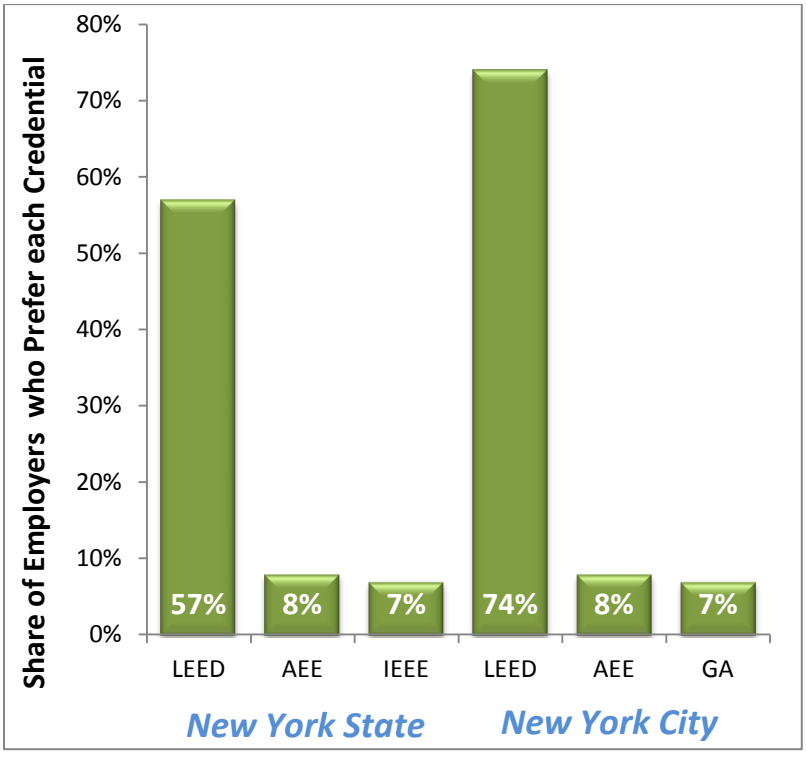
said they did not expect any change, 4 percent expected to have green employees a year later, and 22 percent were not sure.

Composition of Green Workforce. The green economy, while sizable, exists within the larger economy, which is growing very slowly. Employment in the construction industry, in particular, has not yet recuperated from the recession, and this has affected the hiring of architects and some types of engineers. Industry experts report very little hiring of architects at present, and many architecture firms have reduced staff in the last few years.

In general, employers in the focus groups did not view their green workforce as separate from their regular workforce. Although many view a commitment to green or sustainability as an asset in hiring, most provide training on-the-job to make sure that employees have the green skills they need to perform effectively.

Employers were asked in the survey what if any green credentials they prefer their employees to have. As shown in the chart below, 57 percent of the employers with green employees in New York State – and 74 percent in New York City – preferred a Leadership in Energy and Environmental Design (LEED) credential, eight percent prefer an Association of Energy Engineers (AEE) credential, and seven percent prefer an Institute of Electrical and Electronics Engineers (IEEE) credential.

GREEN CREDENTIAL(S) PREFERRED BY EMPLOYERS



AEE	Association of Energy Engineers
GA	Green Advantage
IEEE	Institute of Electrical and Electronics Engineers
LEED	Leadership in Energy and Environmental Design

WHAT IS LEED?

Leadership in Energy and Environmental Design (LEED®) is a rating and certification system for green buildings and an accreditation system for professionals. LEED is a registered trademark with the U.S. Green Building Council (USGBC), a non-profit organization made up of over 13,000 member organizations. LEED was introduced in 1998 and has been revised and expanded several times since that time. The U.S. Green Building Council (USGBC) has developed the LEED® Green Building Rating System™, a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

LEED offers both certification for buildings and accreditation for professionals. For buildings, the LEED standard consists of many different certifications covering new construction, renovations, and building operations. In order to qualify for certification, a building must earn and be awarded at least 40 points for improving performance in areas such as energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. Depending on the number of points received, there are four levels of certification: Certified, Silver, Gold, and Platinum.

LEED rating systems are currently available for new construction, existing buildings, commercial interiors, core and shell, schools, retail and homes. Rating systems are in pilot or under development for neighborhood developments and health care.

LEED Professional Credentials (LEED AP and Green Associate) recognize professionals who have demonstrated a thorough understanding of green building techniques, the LEED green building rating systems, and the certification process. The LEED Professional Credentials program is administered by the Green Building Certification Institute (GBCI), which was established with the support of USGBC to allow for objective, balanced management of the credential program.

SOURCE | www.usgbc.org

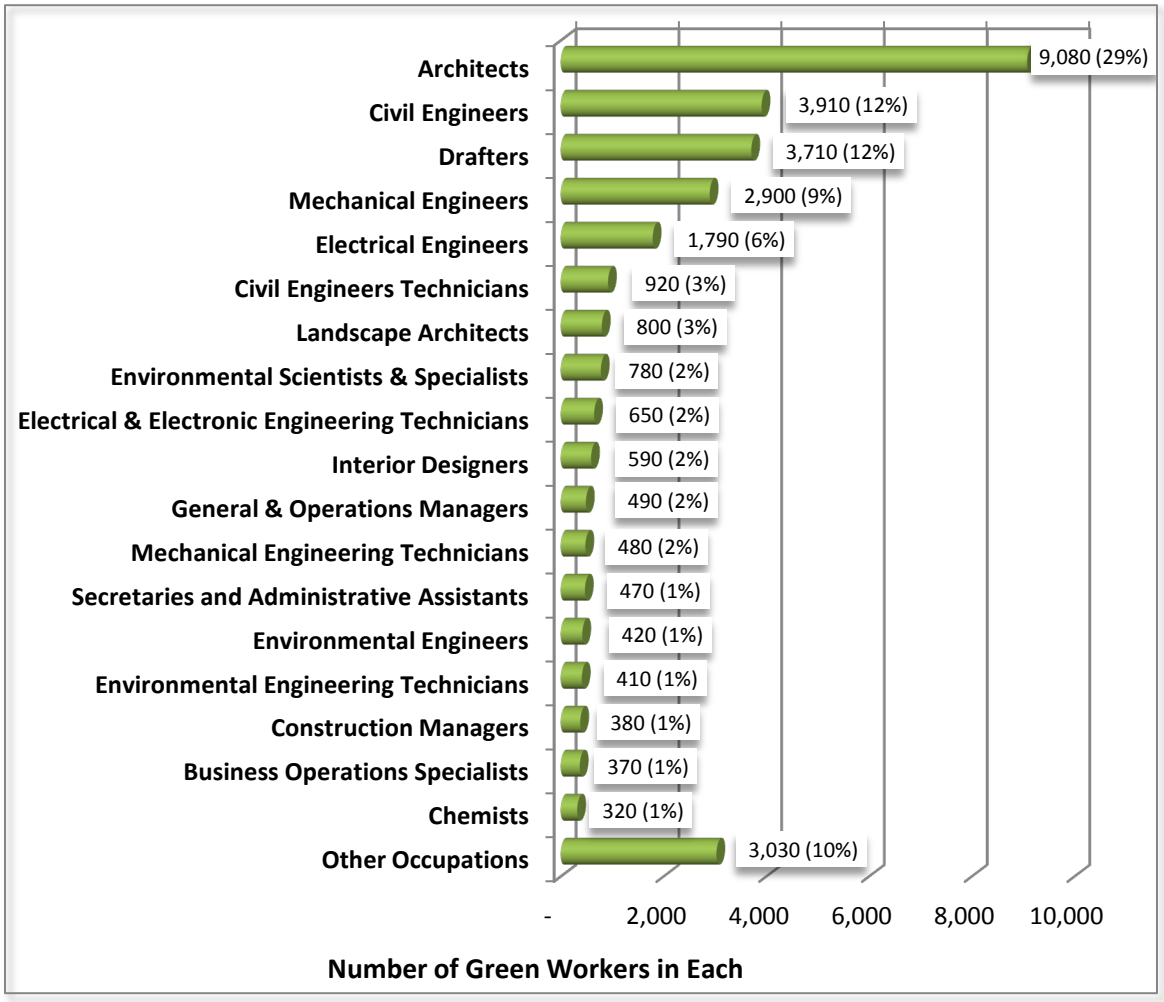
Architects and engineers interviewed in connection with this research indicated that LEED credentials are desirable because their firms work on LEED-registered projects. Some engineering firms also prefer a Master's degree in Energy Management; others consider an energy degree a "plus," but not necessary. Some architecture firms hire individuals without the LEED AP (Tier II) credential but expect new employees to earn the credential within 6 months.

Occupational Information

Key Occupations. As shown in the chart on the next page, the statewide employer survey found that green employment in Professional Services is concentrated in a few occupations – Architects, Civil Engineers, Drafters, Mechanical Engineers and Electrical Engineers. Together, these five titles account for over two-thirds of the cluster's green employment. All of these occupations are involved in delivering energy efficiency products and services.

'Other Occupations' make up 10 percent of the cluster's green employment. 'Other Occupations' includes job titles such as Occupational Health and Safety Specialists, Commercial and Industrial Designers, and Urban and Regional Planners.

GREEN OCCUPATIONS IN THE PROFESSIONAL SERVICES CLUSTER



The jobs mentioned most often by engineering firms represented in focus groups were *energy engineer, design engineer, mechanical engineer, electrical engineer* and *operating enginee*r. One participant pointed out that most energy auditors are mechanical engineers. Architects interviewed mentioned both architects and mechanical engineers as critical to green design. In describing some of these jobs, focus group participants added:

- *Design engineers* need to have the expertise to design and implement energy saving building systems such as lighting systems, plumbing systems, electrical systems, and heating and cooling systems.
- *Energy engineers* look at the entire building—the envelope, the systems, the electrical systems and lighting systems. They model the building and evaluate independent energy conservation measures as well as how they interact with each other. Focus group

participants noted that a great deal of sophistication is needed and that it requires a substantial amount of training. These firms utilize computer-assisted energy modeling, but the right information must be inputted, because if it is not modeled correctly, "you'll get bad information." As one employer said, "These are specialists—I call them energy specialists."

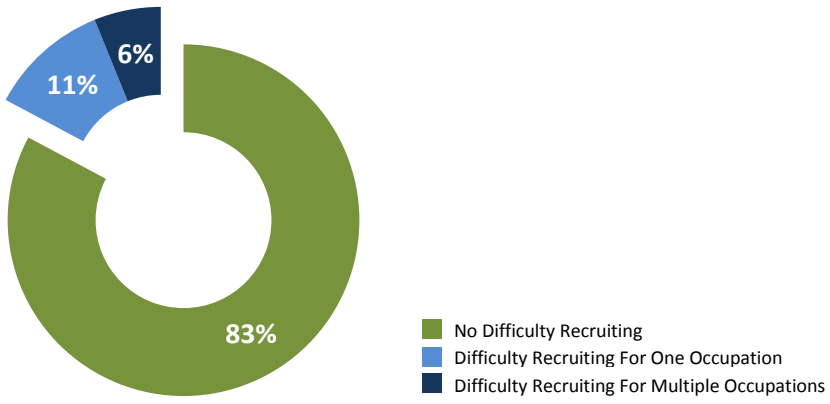
- Representatives of consulting firms mentioned the need for *financial analysts* who understand the relationship of energy to total energy cost.
- Some engineering firms design, manage and run energy efficiency programs and have a need for *program evaluators, measurement and verification professionals,* and *inspectors.*
- Another skill shortage area often mentioned in the employer focus groups was *Heating, Ventilation and Air Conditioning* (HVAC), where companies reported that additional training is needed for HVAC technicians to "take them to the next (green) step."

New York City engineering firms, in particular, indicated that there are opportunities for less-skilled people in the energy audit business, but not in engineering tasks. Citing the huge local building stock, they believed that less skilled people, including returning service people, could carry out a circumscribed auditing regime.

The general feeling among industry experts and focus group participants was that people become more valuable with hands-on experience and that there is no substitute for this. Another observation was that people with commitment to sustainability and broad interest in the field are valued.

Recruitment, Retention and Turnover. As part of the employer survey, green firms were asked whether they have difficulty recruiting qualified workers. Of the 2,840 green firms in this cluster, 17 percent (490) had difficulty recruiting qualified green workers. Six percent had difficulty recruiting for more than one occupation.

PERCENT OF PROFESSIONAL SERVICES FIRMS WITH RECRUITING DIFFICULTIES



The occupation for which employers have the most difficulty finding qualified employees was chemist, where 53 percent of firms report this issue. The second most frequent occupation with recruiting difficulties was Business Operations Specialist, which is the O*NET title that includes Energy Auditor. Occupational recruiting difficulties varied by region, however. The three most difficult to recruit occupations in each region were as follows:

- Capital Region/Mohawk Valley/North Country: Computer Programmers, Application Software Developers, and Chemical Engineers
- Central New York/Southern Tier: Architects, Civil Engineers, and Electrical Engineers
- Hudson Valley: Architects, Electrical Engineers and Mechanical Engineers
- Long Island: Chemists, Chemical Technicians (no other occupation cited)
- New York City: General and Operations Managers, Architects, and Civil Engineers
- Western New York/Finger Lakes: Construction Managers, Architects, and Civil Engineers

Focus group participants from engineering firms said they had difficulty both recruiting and retaining engineers in general. Several suggested that more marketing and outreach is needed to make this field attractive. Some felt that the pay may not be competitive enough to attract qualified candidates to engineering work.

One downstate employer mentioned that geography is important, and that Long Island firms have more difficulty finding and retaining engineers than do firms in Manhattan. Some suggested that higher salaries are needed because of the high cost of living in the New York City metropolitan area. One person believed that engineering salaries would increase in the near term, citing the shortage of talent in the field.

According to focus group participants, a number of people leave engineering to enter higher paying fields such as financial services. There was general agreement that turnover is high in engineering.

Although not typically considered a professional service occupation, focus group employers in New York City cited a shortage of operating engineers, which is the job title typically used in New York City for Stationery Engineers and Boiler Operators. Employers said that many existing operating engineers are older and that it is hard to “change old-timers’ minds about new ways of doing things.” Some said that there are “no young people coming into this field.” Also, it was felt that some of the new technology is too complex for the older workforce, drawing an analogy to auto mechanics that needed to learn how to work with computerized equipment when automotive technology changed. Operating engineers play key roles in both commissioning and retro-commissioning buildings. Employers suggested that there should be courses to improve the skill sets of existing operating engineers.

The major sources of recruitment reported by employers in focus groups and interviews were referrals from people within the company and word of mouth, hiring directly from colleges, and online job boards, such as Monster. Among these sources, however, job boards were seen as the least useful.

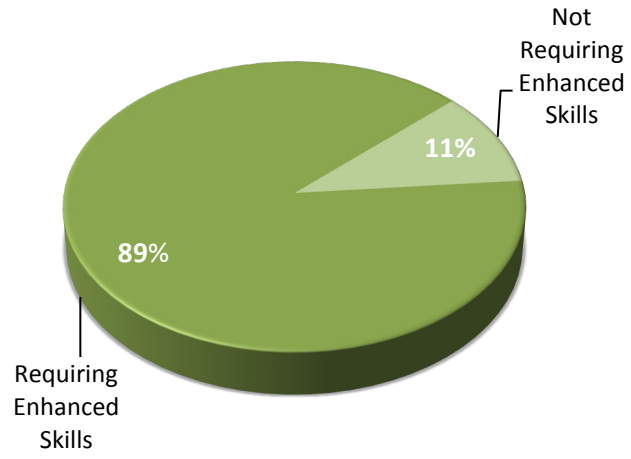
In New York City, some engineering firms reported recruiting employees from City agencies. In fact, one focus group participant had previously worked for the City. In addition, some large

non-profit organizations involved in energy efficiency and weatherization employ similar types of employees to engineering firms that specialize in these same areas.

Colleges mentioned as sources of recruitment included Manhattan College, SUNY schools, Penn State, Rochester Institute of Technology, Northeastern, Rutgers, Columbia, New York Institute of Technology, Stevens Institute of Technology, Massachusetts Institute of Technology, and New York University. There was general agreement that schools that offered degrees in both Architecture and Engineering were ideal. They indicated that the reputation of the school was not as important to them as the degree itself. They also emphasized – as did employers in other industries included in this study – that they value co-op and internship programs operated in partnership with colleges and universities. Focus group participants said that their criteria for hiring includes motivation, hard work, "smarts," commitment, capacity and willingness to learn, and imagination.

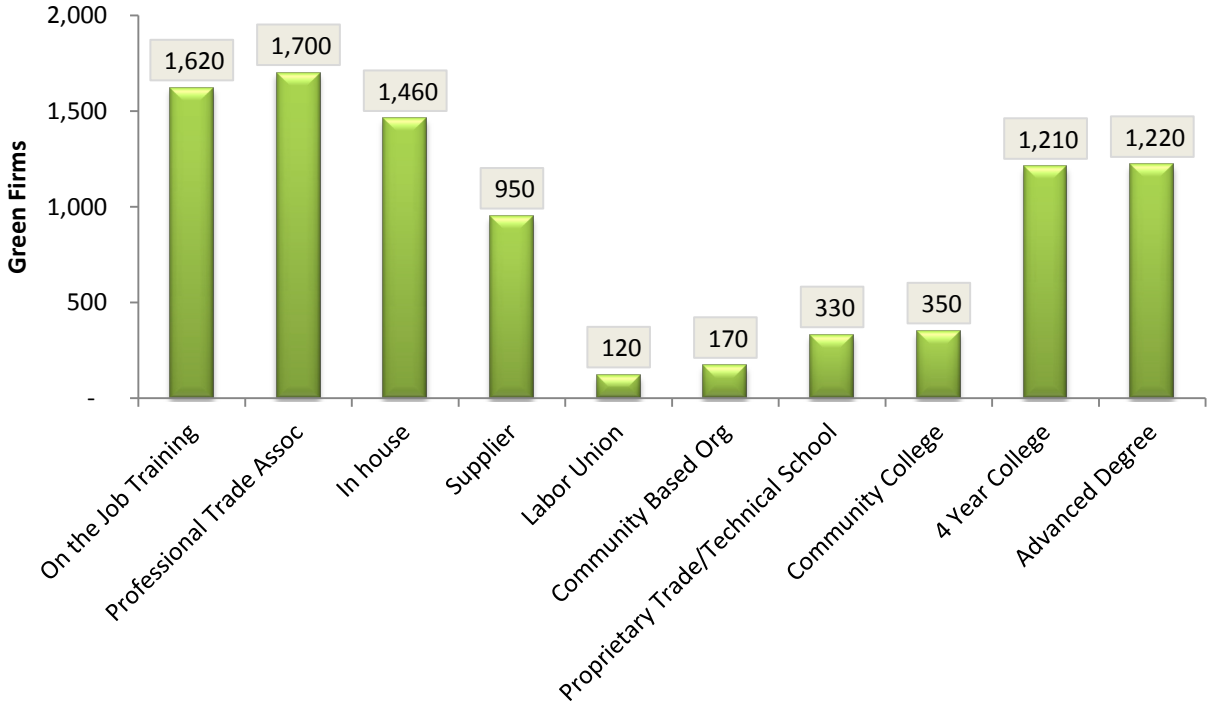
Educational Preparation. In the statewide survey, employers were asked how many of their employees required new skills to be able to perform their work in a green economy, and of those that required skills, where they were acquired. A strong majority, almost nine out of 10 employers with green employment required enhanced skills.

SHARE OF PROFESSIONAL SERVICES FIRMS WITH GREEN EMPLOYMENT REQUIRING ENHANCED SKILLS



As the chart on the next page illustrates, the sources of enhanced skills training ranged from the most informal (on-the-job training) to the most rigorous and formal (advanced degree). The most common sources were professional trade association – most likely LEED accreditation from the U.S. Green Business Council, discussed in greater detail above – and on-the-job training.

SOURCES OF ENHANCED SKILLS TRAINING



Employers that took part in focus groups reported that most training for green "enhanced" skills is on-the-job, with senior people teaching junior people. According to these employers, college graduates come prepared with the "basics," but they need to learn "nuances" to be of key value to the firms.

A key finding of the focus groups is that employers would like help with the cost of training people in new skills. Firms indicated that training can be a huge burden, as it takes time to train junior people who may take their new skills with them to earn more in another firm or another industry.

Specific training needed included energy modeling for energy specialists and LEED EB training in commissioning for Operating Engineers. A number of employers are having trouble finding qualified individuals for energy modeling, and believe that courses in energy modeling should be created by schools.

Commissioning is not easily trained, however, as it requires extensive experience usually gained over a long period of time. Employers added that there is also a special type of training in commissioning or retro-commissioning for LEED, existing buildings. As one focus group participant explained, "The building management system is much more sophisticated. So you need to have the ability to look at operating the systems as efficiently as possible, training the operating engineers who are going to take over the systems."

One focus group participant mentioned that there are energy efficiency programs overseas, but that in the U.S., there are no programs for energy efficiency and that they are needed, especially at the undergraduate level.

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:

- *Offer specific courses* in such topics as cogeneration, photovoltaic, geothermal, energy efficiency.
- *Offer more hands-on practical experience* and more work-study or internship programs.
- *"Green" needs to be woven into standard engineering courses*, e.g. energy auditors should be trained to do field surveys; mechanical engineers should be taught computer energy modeling. Need to teach energy efficiency to undergraduates.
- *Schools should emphasize teamwork and interpersonal skills more than they do*. Several employers noted that technical people need to be able to "sell" additional services and products, and need to be tuned into their customers when they are performing work. Also, teamwork is needed to get LEED certification, because professionals from different disciplines must work together.
- *Schools should expose students to more interdisciplinary work, especially between architects and engineers*. No longer are architects responsible for the way things look and engineers for the way they work. Both disciplines need to work together and understand each other's disciplines. Both architecture and engineering firms said that there is a need for greater integration between the two professions. Both believe that having an integrated design is critical. Architects are focused on the environmental level, engineers on the technical level, but everything is interwoven. The key is to have people who are "integrators," who can translate performance requirements into design solutions.

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.