Economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy use, recycling materials, and developing and adopting renewable sources of energy.

SOURCE | O*NET®, Greening of the World of Work, 2009.
2 Introduction to New York City Green Jobs

What is the Green Economy?

Today’s green movement started decades ago, evolving from grass roots activism to protect the environment into a broad campaign to diversify energy sources, reduce carbon emissions, and improve the quality of life. The movement has brought about areas of real change in the way that many goods and services are produced, distributed and consumed. The term green economy describes these changes in the way business is done and green jobs describes the occupations most affected by emerging green economy. For the purpose of this report, we adopt the definition of the green economy developed by the U.S. Department of Labor in its research report entitled Greening of the World of Work: Implications for O*NET®-
Because it was developed to capture the business processes involved in different industries in general, the national system for industry classification (i.e., the North American Industrial Classification System or NAICS) does not allow us to easily identify green industries. To work around this problem, O*NET® identified 12 green sectors that cut across existing NAICS industries. These sectors are listed and briefly described in Box 1 on page 2.

New York City is particularly well represented in some of these sectors, such as Green Construction, Energy Trading, and Energy Efficiency. Similarly, shifts in the green economy will cause some sectors to grow more quickly than

Box 2: Major Green Credentialing Organizations

<table>
<thead>
<tr>
<th>Credentialing Agency</th>
<th>Acronym</th>
<th>Credentials Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Advantage (Building Professionals)</td>
<td>GA</td>
<td>GA – Residential, GA–Commercial, GA–Commercial and Residential</td>
</tr>
<tr>
<td>Green Building Certification Institute</td>
<td>LEED</td>
<td>LEED Green Associate, LEED Green Fellow (in development), LEED Green AP in Operations and Management, LEED Green AP Homes, LEED Green AP Interior Design &amp; Construction, LEED Green AP Building Design &amp; Construction</td>
</tr>
<tr>
<td>National Association of Home Builders</td>
<td>NAHB</td>
<td>Certified Green Professional</td>
</tr>
<tr>
<td>North American Board of Energy Practitioners</td>
<td>NABCEP</td>
<td>Photovoltaic (PV) Installer Certification, Solar Thermal Installer Certification, and Entry Level Certificate Program</td>
</tr>
</tbody>
</table>

4 Introduction to New York City Green Jobs

The next two sections examine two ways of estimating where and how much green job growth there will be.

**What Are Green Jobs?**

The O*NET® report defines green jobs as “occupations that are affected by green economic activity” in one of the following ways: (1) existing occupations that require a substantial set of additional skills (regardless of demand), (2) existing occupations that are in greater demand, or (3) entirely new and emerging occupations.

**Enhanced Skills.** Green economy activities actually change the work and worker requirements of an existing occupation. The purpose of the occupation stays the same, but tasks, skills, knowledge, and requirements such as licensure have changed. Although these occupations change, they may or may not experience any change in demand.

As the name implies, enhanced skills jobs require specialized education and training. Jobseekers and workforce providers should be aware that employers may show preference to candidates who have professionally recognized credentials as concrete evidence of the additional training. Typically, individuals earn green credentials by studying with an accredited educational institution or training provider and passing a test. Box 3 lists some major organizations and credentials they offer.

It is important to note that these credentialing organizations often require applicants to begin their training with some combination of relevant work experience and educational attainment.

Automotive technicians, and heating, ventilation, and air conditioning installers are examples of enhanced skills jobs. Some of the major credentialing institutions for green jobs are listed in Box 2 on page 3.

**Increased Demand.** The green economy increases the demand for these existing occupations. The increased demand does not entail changes in the work or worker requirements for the occupation although the work context may change. Insulation workers and electricians are examples of increased demand jobs.

**New and Emerging.** Green economy activities generate new occupations with unique work and worker requirements.

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**BOX 3. Examples of New and Emerging Green Jobs**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Auditors</td>
<td>Conduct energy audits of buildings, building systems and process systems. May also conduct investment grade audits of buildings or systems.</td>
</tr>
<tr>
<td>Energy Engineers</td>
<td>Design, develop, and evaluate energy-related projects and programs to reduce energy costs or improve energy efficiency during the designing, building, or remodeling stages of construction. May specialize in electrical systems; heating, ventilation, and air-conditioning (HVAC) systems; green buildings; lighting; air quality; or energy procurement.</td>
</tr>
<tr>
<td>Testing Adjusting and Balancing TAB Technicians</td>
<td>Test, adjust, and balance HVAC systems so they perform as designed.</td>
</tr>
<tr>
<td>Weatherization Installers and Technicians</td>
<td>Perform a variety of activities to weatherize homes and make them more energy efficient. Duties include repairing windows, insulating ducts, and performing heating, ventilating, and air-conditioning (HVAC) work. May perform energy audits and advise clients on energy conservation measures.</td>
</tr>
<tr>
<td>Carbon Credit Traders</td>
<td>Represent companies in the sale and purchase of carbon emissions permits.</td>
</tr>
</tbody>
</table>

Energy auditors and carbon credit traders are examples of new and emerging jobs. Other selected new and emerging occupations are detailed in Box 3 on page 4.

O*NET® based its growth projections within the three categories – enhanced skills, increased demand, and new and emerging – on national estimates of future occupational growth that were developed by the Bureau of Labor Sta-

### TABLE 1. Selected Enhanced Skills and Increased Demand Green Occupations, New York City

<table>
<thead>
<tr>
<th>Title</th>
<th>Green Sectors</th>
<th>Typical Training</th>
<th>Annual Openings</th>
<th>Total Jobs</th>
<th>Projected Growth 2010</th>
<th>2010 Wages Median</th>
<th>Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENHANCED SKILLS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General and Operations Managers</td>
<td>AF EE</td>
<td>BA/BS &amp; work experience</td>
<td>1,080</td>
<td>44,960</td>
<td>-2%</td>
<td>$140,220</td>
<td>$76,420</td>
</tr>
<tr>
<td>Financial Analysts</td>
<td>EE ET GC GR RD</td>
<td>BA/BS</td>
<td>560</td>
<td>24,080</td>
<td>17%</td>
<td>$97,670</td>
<td>$63,210</td>
</tr>
<tr>
<td>Plumbers, Pipefitters, and Steamfitters</td>
<td>GC</td>
<td>Long-term OJT</td>
<td>430</td>
<td>12,670</td>
<td>14%</td>
<td>$56,730</td>
<td>$31,700</td>
</tr>
<tr>
<td>Maintenance and Repair Workers, General</td>
<td>EE EP GC MF RE</td>
<td>Moderate-term OJT</td>
<td>390</td>
<td>45,310</td>
<td>6%</td>
<td>$40,070</td>
<td>$25,810</td>
</tr>
<tr>
<td>Shipping, Receiving, and Traffic Clerks</td>
<td>MF TP</td>
<td>ww</td>
<td>370</td>
<td>15,480</td>
<td>-4%</td>
<td>$29,710</td>
<td>$19,730</td>
</tr>
<tr>
<td>Construction Laborers</td>
<td>GC</td>
<td>Moderate-term OJT</td>
<td>280</td>
<td>16,930</td>
<td>9%</td>
<td>$59,530</td>
<td>$31,810</td>
</tr>
<tr>
<td>Construction Managers</td>
<td>GC</td>
<td>BA/BS</td>
<td>280</td>
<td>11,460</td>
<td>9%</td>
<td>$123,170</td>
<td>$71,770</td>
</tr>
<tr>
<td>Architects, Except Landscape and Naval</td>
<td>GC RD</td>
<td>BA/BS</td>
<td>260</td>
<td>7,040</td>
<td>18%</td>
<td>$80,350</td>
<td>$53,470</td>
</tr>
<tr>
<td><strong>INCREASED DEMAND</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laborers: Freight, Stock, Material Movers</td>
<td>GC MF</td>
<td>Short-term OJT</td>
<td>1,090</td>
<td>34,190</td>
<td>-9%</td>
<td>$25,180</td>
<td>$18,140</td>
</tr>
<tr>
<td>Electricians</td>
<td>GC</td>
<td>Short-term OJT</td>
<td>710</td>
<td>19,520</td>
<td>11%</td>
<td>$86,580</td>
<td>$44,620</td>
</tr>
<tr>
<td>Carpenters</td>
<td>GC</td>
<td>Long-term OJT</td>
<td>500</td>
<td>22,560</td>
<td>9%</td>
<td>$54,730</td>
<td>$32,980</td>
</tr>
<tr>
<td>Bus Drivers, Transit and Intercity</td>
<td>TP</td>
<td>Moderate-term OJT</td>
<td>420</td>
<td>22,080</td>
<td>6%</td>
<td>$55,560</td>
<td>$36,730</td>
</tr>
<tr>
<td>Production, Planning, and Expediting Clerks</td>
<td>MF</td>
<td>Short-term OJT</td>
<td>220</td>
<td>6,960</td>
<td>5%</td>
<td>$46,050</td>
<td>$32,720</td>
</tr>
<tr>
<td>Sup/Mgrs: Mechanics, Installers, Repairers</td>
<td>MF</td>
<td>Related experience</td>
<td>190</td>
<td>7,970</td>
<td>0%</td>
<td>$73,900</td>
<td>$52,950</td>
</tr>
<tr>
<td>Dispatchers,</td>
<td>TP</td>
<td>Moderate-term OJT</td>
<td>130</td>
<td>4,970</td>
<td>-3%</td>
<td>$36,050</td>
<td>$22,740</td>
</tr>
<tr>
<td>Team Assemblers</td>
<td>MF</td>
<td>Moderate-term OJT</td>
<td>130</td>
<td>6,430</td>
<td>-15%</td>
<td>$21,260</td>
<td>$16,870</td>
</tr>
</tbody>
</table>

**SOURCE** | Green Jobs: O*NET, Greening of the World of Work; Occupational projections: NYCLMIS analysis of data from New York State Department of Labor Long-Term Occupational Projections, 2006-16.

**NOTE** | Employment, openings, and growth projections are for all jobs in a given occupation, including those that may not be involved in green economic activity.
6 Introduction to New York City Green Jobs

Until economic conditions and price incentives change to favor investment and technological innovation, policy initiatives can be expected to be the main driver of the green economy and green job growth.

There are somewhat more green jobs and openings in enhanced skills than increased demand occupations, suggesting that people in existing occupations (whether employed or dislocated) will need to obtain training in new skills to meet future demand. Table 1 further indicates that the need for reskilling outweighs growth in existing jobs. Finally, job growth is somewhat concentrated toward the top levels of educational attainment: four out of eight of the most promising “enhanced skills” occupations require a college degree.

Statistical projections are an important piece of the puzzle in estimating future demand. Another piece involves understanding what initiatives and economic events are likely to influence employer demand. As we will see in the next section, these market drivers point to a slightly different mix of jobs and sectors from what is suggested by the statistical projections. The last piece of the puzzle comes from the employers themselves. The final section of the report describes efforts to survey and speak with thousands of New York City employers to ask them whom they employ, and what their hiring prospects look like among other things.

What might help green jobs grow in New York City?

Current thinking identifies three main factors that will determine if the green economy will grow, decline, or stay the same in terms of overall economic activity. Technological Advances. As in many
other sectors, technological innovations drive many activities in the green economy. New green technology lowers performance costs, reduces or eliminates negative ecological impacts and improves the productive and responsible use of natural resources across a variety of goods, services and processes. Some examples of green innovation include photovoltaic (solar) cells, LED lighting, and resource recovery technologies that turn solid waste into an energy source usable by homes and businesses. 

Economic Conditions. Prices and economic trends affect business’ willingness and ability to invest in and adopt new technologies. Households and business owners will adopt new energy technologies only if they become economically feasible. 

Public Policy and Private Sector Initiatives. Policy incentives like tax credits, rebates, direct public spending, grants, and loan guarantees go a long way toward encouraging business owners and consumers to invest in and adopt greener practices. Until economic conditions and price incentives change to favor private investment and technological innovation, policy initiatives can be expected to be the main driver of the green economy and green job growth. 

Current public policy initiatives (such as those listed in Box 4) are driving job development in green sectors. While several firms in New York City are undertaking green initiatives, to date we have not identified any industry-wide initiatives other than the utilities sector’s engagement in green economic activity. Given the current state of the economy, it is reasonable to assume that the private sector will not be the immediate source of green job growth at least in the immediate future.

Numerous city, state, and federal laws have been enacted that encourage greater investment and adoption of green goods and services. The following initiatives are currently under way or on the immediate horizon that will encour-
age green job growth. **PlaNYC 2030** is a mayoral initiative comprising 127 policies and programs intended to improve quality of life and reduce carbon emissions in New York City by 30 percent by 2030. The ambitious plan focuses on five key dimensions of the City’s environment: land, air, water, energy and transportation. PlaNYC initiatives are in various states of development and progress; the entire plan is due for an update in 2011.

One set of programs merits special attention because of it promises to increase demand for skilled auditors, retrocommissioning professionals, and electricians in New York City in the near term. In recognition that 80 percent of the carbon emissions in New York City are from buildings, the **Greener, Greater Buildings Plan** seeks to: (a) reduce carbon emissions from municipal buildings by 30 percent by 2017; and (b) reduce carbon emissions in all buildings by 30 percent by 2030. Greener, Greater Buildings Plan is a suite of laws enacted in December 2009 that changed the City’s building renovation energy code, and requires some large building owners to conduct energy audits, upgrade lighting and meter spaces, and in some cases, implement energy retrofits. The City will use federal stimulus funding to set up Property-Assessed Clean Energy (PACE) financing, a loan fund that makes it easier for building owners to comply with retrofits.5,6

Passed in 2005, Local Law 86 predates PlaNYC. Known as the **Green Building Law**, it requires that new City-owned buildings, additions and renovations meet rigorous standards of sustainability.7

In June 2007, New York City was designated as a Solar America City under the Department of Energy’s **Solar America Initiative**. The goals of the NYC Solar America City Initiative are to reduce barriers to solar power development, support the installation of seven megawatts of photovoltaic capacity by 2015, and create a long-term plan to encourage widespread solar adoption. New York City received $1 million in federal Recovery Act funds in 2009 to
support three enhancements to the solar initiative. The City will develop: 1) a grid that Con Edison can use to distribute solar energy; 2) a finance structure that will make it easier for residents to invest in solar electricity; and 3) a portal to help predict and control energy demand and solar generation.

**Solar Property Tax Abatement.** An incentive program that provides a property tax abatement of 35 percent based on the cost of an installed solar photovoltaic (PV) system in New York City up to $62,500 per year. The abatement is available through 2012.

**Long Island-New York City Offshore Wind Project,** if developed, would locate a wind farm in the Atlantic Ocean 13 miles off the Rockaway Peninsula. If realized, this wind farm would have more than twice the capacity of the first wind farm in the United States, slated for development off the coast of Cape Cod. Partners on the project are Con Edison, the Long Island Power Authority (LIPA), the New York City Economic Development Corporation (NYCEDC), the New York Power Authority (NYPa), the New York State Energy Research and Development Authority (NYSERDA), the Port Authority of New York and New Jersey, and the Metropolitan Transit Authority (MTA).

At the State level, the **Green Jobs, Green New York** law, passed in September 2009, will provide loans for homeowners (up to $13,000) and commercial property owners (up to $26,000) for energy efficiency retrofitting. The funds to support these loans will come from carbon emission credit dollars from the Regional Greenhouse Gas Initiative, described below. With the New York State Department of Labor, NYSERDA will establish workforce-training programs to ensure that there is an adequate number of qualified retrofitting professionals available. Property owners must repay the full loan over time, but energy savings are expected to more than offset the cost of repayment.8

**Home Performance with Energy Star and Multifamily Performance Programs** are the precursors of Green Jobs, Green New York. They provide loans and incentives for residential building owners to undertake retrofits using certified contractors. They are both part of NYSERDA’s New York Energy Smart Program estimated to create over 4,000 retrofit and energy efficiency jobs statewide between 2007 and 2016.9

**The Regional Greenhouse Gas Initiative.** The first mandatory cap-and-trade program in the United States with a target to reduce greenhouse gases by 10 percent in Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

The national **Weatherization Assistance Program** helps low-income families permanently reduce their energy bills by improving their homes’ energy efficiency. New York City has tentatively allocated more than $91 million in Recovery Act funds to 15 weatherization providers.

Although public policies enable investment and spur many-larger scale
With the introduction of the many aggressive policy initiatives that target weatherization, building retrofits and other forms of energy efficiency work in New York City, there is promise for strong occupational growth in the Energy Efficiency and Green Construction sectors.

initiatives, New York City’s private sector utilities, venture capital, and other financing entities will have to make substantial investments if the green economy is to experience robust growth.

Customers served by Con Edison in Queens will participate in the Smart Grid Initiative. Con Edison will install 1,500 smart meters, and another 300 customers will be eligible for in-home monitors that allow customers to track and manage their own energy use. Con Edison will also install intelligent underground systems that use technology to find problems on the grid and fix them more quickly.

Verdant Power’s Roosevelt Island Tidal Energy project in New York City’s East River was launched in 2002 as a pilot for generating electricity from the river’s tidal energy. It is the world’s first grid-connected array of tidal turbines able to produce 80 megawatts of electricity for commercial uses. It completed its demonstration phase in 2008 and is now being built out to produce commercial power on a megawatt scale.  

The introduction of many aggressive policy initiatives that target weatherization, building retrofits and other forms of energy efficiency work in New York City, hold promise for strong occupational growth in the Energy Efficiency and Green Construction sectors. The jobs that stand to gain the most from these initiatives include energy auditors and raters, retrofitting professionals (construction trades and installers), utilities workers, and building services occupations (maintenance and facilities workers).

**NYCLMIS Green Jobs Study**

Earlier this year, the NYCLMIS began to measure employer demand for green skills and the capacity of current educational and training offerings to prepare the labor supply in New York State. The project is part of a statewide partnership with the New York State Department of Labor, Stony Brook University’s Advanced Energy Research and Technology Center, and University of Albany’s Energy and Environmental Technology Applications Center. The NYCLMIS is conducting the New York City portion of the project.

The study will determine whether there is an adequate match between employer demand for green skills (in existing and new jobs) and the educational and training opportunities in New York City. Study activities in New York City will include surveys and interviews with employers, employer associations, labor unions, and other stakeholders. NYCLMIS will also survey and con-
duct focus groups with education and training providers and analyze relevant CUNY degree and nondegree programs with its partners. The project focuses on green economic activity in six industry clusters: construction, energy and environmental-related manufacturing, electric power generation, transmission and distribution, professional services, financial services and building services. Skills needed by non-profit organizations that operate New York’s Weatherization Assistance Program will also be identified. Of particular focus, will be the City’s workforce needs resulting from the recently enacted suite of laws known as the Greener, Greater Buildings Plan.

The research project is supported by a competitive grant from the United States Department of Labor’s Employment and Training Administration made possible through the American Recovery and Reinvestment Act of 2009, with additional support from CUNY’s Office of Adult and Continuing Education and the New York City Workforce Investment Board. Local partners in the study include the New York City Workforce Investment Board (WIB), the New York City Employment and Training Coalition, and CUNY’s Offices of Adult and Continuing Education and Institutional Research and Assessment. Preliminary results of the study are expected before the end of 2010, with the final report projected for release in the Summer of 2011.
ENDNOTES

1. This report borrows heavily from an internal document prepared by Pamela Corbett, formerly with the New York City Workforce Investment Board (NYCWIB) with assistance from the NYCLMIS. Another important, publicly available source for this report was Cha, J.M. and J. Dafoe, New York City Green-Collar Jobs Roadmap. A report by Urban Agenda and the Center for American Progress.


3. A complete list of New York City green occupational projections appears on the NYCLMIS website along with this report.


5. Local Laws 084, 085, 087, and 088, were enacted as a package on December 9, 2009. For more information, go to http://legistar.council.nyc.gov.

6. In November 2009, New York State passed legislation that authorizes municipalities to create property assessed clean energy (PACE) program using federal grant assistance or federal credit support. In a PACE program a municipality sets up a special clean energy finance district capable of issuing low-interest bonds. Building owners opt into these districts and can use the bond money for energy audits, renewable energy feasibility studies, the installation of renewable energy systems, and cost-effective and permanent energy efficiency improvements. The loans are repaid through a 15-20 year annual assessment on property taxes. (Sussman, M., "Keeping PACE: How NY municipalities can implement a property assessed clean energy program to make use of available federal funds to reduce energy use," State of the Planet, March 17, 2010) In April 2010, the U.S. Department of Energy awarded $40 million to support PACE financing to New York State’s Energy Research and Development Authority (NYSERDA), New York City, and some Westchester municipalities. To be implemented, City Council must adopt an ordinance in the city code creating the energy-financing district.


About the NYCLMIS

The New York City Labor Market Information Service (NYCLMIS) provides labor market analysis for the public workforce system. The service is a joint endeavor of the New York City Workforce Investment Board (WIB) and the Center for Urban Research at The Graduate Center of the City University of New York. The NYCLMIS’ objectives are to:

■ Develop action-oriented research and information tools that will be used by workforce development service providers and policy makers to improve their practice.
■ Be the portal for cutting-edge and timely labor market data about New York City.

The NYCLMIS primarily serves the program and policy needs of the public workforce system. The NYCLMIS creates research and associated products that are of service to the broader practitioner and policy communities in their day-to-day and strategic decision-making. These products help distill, frame, and synthesize the volumes of data available for the practical use of the public workforce system’s partners and stakeholders, with the overall goal of raising public awareness of the importance of workforce development in New York City.

About the WIB

The New York City Workforce Investment Board (WIB) administers the federal Workforce Investment Act funds in New York City and oversees the public workforce system run by the Department of Small Business Services and the Department of Youth and Community Development. The WIB is made up of over 40 volunteer members, appointed by the Mayor, representing local businesses, educational institutions, labor unions, community-based organizations, and other government agencies.

About the Center for Urban Research

Working with the City University of New York Graduate Center’s faculty and students, the Center for Urban Research organizes basic research on the critical issues that face New York and other large cities in the U.S. and abroad; collaborates on applied research with public agencies, non-profit organizations, and other partners; and holds forums for the media, foundations, community organizations and others about urban research at The Graduate Center of the City University of New York.
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