

Green Collar Jobs
Roundtable

Briefing
Packet

June 24, 2008

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Tuesday, June 24, 2008
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Urban Agenda, the New York City Central Labor Council and the New York City Environmental Justice Alliance have convened the Green Collar Jobs Roundtable in response to the growing need for workers with the green skills to make New York City more environmentally sustainable.

Participating in this first roundtable discussion are committed to growing a green collar workforce. All of you bring invaluable expertise and knowledge. We all also have variable levels of knowledge about environmental sustainability, in general, and each others work, in particular. Our objective is to ensure that all voices around the table are heard.

The briefing packet provides baseline information that should be useful to our discussion. It primarily contains excerpts from some of the many fine descriptions and publications prepared by others as well as the *Growing Green Collar Jobs* report Urban Agenda prepared for the New York City Apollo Alliance.

The materials focus on why this is a propitious moment for green job workforce development, basic definitions of green jobs and the sectors in which they are needed, and ways these needs can be met.

We know you are busy and have different needs for information. The following is an outline of the contents, so that you can pick and choose what you want to read:

Section I – Introduction (page 4-12)

“Introduction” excerpted from *Growing Green Collar Jobs: Energy Efficiency*, Urban Agenda for New York City Apollo Alliance, 2007.

“Green-Collar Jobs – A Definition” excerpted from *Green-Collar Jobs in America’s Cities: Building Pathways out of Poverty and Careers in the Clean Energy Economy*, Apollo Alliance and Green for All with Center for American Progress and Center on Wisconsin Strategy, 2008.

“The Vision” excerpted from *Community Jobs in the Green Economy*, Apollo Alliance and Urban Habitat, 2007.

“The Terms: A Green Jobs Glossary” excerpted from *Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy*, Center on Wisconsin Strategy, The Workforce Alliance, Apollo Alliance, 2008.

“Creating a Green Collar Workforce” excerpted from *Clean, Secure Energy and Economic Growth: A Commitment to Renewable Energy and Enhanced Energy Independence (the First Report of the Renewable Energy Task Force to Lieutenant Governor David A. Paterson)*, 2008

Section II – The Jobs (pages 13-24)

Examples of Green Collar Jobs

“Job Opportunities in a Green Economy” excerpted from *Job Opportunities for the Green Economy: A State-by-State Picture of Occupations that Gain from Green Investments*, Blue-Green Alliance, 2008.

“Energy Efficiency Jobs At-A-Glance” excerpted from *Greener Pathways*

“Fact Sheet: Jobs from Renewable Energy & Energy Efficiency,” Environmental and Energy Study Institute, 2008

Section III – How to Grow Green Collar Jobs (page 25-44)

“Policy Principles for Green Jobs Initiatives” excerpted from *Greener Pathways*

Green Collar Workforce Development Program Models:

International: Germany

US: Washington State; Oakland, CA; Los Angeles; Chicago; Richmond, CA; Newark, NJ

New York City:

Consortium for Worker Education/Central Labor Council Training Center

The Association for Energy Affordability

SEIU 32BJ Thomas Shortman Training Program

Building Works

Sustainable South Bronx

Youth Ministries for Peace and Justice

New York City Department of Parks & Recreation

US Green Building Council, NYC Chapter

City University of New York (Material courtesy of Suri Duitch, City University of New York)

“Federal Programs and Resources” excerpted from *Greener Pathways*

Introduction

Introduction

Excerpted from: "Growing Green Collar Jobs: Energy Efficiency",
Urban Agenda, Nov. 2007



Over the next two decades, New York City will become home to an anticipated one million new residents. But New York City's stretched and aging infrastructure, overburdened electrical grid, and limited open space are not even meeting current needs. The likely effects of global warming could put further

strain on these resources, seriously affecting how New Yorkers live and work, and how the City operates. At the same time, long-standing problems — income inequality, lack of affordable housing, poor air quality, the growth of low-wage jobs, and joblessness — are intensifying.¹

These challenges do not exist in isolation. Economic inequality and environmental degradation are interconnected and require a coordinated response. In fact, as we address environmental problems, there exists a tremendous opportunity to create good jobs and shared prosperity across all five boroughs.

The City is already considering a number of farsighted legislative and policy initiatives that could help make this potential a reality. On Earth Day, Mayor Bloomberg announced PlaNYC 2030, a set of 127 separate initiatives designed to meet ten major goals, from ensuring that every New Yorker lives within a ten-minute walk of a park to reducing greenhouse gas emissions 30 percent by 2030.² Created with input from a diverse group of civic leaders, PlaNYC builds upon prior initiatives like Local Law 86, the recently revised building code, and decades of community-based advocacy.

To fully realize PlaNYC 2030's motto of a "greener, greater New York" and truly capitalize on going green, New York City must make certain that the jobs created by PlaNYC 2030 are "green collar jobs."

A green collar job is more than simply a job in an environmental field. It also provides a family sustaining wage, safe working conditions, and chances for career advancement. Only by creating green

collar jobs can the City truly confront both its environmental and economic challenges.

Whether as retooled existing jobs or new professional categories, green collar jobs present a new paradigm for equitable economic development. Green collar jobs are accessible both to current workers and to those New Yorkers often shut out of the job market — youth, people of color, and the court-involved. With adequate training and strong job standards, green collar jobs can offer pathways out of poverty for New York City’s growing number of jobless and underemployed, as well as opportunities for existing workers to advance in their professions.¹³

Green collar jobs allow workers to contribute to the health of their communities. And because the

bulk of green collar jobs in New York City would involve transitioning existing infrastructure to greater sustainability, they are not outsourceable. Improving the energy efficiency of an existing building in New York City, replanting an

urban park, or cleaning up a contaminated piece of land simply cannot be done elsewhere.

Many green collar jobs build on the skill base of the existing workforce. For example, improving a building’s energy efficiency may require new techniques and new technology, but the jobs involved are rooted in existing engineering and construction skills.

Without a trained green collar workforce, greening New York City’s infrastructure and building local, green industries will be difficult. In addition, with many skilled workers nearing retirement, a new generation of skilled workers needs to be trained. It is imperative that these workers have the cutting-edge, sustainable job skills of the future.¹⁷

The vision of prosperity through sustainability motivates the New York City Apollo Alliance, a coalition of labor, business, environmental protection, environmental justice, and civic leaders convened by Urban Agenda. NYC Apollo has developed *Growing Green Collar Jobs*, a series of reports that will provide a ground’s eye view of the jobs that already

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Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of background or status, in the development, implementation, and enforcement of environmental laws, regulations, and policies. The environmental justice movement responds to the reality that power plants, landfills and other environmental hazards are often sited in low-income communities and communities of color without their participation in the decision-making process.¹⁴

Environmental justice has also come to mean the equitable distribution of the benefits of the green economy: green collar jobs, community reinvestment, and clean technology.¹⁵ Organizations like the Ella Baker Center in Oakland, Strategic Concepts in Organizing and Policy Education (SCOPE) in LA, Sustainable South Bronx, the United Puerto Rican Organization of Sunset Park (UPROSE), and Urban Agenda recognize that green collar jobs can help redress past injustice while creating economic opportunity.¹⁶

exist, the opportunities for job growth, and factors currently limiting green collar development in

- Energy efficiency and energy management for existing buildings;
- Automotive retrofits;
- Landscaping, urban forestry, waterfront restoration, and green roofs;
- Clean energy: renewable energy systems (solar photovoltaic, solar thermal, geothermal, small wind, landfill gas, anaerobic digesters, and tidal power), biofuel production, and cogeneration;
- Recycling;
- Deconstruction, recycling of building construction waste, and reuse of building materials; and
- Brownfield remediation.¹⁸

This report, ***Growing Green Collar Jobs: Energy Efficiency***, is the first in this series. It focuses specifically on green collar opportunities in one of the largest, fastest growing, and most promising green industries for New York City: improving the energy efficiency of existing buildings.

Ultimately, the key to growing green collar jobs will be leadership from all sectors — government, business, labor, and civil society — in supporting green industry development and ensuring that green jobs are good jobs. *Growing Green Collar Jobs* calls on the City Council and the Administration to embrace this opportunity and make the creation of green collar jobs a cornerstone of New York City’s sustainable future.



GREEN-COLLAR JOBS — A DEFINITION

Green-collar jobs, as we define them, are well-paid, career track jobs that contribute directly to preserving or enhancing environmental quality. Like traditional blue-collar jobs, green-collar jobs range from low-skill, entry-level positions to high-skill, higher-paid jobs, and include opportunities for advancement in both skills and wages.

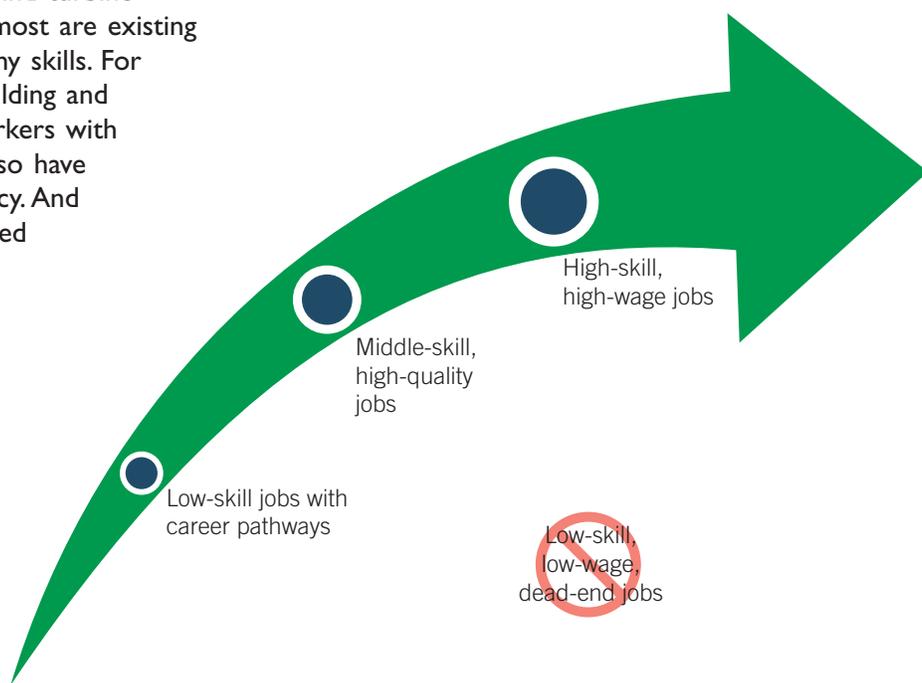
Green-collar jobs tend to be local because many involve work transforming and upgrading the immediate built and natural environment—work such as retrofitting buildings, installing solar panels, constructing transit lines, and landscaping.

Green-collar jobs are in construction, manufacturing, installation, maintenance, agriculture, and many other sectors of the economy. A number of recent publications describe these jobs in detail (see “Resources” section). While some green-collar jobs (e.g. wind turbine technician) are in new occupations, most are existing jobs that demand new green economy skills. For example, construction companies building and retrofitting America’s cities need workers with traditional construction skills who also have up-to-date training in energy efficiency. And employers doing solar installation need workers with conventional electrical training, in addition to specialized solar skills.

Because the phrase “green-collar job” has been bandied about so much lately, it is important to emphasize once again what we mean—or rather, what we do *not* mean—when we use this term. Put simply, if a job improves the environment, but doesn’t provide a family-supporting wage or a career ladder to move low-income workers

into higher-skilled occupations, it is not a green-collar job. Such would be the case with workers installing solar panels without job security or proper training, or young people pushing brooms at a green building site without opportunity for training or advancement.

In sum, spurring the creation of green-collar jobs in your community means more than creating short-term work on individual green projects. It means building a sustainable economy, where environmental goals go hand in hand with social and economic goals. It means embracing visionary policies for your community, mobilizing all of the resources at your disposal to meet those goals, and explicitly working to expand the number of long-term, high-quality green-collar jobs for local residents.



I. THE VISION

The Vision for a Green Economy and Equitable Development

America's energy economy is not working. Our addiction to fossil fuels has dire consequences, from global warming to roller coaster energy bills to expensive power outages that cripple our business economy. Meanwhile, low-income urban communities—the sites of most of our dirty power generation—continue to be plagued by poor education and health, high crime, limited employment opportunities, and a diminishing affordable housing stock.

For years, many people saw these situations as unrelated. However, it has become clearer and clearer that investing in clean energy technology can also create good jobs, and that these jobs are clustered in high-density urban areas. An early Apollo Alliance study shows that major national investments in the four priority areas—renewable energy, alternative cars and fuels, high performance buildings and infrastructure, and equitable development—would result in almost three and a half million “green jobs” for Americans. “Green jobs” are those that are directly related to local investments in energy efficiency, renewable energy, and renewable fuel sectors. For instance, a city that decides to install a wind turbine to generate clean power creates “green jobs” in every sector of the wind industry, from component part manufacturing to turbine installation to sales to operating and maintenance. Because the wind turbine is located in the city, many of these jobs are local. Moreover, many of these jobs, especially in the construction and manufacturing sectors, do not require a college degree but are relatively high-wage. Thus the clean energy economy has the potential to provide valuable opportunities to the millions of unemployed and displaced workers who live in our communities.

Vision:

A green economy that benefits all Americans and is strong enough to lift people out of poverty

If cities want to realize this potential, policymakers and communities must explicitly ensure that the benefits of the clean energy economy include low-income workers and people of color. As the green economy continues to grow, it is important to ask some hard questions, including:

- What makes for a successful green economy?
- Who benefits from green economic development policies and practices?
- What policies and practices will ensure that green jobs will go to the under- or unemployed in our low-income communities?

Unless cities candidly address these issues, much of the green economy's most important features, including the opportunity to create decent jobs for low-income Americans, will be lost. For this reason, Urban Habitat and the Apollo Alliance are committed to advancing a green economy that is rooted in the principles of equitable development. Equitable development is premised on the notion that a city's development practices result in affordable housing, safe, reliable public transit, living-wage jobs, quality education, a clean environment, and quality health care for all city residents. In practice, equitable development goes beyond the physical development of a place—for example, the construction of various types of buildings, placement of buildings, and activities within those buildings. Truly equitable development must also meaningfully engage residents, workers, community organizations, businesses, and organized labor in planning and decision-making processes, before the first brick is laid.

Equitable green economic development presents a unique opportunity to address three essential goals simultaneously: a healthy environment, a vital economy, and social equity. We hope this report helps illustrate how that opportunity can become reality.

THE TERMS: A GREEN JOBS GLOSSARY

In order to help states develop green jobs, we must first define them. We must also describe the building blocks that create and sustain them. For just as we find that green jobs are not necessarily new jobs, but often traditional occupations in industries reinventing themselves for the new energy economy, we argue here and elsewhere that related employment and training programs should be integrated into existing economic and workforce development systems. Advocates, practitioners and policy-makers in the coming decade will need to use those systems to connect workers to the emerging green economy, and link alternative energy employers to a trained—and where necessary, green-skilled—workforce. To help them do so, the following glossary attempts to clarify the sometimes vague or obscure terms that define a high-road approach to green job development.

Green Jobs

“Green jobs” and “green-collar jobs” are evocative and potentially galvanizing terms; they are also notoriously ambiguous. For the purposes of this report, “green jobs” or “green-collar jobs” are family-supporting jobs that contribute significantly to preserving or enhancing environmental quality. Defined more by industry than occupation, they reside primarily in the sectors that make up the clean energy economy—efficiency, renewables, alternative transportation, and fuels.¹⁰

Some of these jobs seem intuitively green: solar panel installers, wind tower mechanics, biofuel technicians. Many do not. A machinist punching parts for wind turbines may also punch parts for decidedly less green purposes, and her work may not look different from a job across town producing components for an oil refinery. As this report seeks to make clear, creating a new energy economy will involve creating some brand new industries and many brand new jobs. But even more of it will involve transforming the industries and jobs we already have. From a workforce development perspective this means less focus on creating courses of study and curricula from scratch, and more on embedding green curricula for green skills into existing programs.

Most green-collar jobs are and will be middle-skill jobs requiring more than high school, but less than a four-year degree. Clearly many PhDs, financial analysts, and engineers hold green jobs and directly contrib-

ute to the building of a green economy. But publicly-funded workforce development projects should promote green-collar jobs accessible to those with less than a BA. These jobs represent the bulk of employer demand and range from entry-level to high-wage jobs in a multitude of industries, including renewable energy, energy efficiency, and biofuels. Within these industries, green-collar work includes building, construction, assembly, installation, operation, maintenance, transportation, and manufacturing.

Green jobs thus defined can be significantly affected by state policy and meaningfully supported by established workforce development systems. Given the exploding interest in green jobs, and the real potential for their development, we need to consider where the lack of a trained workforce might hinder the regional development of a given industry, where state policies might be effective in shaping related employment and training programs, and where the potential size of the industry merits sustained public efforts to leverage private investment.

Good Jobs

A green job is a good job. Throughout this report, and indeed we hope, infused in all discussions of the clean energy economy is a green vision of a stronger environment and a stronger American middle class. If we focus only on environmental content, to the exclusion of job quality, we risk affirming day laborers installing solar panels without job security or proper training, minimum wage workers toiling in a clean tech manufacturing facility without healthcare or the right to organize, and youth pushing brooms at a green building site without training or opportunity for advancement.

A good job pays more than a poverty wage, or more than about \$10 an hour.¹¹ But there is more to it than that. Good jobs offer benefits, at least health-care and ideally pensions, paid sick leave, safe working conditions, reasonable schedules, organizing rights, and a modicum of job security. And because low-road economic practice condemns a substantial number of Americans not just to short-term, low-wage jobs, but also to long-term poverty traps, a good job is one with an accessible pathway to advancement.¹²

SECTION FOUR

CREATING A GREEN COLLAR WORKFORCE

The development of a successful clean energy economy in New York State will require a well-trained clean energy workforce to design, install and maintain these new technology systems. The quality of workforce training and maintenance of skilled industry jobs will be a key component in attracting clean-tech companies and building robust markets for renewable energy and energy efficiency technologies.

According to the National Association of Energy Services Companies, investments in the training of just building maintenance workers, superintendents, and engineers could improve the operations of sophisticated heating and cooling systems by as much as 10 percent. These small improvements would save millions of dollars in energy costs each year in large public, industrial, and commercial buildings.

There are two main reasons why renewable energy technologies offer an economic advantage: (1) they are labor-intensive, so they generally create more jobs per dollar invested than conventional electricity generation technologies, and (2) they use primarily indigenous resources, so most of the energy dollars can be kept at home.

According to a 2007 report released by the American Solar Energy Society, renewable energy industries today amount to nearly \$1 trillion in revenue in the United States, generating more than \$150 billion in tax revenue at the federal, state and local levels.³¹ The report indicates that, by 2030 the renewable energy and energy efficiency industries could create 40 million jobs, and generate up to \$4.5 trillion in revenue in the United States.³² This will only be achieved, however, through adequate public policy initiatives (including a renewable portfolio standard), renewable energy incentives, public education, and research and development. These jobs will not be just engineering-related, but will include millions of new manufacturing, construction, accounting and management positions. Solar, wind, ethanol, fuel cells and energy efficiency are likely to be the largest areas of growth within the industry.

While the potential for growth in this sector is tremendous and could provide literally hundreds of thousands of new jobs, there are challenges which need to be addressed. A 2006 study from the National Renewable Energy Lab (NREL) identified the shortage of skills and training as a leading non-technical barrier to renewable energy and energy efficiency growth. The Study identified a number of critical unmet training needs, including lack of reliable installation, maintenance, and inspection services, the shortage of key technical and manufacturing skills, and failure of the educational system to provide adequate training in new technologies.³³ The American Public Power Association estimates half of current utility workers will retire within the next decade, leaving the United States without enough trained new workers to fill their places. In addition, the number of high school graduates with technical training has declined by 35 percent over the last decade, which further exacerbates this trend.³⁴

³¹ Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century; American Solar Energy Society, 2007.

³² Ibid.

³³ R. Margolis and J. Zuboy, Non-technical Barriers to Solar Energy Use: Review of Recent Literature, National Renewable Energy Lab, September 2006 (NREL/TP-520-40166).

³⁴ Workforce Planning for Public Power Utilities: Ensuring Resources to Meet Projected Needs, American Public Power Association, 2005.

The NYS Office of the State Comptroller estimates that the production of renewable energy to meet the State's RPS goal could generate up to 43,000 new jobs here in-state.³⁵ New York has begun to take steps to train a clean energy sector workforce through NYSERDA and select academic institutions.³⁶ However, if New York is going to bolster its energy efficiency and renewable energy initiatives to meet our set goals, the State must simultaneously bolster its effort to rapidly increase this sector to adequately meet both near- and long-term future demands. In addition, training initiatives within the state should be done through a collaborative effort to utilize training curriculums, existing facilities, ensure consistent training quality standards, and to track the workforce sector to identify those areas where more attention is needed.

➤ EXPAND TRAINING PROGRAMS TO SUSTAIN A GREEN COLLAR WORKFORCE

The State should align and expand existing accredited training programs to recruit and develop an abundant supply of highly skilled workers who can design, install and maintain renewable energy and energy efficiency systems in New York. A skilled workforce, combined with other quality assurance measures, will reinforce public trust of these technologies. The steps needed to accomplish this include:

- Directing the Department of Labor, with collaboration from NYSERDA, the State Education Department (SED), the State University of New York (SUNY) and the City University of New York (CUNY), and other appropriate entities, to immediately undertake an inventory of existing workforce training programs and streamline such efforts to utilize existing resources in the most optimal manner;
- Expanding existing NYSERDA programs for installer certification to maintenance and operation of large-scale renewables and additional small scale renewable technologies such as small wind, solar thermal, biomass and anaerobic digestion systems;
- Providing resources for New York's universities, community colleges, and other accredited training organizations to establish curriculum and training programs to re-train the existing workforce and to develop the skills of students entering the job market;
- Identifying strategies and best practices for retaining qualified green collar workers;
- Targeting residents of disadvantaged communities and MBE/WBE's; and,
- Directing the Department of Labor, with collaboration from NYSERDA, SUNY and CUNY, and other appropriate entities, to annually report to the Executive and the Legislature on green market workforce trends.

³⁵ Energizing the Future: The Benefits of Renewable Energy for New York State, New York State Office of the State Comptroller, March 2005 (Report 12-2005).

³⁶ NYSERDA has programs for PV installer certification and curriculum accreditation, Energy Smart Students Program, and a \$10 million Renewable Energy Technology Manufacturing Incentive Program. SUNY Delhi, SUNY Farmingdale, Hudson Valley Community College, and Bronx Community College offer PV training/installation workshops. HVCC provides the baseline training for the Building Performance Institute's (BPI) Building Analyst; Envelope, Heating, and Cooling Professional certifications; the HERS Rater certification process, basic computer training, trade-related math skills and sales/marketing training.

The Jobs

EXAMPLES OF GREEN COLLAR JOBS

Building retrofits:

A building retrofit is an electrical, mechanical, and/or structural upgrade aimed at increasing energy efficiency, improving indoor air quality, or mitigating greenhouse gas emissions. Building retrofits entail a wide range of physical labor—from replacing boilers to caulking around windows to installing light sensors—as well as assessments of energy use and system performance. Although retrofit work varies, job titles generally include Carpenters, Electricians, Glaziers, Insulators, Laborers, and Roofers.

Additionally, retrofits require a pre-assessment (also known as an energy audit). Auditors or Assessors have backgrounds in building science, but their skills range depending on the size of the buildings. Assessing smaller buildings and 1–4 family homes requires knowledge of blower doors to test air and heat flow, manometers to measure fluid pressure, and infrared photography to examine insulation — as well as familiarity with energy modeling software. Auditing a larger building requires an analytical understanding of, and familiarity with, the controls for complex systems, such as large heating, ventilation and air-conditioning (HVAC). The level of skill and background required to do the physical improvements of a retrofit varies, ranging from specialized electrical work to more general laborer work. New York City’s building retrofit market is set to expand considerably in light of rising energy costs, an overtaxed electricity distribution grid, and policies aimed at mitigating climate change—79 percent of New York City’s greenhouse gas emissions come from existing buildings. NYSERDA (New York State Energy Research Development Authority) incentives and programs will also play a continuing role.

Energy efficient building maintenance:

Energy efficient building maintenance is the proper operation of new, energy-efficient equipment and systems and existing building equipment to ensure that a building is maintained at peak efficiency. Energy efficient building maintenance is grounded in the existing knowledge base of building personnel, including building cleaners, porters, maintenance workers, window cleaners, superintendents, stationary and operating engineers. Accordingly, the field provides many opportunities for advancement to incumbent building workers. Energy efficient building maintenance positions require a background in energy use, water use, cleaning products, HVAC, and building control systems, but the degree of expertise depends on the position. In light of the City’s efforts to “green” the building code, and the growth in demand for efficient buildings, there will likely be new opportunities for both incumbent building workers and new workers in this burgeoning green collar field.

Public transportation:

Public transportation in New York City includes the MTA’s buses, subways, ferries, and railroads, the Port Authority’s light rail and ferries, and numerous independent bus and ferry providers. The MTA’s NYC Transit agency employs nearly 47,000 people in more than 20 major departments and divisions—not even taking into account LIRR, Port Authority, or independent transportation companies’ employees. In addition to bus and subway operations and maintenance employees, the field’s workforce includes engineers,

electricians, computer programmers, ironworkers, masons, physicians, mechanics, carpenters, accountants, environmental specialists, and hundreds of other job titles. Approximately 85% of NYC Transit's staff is selected through an examination process. Public transportation provides strong career pathways, and employees are given the opportunity to advance to highly skilled positions through a series of promotional and assignment exams. Basic qualifications for many entry-level positions include a high school diploma and effective communication and interpersonal skills. Because public transportation is a developed field with a complex hiring and training system, adequate government funding is the main impetus—or hindrance—to creating these green collar jobs. Case in point: according to the Louis Berger Group, PlaNYC's transportation-related initiatives will create over 210,000 jobs between now and 2030, but this projection is contingent on adequate funding.

Recycling:

Recycling, a “system of collecting, sorting, and reprocessing old material into usable raw materials,”¹ is also a strong driver of economic development and job creation. On a per ton basis, sorting and processing recyclables alone sustain 10 times more jobs than landfilling or incineration and the growing recycling and reuse industry employs well over one million people nationwide. Independent businesses, municipal agencies, (such as New York City's Department of Sanitation) and government contracted companies, (such as Visy Paper in Staten Island), specialize in various subsectors of the industry including composting, computer and battery recycling, aluminum and steel recycling, glass and plastic recycling, paper recycling, and recycled product manufacturing. Job titles include sorters, recycling managers, recycling foremen, material recovery facility technicians, sanitation workers, sales representatives, process engineers, and chemists. Recycling jobs run the gamut in terms of employment requirements and compensation. Entry level positions in material recovery facilities, for example, require the ability to stand for long hours and generally provide living wages. The Department of Sanitation's sanitation workers, on the other hand, must have a high school diploma, a commercial driver's license, pass a written and physical exam, and undergo background checks. These workers are paid high union wages.

Renewable energy:

Renewable energy is derived from natural, inexhaustible resources such as the sun, wind, and water. Renewable technologies include solar photovoltaics (PV), solar thermal, wind turbines, tidal turbines, and biogas digesters. Installation and maintenance of these technologies require skilled workers including, but not limited to, electricians, engineers, glaziers, sheetmetal workers, steamfitters, and steel workers. The renewable energy field also creates jobs in manufacturing and design. Although this is generally an emergent higher-skilled green collar field, few of the positions are new. Many of these green collar jobs simply require retooling existing training—for example, training electricians to install solar panels. In the past few years, renewable energy has made considerable strides in New York City thanks to some ambitious efforts including CUNY's Million Solar

¹ National Resources Defense Council, Glossary of Environmental Terms

Roofs Initiative and Verdant Power's tidal power pilot project in the East River. The market is primed to further expand in light of energy costs and climate change.

Urban forestry:

Urban forestry is “the management of vegetation, particularly trees and forests, to improve the urban environment and the quality of life of people who live, work, and spend their leisure time in urban and urbanizing landscapes.”² Urban forestry is a diverse field that includes park maintenance, tree planting, green roof installation, and open space design. Job titles include Associate Park Service Workers, City Park Workers, Climbers and Pruners, Gardeners, Landscape Architects, Naturalists, Park Supervisors, Recreation Directors, Urban Park Rangers and Tree Specialists. Urban forestry has many civil service and public sector positions with opportunities for advancement. The level of skill and experience required to fill these positions vary. Whereas entry level positions with the Department of Parks and Recreation are open to most people with a willingness to work, the Climber and Pruner position requires at least six months of full-time experience planting, maintaining and cutting trees and shrubs, and the Landscape Architect position requires four years of experience as a full-time Landscape Architect. With Mayor Bloomberg's Million Trees initiative and several other parks-based plans in the pipeline, urban forestry is primed to be a promising sector for decades to come. However, labor and community groups have expressed reservations over the City's efforts to outsource good-paying, public sector parks positions and privatization remains a hot-button topic as this green collar field grows.

Brownfield remediation:

According to the EPA, "Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Brownfield remediation entails the removal of ignitable, corrosive, reactive or toxic materials from brownfield sites for community, residential or commercial development. Job titles include Asbestos Removal Mechanics, Asbestos Worker Supervisors, and Hazardous Material Handlers. Brownfield remediation work generally requires a high school diploma and physical strength as well as a willingness to work in a potentially dangerous environment. Basic math skills are also required for some remediation jobs. Because of the work's hazardous nature, most workers must have at least 40 hours of on-the-job training and must complete a training program that meets federal OSHA standards. Brownfield remediation workers are often prepared to do other work that requires handling hazardous materials, including emergency cleanup operations. By some estimates, there are 7,600 acres of brownfields in New York City and with the City's new brownfield-based agency, the Office of Environmental Remediation, there should be no shortage of remediation work in the decades to come.

² U.S. Forest Service, http://www.fs.fed.us/ne/newtown_square/research/themes/glossary.shtml



Job Opportunities in a Green Economy: New York Can Gain from Fighting Global Warming

Curbing global warming is the work of a generation, and specifically, the work of millions of people, performing the jobs needed to build the green economy. Clean energy investments will create opportunities for welders, sheet metal workers, machinists, truck drivers, and others. In New York, there are nearly 615,000 jobs in a representative group of job areas that could see job growth or wage increases by putting global warming solutions to work. And the benefits of those new jobs would spread to a much wider swath of the economy.

For more information, please contact **Peter Altman** at (202) 289-6868

Produced in Partnership with:
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United Steelworkers
Blue-Green Alliance
Center for American Progress
Green for All

Visit www.bluegreenalliance.org/gjfa to read the full report, *Job Opportunities for the Green Economy: A State-by-State Picture of Occupations that Gain from Green Investments*

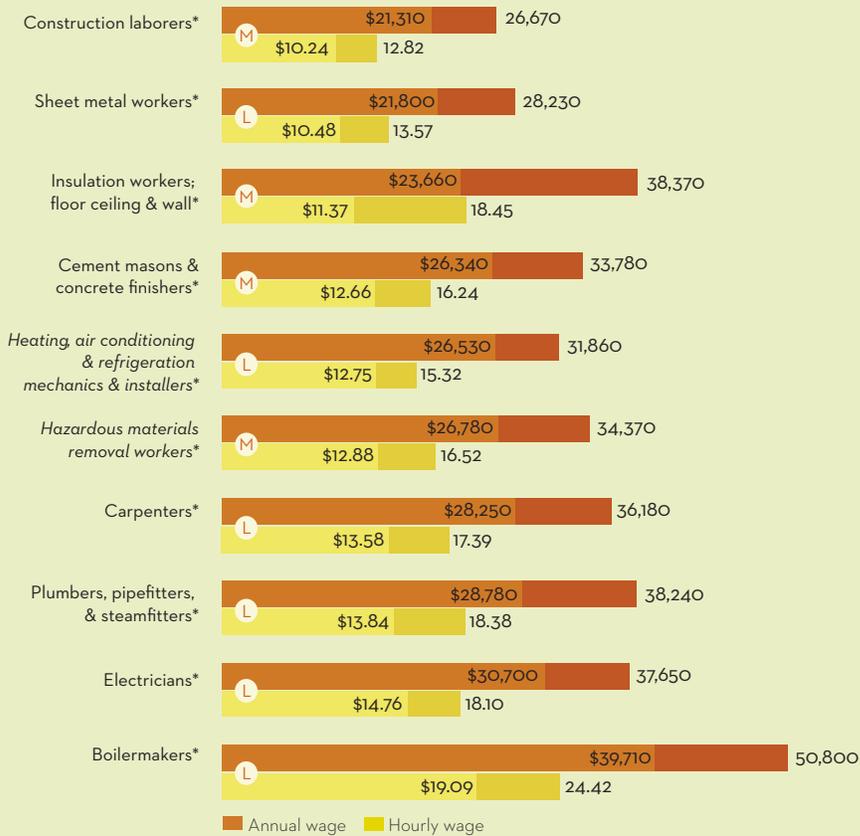


Green Jobs in New York

Solving global warming will require all kinds of workers with a wide range of skills. Tens of thousands of New Yorkers have good-paying job skills that are representative of a broad range of skills needed to build clean energy solutions:

- **Carpenters** will be needed to make buildings more energy efficient. There are nearly 54,000 carpenters in New York, paid an average of nearly \$22 per hour.
- **Electricians** are essential to expanding mass transit solutions. There are over 34,000 electricians in New York, paid an average of over \$28 per hour.
- **Operations managers** are needed to manufacture of energy-efficient automobiles. There are nearly 96,000 operations managers in New York, paid an average of nearly \$54 per hour.
- **Machinists** craft essential components for wind power. There are over 15,000 machinists in New York, paid an average of over \$17 per hour.
- **Welders** are vital to solar power manufacturing. There are over 9,000 welders in New York, paid an average of over \$16 per hour.
- **Industrial truck drivers** transport supplies and fuels for the cellulosic biofuels sector. There are over 19,000 industrial truck drivers in New York, paid an average of nearly \$15 per hour.²

ENERGY EFFICIENCY JOBS AT-A-GLANCE



NOTES

This chart depicts national wage data for selected middle-skill occupations in the residential building construction industry.

■ The 25th percentile describes wages at the lower end of the labor market.

■ Median wage marks the center of the wage distribution in a given occupation.

Italics indicate that BLS projects faster than average growth for this occupation across all industries over the next decade.

* In-Demand occupation per DOL, regardless of overall occupational growth levels, because the work is central to a high-growth industry, like energy or construction.

Regional wage ranges and more precise occupational projections by industry can be run on a state-by-state basis.

Typical education and training path:

Ⓜ **Moderate-term on-the-job training:** Requires from one to twelve months of training, which typically occurs at the workplace.

Ⓛ **Long-term on-the-job training:** Requires more than one year of on-the-job training, or combined work experience and classroom instruction, and may include apprenticeships of up to five years.

These are general indicators; there may be other pathways into the occupation, as well as additional educational, training or licensing requirements.

Source: U.S. Bureau of Labor Statistics

Key Points

- Jobs in energy efficiency retrofitting look a lot like traditional construction jobs.
- While only two of these occupations show faster than average projected growth, the Department of Labor (DOL) identifies all 10 as "in-demand" because they are critical to high-growth industries.
- Every \$1 million invested in efficiency retrofits generates eight to eleven on-site jobs. Job numbers rise if we include indirect economic effects.
- State and municipal retrofitting programs will need to be tied to regional training programs, as the construction and building trades face imminent shortages of skilled workers.
- A good place to start greening career pathways in the building trades is through union apprenticeship and related programs, some of which are currently constructing workable pathways out of poverty.
- Some construction jobs have high wages, but offer only seasonal employment.

Jobs to Watch

Some high-demand energy-efficiency jobs are relatively new; we do not have good wage and employment data because they are not yet tracked by the U.S. Bureau of Labor Statistics (BLS). Local research is the most fruitful source of information about these sorts of jobs.

The New York State Energy Research and Development Authority, for example, is in the process of standardizing job titles and skill requirements for energy auditors. And the Regional Economic Development Institute at Los Angeles Trade-Technical College identifies several emerging middle-skill occupations among green construction jobs with highest employment potential:

Energy and indoor air quality auditor • Deconstruction worker
HVAC operations and maintenance technician • Systems technician • Solar installer and technician



FACT SHEET

Jobs from Renewable Energy & Energy Efficiency

November 8, 2007

National

- According to research by Roger Bezdek for the American Solar Energy Society, the renewable energy (RE) and energy efficiency (EE) industries created a total of 8.5 million jobs in 2006; 450,000 jobs in RE and 8 million jobs in EE throughout the United States.ⁱ
- The Union of Concerned Scientists estimate that a national Renewable Portfolio Standard (RPS) of 20% by 2020 would create 185,000 new jobs from renewable energy development, add \$25.6 billion in income to farmers, ranchers, and rural landowners and save consumers \$10.5 billion in lower electricity and natural gas bills by 2020.ⁱⁱ
- A report from the Renewable and Appropriate Energy Laboratory in Berkeley found that renewable energy creates more jobs per megawatt (MW) of power installed, per unit of energy produced, and per dollar of investment, than the fossil fuel energy-based sector.ⁱⁱⁱ
- The Union of Concerned Scientists estimates that requiring automakers to meet a fleetwide average of 35 miles per gallon by 2018 will create 241,000 additional jobs nationwide by 2020, and increase jobs in the automotive sector alone by 23,900. Such a requirement would also save consumers \$37 billion in 2020 alone and cut national oil use by 1.6 million barrels per day by 2020.^{iv}

States

- A study by the IC2 Institute reports that **Texas** could add 123,000 new high-wage jobs by 2020 to its economy by actively moving toward solar power.^v
- A recent study by the American Council for an Energy-Efficient Economy (ACEEE) reports that by adopting energy efficient strategies **Florida** will save \$28 billion, offset the state's entire future growth in electric demand by 2023, and create more than 14,000 jobs in 2023.^{vi}
- Based on the ACEEE report, **Florida** recently adopted a series of rigorous clean energy policies,

including a dramatic reduction in greenhouse gas emissions, a 20% renewable electricity by 2020 Renewable Portfolio Standard (RPS), and the California motor vehicle emission standards.^{vii}

- According to Environment California, the impact of meeting **California's** previously enacted RPS of 20% by 2017 would create an estimated 119,000 person-years of employment at an average salary of \$40,000. The California RPS has now been pushed forward to 20% by 2010.^{viii}
- Environment California also forecasts that **California's** Million Solar Roof Initiative will create 15,000 new jobs for the Golden state.^{ix}
- The Union of Concerned Scientists concluded that **Washington's** Initiative 937 (I-937), a 15% by 2020 RPS, would create 2.6 times more jobs than fossil fuels, resulting in a net increase of 1,230 jobs by 2025 for the state.^x
- In a report for the American Solar Energy Society (ASES), Roger Bezdek found that **Ohio** created over 500,000 total jobs in Renewable Energy and Energy Efficiency industries in 2006.^{xi}
- A new study by Global Insight Inc. for the Renewable Energy Trust reports that the clean energy sector currently provides over 14,000 jobs in **Massachusetts**, and will soon become the 10th largest sector in the state.^{xii}

International

- According to the European Union Commission on Monitoring and Modeling Initiative on Targets for Renewable Energy (MITRE), net employment growth in the **European Union** is projected to increase to 950,000 under current policies, and up to 1,660,000 under the Advanced Renewable Strategy (ARS) of meeting 22.1% of energy demand with renewable energy by 2010.^{xiii}
- The Danish Wind Energy Association reports that wind energy created over 20,000 jobs in **Denmark**,

supplied 20% of their electricity in 2004 and will supply 25% by 2008.^{xiv}

- According to the ASES-Bezdek report, RE employed over 214,000 people in **Germany** in 2006, 64,000 of whom are employed in the wind industry, according to the German Wind Energy Association.^{xv}
- RenewableEnergyAccess.com reported that **Germany** recently increased its Renewable Energy Sources Act, increasing its renewable energy targets from 20% to 27% by 2020, and to 45% by 2030.^{xvi}
- Erneuerbare Energien, a German Renewable Energies organization, predicted that if **Germany** met its [now outdated] goal of 20% by 2020, 500,000 people would be employed within the RE sector by 2020.^{xvii}
- The European Wind Energy Association reports that **Spain** currently employs about 35,000 people in the wind industry.^{xviii}
- In **Brazil**, the US Agency for International Development (USAID) sponsored a program to train students from the poorest neighborhoods in building renewable energy capacity. Nearly 12-15 million Brazilians live without electricity. The program has been a huge success--over 60% of the graduates from the 8-month long program now have jobs or are attending university full-time, and rural communities are benefiting from the new access to electricity.^{xix}

Wind

- According to the American Wind Energy Association, the United States currently has over 11,000 MW of installed wind energy capacity. Roger Bezdek concludes in his ASES report that in 2006 the wind industry created 16,000 direct jobs and 36,800 total jobs in 2006.^{xx xxi}
- According to a study by the Renewable Energy Policy Project, a national development of 50,000-70,000 MW of wind energy could potentially create 215,000-331,000 full time equivalent job/years of employment.^{xxii}

Biofuels

- The ethanol industry produced 5 billion gallons in 2006, and created 163,034 jobs in all sectors of the economy during 2006 according to a report by the Renewable Fuels Association. Ethanol Across America reported the creation of 5,300 jobs in Minnesota, 5,187 jobs in Iowa and 3,000 jobs in Nebraska.^{xxiii xxiv}
- Assuming biodiesel growth reaches 650 million gallons of annual production by 2015, the National Biodiesel Board estimates an additional 39,102 jobs will be created between 2006-2015.^{xxv}

Geothermal

- The Geothermal Energy Association (GEA) reported 4,583 direct jobs in 2004, with an average salary of \$40,000-50,000.
- The Energy Information Administration (EIA) projected an increase of 2,455 MW in the geothermal industry by 2026, which would create 8,764 direct jobs and 21,910 total jobs by 2026 according to GEA.^{xxvi}

Solar

- Predicted to become a \$15 billion industry by 2020, the solar energy industry employed over 20,000 people in 2001, and is expected to employ 150,000 people in 25 years.^{xxvii}
- The Solar Energy Industries Association (SEIA) has a goal of supplying half of all new U.S. electricity generation from the sun by 2025, creating over 260,000 jobs by 2030.
- SEIA estimates that extending the Investment Tax Credit (ITC) by 8 years will create more than 55,000 new American jobs in the solar industry and over \$45 billion in economic investment by 2015.
- A joint analysis by Greenpeace and European Photovoltaic Industries Association (EPIA) shows that if 205 gigawatts of photovoltaic (PV) systems capacity are in place by 2020, solar energy could provide 2 million jobs worldwide.

Wave & Tidal

- Pat Cooke, Chairman of Able Engineering and head of the FreeFlow 69 project, estimates that a 1,000MW wave and tidal power system could create up to 2,000 manufacturing and installation jobs and 100 permanent jobs.

Coal

- According to data from the National Mining Association (NMA), jobs in the U.S. coal mining industry have been decreasing steadily since 1985 (185,000 jobs in 1985, now down to 80,000 in 2005).^{xxviii}
- FutureGen, a government-sponsored \$1.5 billion 275MW clean-coal, near-zero emission plant, is expected to create 200 permanent jobs and 600-700 jobs during construction according to the Department of Energy.^{xxix}

Coal-to-Liquid

- The Coal-to-Liquid Coalition reports that a typical 10,000 barrel/day CTL plant creates 200 direct jobs on-site, 150 jobs at supporting coal mines and 2,800 indirect jobs throughout the region.

Nuclear

- According to the Nuclear Energy Institute (NEI), a 1,000 MW nuclear plant creates 400-700 permanent jobs.^{xxx}

Natural Gas

- According to NaturalGas.org, natural gas provides the United States with about a quarter of our energy. Data from the Department of Labor shows that distribution of natural gas employed 106,400 people in 2006.

Green Collar Jobs in Congress

- The \$100 million “Sanders-Clinton Energy Efficiency and Renewable Energy Worker Training Program” amendment (S.A. 1502) was adopted as part of the CLEAN Energy Act of 2007 (H.R. 6) which passed in the Senate on June 21, 2007.

- The “Green Jobs Act of 2007” (H.R. 2847), is a \$125 million program for job training in the renewable energy and energy efficiency industry, which was passed with the House Energy bill (H.R. 3221) on August 4th, 2007. The Sanders-Clinton worker training program is designed as a “stand alone” program within the Department of Labor, while the Green Jobs Act of 2007 is designed for the Workforce Investment Act program within the Department of Labor. The House version also has a 3rd grant section specifically for the “Pathways out of Poverty Demonstration Program,” hence the \$25 million difference between the Green Jobs Act of 2007 and the Sanders-Clinton amendment. Despite minor differences, these two pieces of legislation were crafted together and are expected to come together to form one Renewable Energy and Energy Efficiency worker training program.

ⁱ *Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries: U.S. and Ohio*, Roger H. Bezdek of Management Information Services Inc. for American Solar Energy Society, July 2007

http://www.ases.org/jobs_report.pdf

ⁱⁱ *Cashing in on Clean Energy National Analysis*, Union of Concerned Scientists, July 2007

http://www.ucsusa.org/clean_energy/clean_energy_policies/cashing-in.html

ⁱⁱⁱ *Putting Renewables to Work: How Many Jobs can the Clean Energy Industry Generate*, Renewable and Appropriate Energy Laboratories, April 2004

<http://rael.berkeley.edu/files/2004/Kammen-Renewable-Jobs-2004.pdf>

^{iv} *Creating Jobs, Saving Energy and Protecting the Environment: An Analysis of the Potential Impacts of Investing in Efficient Cars & Trucks, a 2007 update*, Union of Concerned Scientists, June 2007

http://www.ucsusa.org/news/press_release/raising-fuel-economy-0045.html

^v *Opportunity on the Horizon: Photovoltaics in Texas*, IC2 Institute, University of Texas- Austin, June 2007

<http://www.utexas.edu/ati/cei/documents/TexasSolarOpportunity2007.pdf>

^{vi} *Potential for Energy Efficiency and Renewable Energy to Meet Florida’s Growing Energy Demands*, American Council for an Energy Efficient Economy, June 2007

<http://aceee.org/pubs/e072.pdf?CFID=3210756&CFTOKEN=93870672>

^{vii} *Governor Crist Signs Executive Orders to Reduce Greenhouse Gas Emissions*, Governor Charlie Crist Press Release, July 16 2007

<http://www.flgov.org/release/9230>

^{viii} *Renewable Energy and Jobs: Employment Impacts of Developing Markets for Renewables in California*, Environment California Research and Policy Institute, July 2003

http://www.environmentcalifornia.org/uploads/OW/aa/OWaa2RaedlfHwQOWbxKd5w/Renewable_Energy_and_Jobs.pdf

^{ix} *The California Solar Initiative: A monumental step to a million solar roofs*, Environment California, March 2007

<http://www.environmentcalifornia.org/newsroom/energy/energy-program-news/the-california-solar-initiative-a-monumental-step-to-a-million-solar-roofs>

^x *The Washington Clean Energy Initiative: Effects of I-937 on Consumers, Jobs & the Economy*, Union of Concerned Scientists, October 2006

http://www.ucsusa.org/assets/documents/clean_energy/Washington-I-937-Report-Final.pdf

^{xi} *Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries: U.S. and Ohio*, Roger H. Bezdek of Management Information Services Inc. for American Solar Energy Society, July 2007

http://www.ases.org/jobs_report.pdf

^{xii} *Massachusetts Clean Energy Industry Census*, Massachusetts Technology Collaborative, Renewable Energy Trust, August 2007

<http://www.masstech.org/Clean-Energy-Census-Report-2007.pdf>

^{xiii} *Meeting the Targets and Putting Renewables to Work- FLYER*, EU Commission on Monitoring and Modeling Initiative on Targets for Renewable Energy (MITRE)

<http://mitre.energyprojects.net/>

^{xiv} *Denmark- Wind Energy Hub*, Danish Wind Energy Association, 2004

[http://www.windpower.org/media\(207,1033\)/wind_power_hub_pamphlet.pdf](http://www.windpower.org/media(207,1033)/wind_power_hub_pamphlet.pdf)

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- ^{xv} *A Clean Issue- Wind Energy in Germany*, German Wind Energy Association, May 2006
http://www.wind-energie.de/fileadmin/dokumente/English/Broschuere/BWEImageEngl_2006.pdf
- ^{xvi} *Germany Upholds Groundbreaking Renewable Energy Law*, RenewableEnergyAccess.com, July 6, 2007
<http://www.renewableenergyaccess.com/rea/news/story?id=49250>
- ^{xvii} *Data & Facts concerning renewable energy sources in Germany*, Erneuerbare Energien (“Renewable Energies”), October 2006
<http://www.unendlich-viel-energie.de/index.php?id=282>
- ^{xviii} *Economics of Wind Energy*, European Wind Energy Association,
<http://www.ewea.org/index.php?id=201>
- ^{xix} *Success Story: Training Youth for Energy Jobs*, USAID
http://www.usaid.gov/stories/brazil/ss_br_youthenergy.html
- ^{xx} *Wind Energy Projects throughout the United States of America*, American Wind Energy Association, March 2007
<http://www.awea.org/projects/>
- ^{xxi} *Renewable Energy: Economic Powerhouse? New research suggests that industry growth could generate hundreds of thousands of jobs for U.S. workers*, Table 1, Solar Today, July/August 2007
http://www.solartoday.org/2007/july_aug07/economic_powerhouse.htm
- ^{xxii} *Wind Turbine Development, Location of Manufacturing Activity*, Renewable Energy Policy Project, September 2004
<http://www.crest.org/articles/static/1/binaries/WindLocator.pdf>
- ^{xxiii} *Contribution of the Ethanol Industry to the Economy of the United States*, LEGC for Renewable Fuels Association, February 2007
http://www.ethanolrfa.org/objects/documents/2006_ethanol_economic_contribution.pdf
- ^{xxiv} *Economic Impacts of Ethanol Production*, Ethanol Across America, Issue Brief Spring 2006
http://www.ethanolacrossamerica.net/CFDC_EconImpact.pdf
- ^{xxv} *House Subcommittee on Energy and Air Quality “Alternative Transportation Fuels: Overview”*, Testimony by Scott Hughs, Director of Governmental Affairs, National Biodiesel Board, April 2007
http://www.biodiesel.org/resources/PR_supporting_docs/20070418_House%20Energy%20Subcmte%20Hrg%20on%20Alt%20Transport%20Fuels%20041807%20_2_.pdf
- ^{xxvi} *All About Geothermal Energy- Employment*, Geothermal Energy Association, September 2005
<http://www.geo-energy.org/aboutGE/employment.asp>
- ^{xxvii} *Solar Electric Power: The US Photovoltaic Industry Roadmap*, May 2001
http://www.sandia.gov/pv/docs/PDF/PV_Road_Map.pdf
- ^{xxviii} *Mining Industry Employment in the United States by Sector 1985-2005*, National Mining Association, December 2005
http://www.nma.org/pdf/e_sector.pdf
- ^{xxix} *FutureGen*, Department of Energy,
<http://www.fossil.energy.gov/programs/powersystems/futuregen/>
- ^{xxx} *Nuclear Statistics: Nuclear Power Plant Contributions to State & Local Economies*, Nuclear Energy Institute, updated January 2007
<http://www.nei.org/index.asp?catnum=3&catid=1525>

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About the Environmental and Energy Study Institute

EESI is a national nonprofit that works to advance a cleaner, more secure and sustainable energy path. EESI was established in 1984 by a bipartisan group of Congressional environmental and energy leaders to meet the critical need for rigorous, informed debate, independent analysis and innovative policy development related to energy and environmental issues.

POLICY PRINCIPLES FOR GREEN JOBS INITIATIVES

We offer the following green jobs precepts not as a one-size-fits-all formula, but as a set of key policies and practices that should underpin state efforts to secure the better environment/better economy/better opportunity promise. While written for state policymakers, the guidelines could be easily adapted for cities or regions.¹⁵⁸

Despite the recent policy advances at the national level represented by the passage of the Green Jobs Act, states cannot afford to wait for federal policymakers to take the lead in developing policy and investment strategies that help to create green-collar jobs and train workers to fill them. Indeed, states are in an ideal position to develop models now to build a strong and equitable green economy that can catalyze and inform future federal policymaking. The principles below, together with the Washington state example that follows, are intended to suggest a framework for building and implementing such a model.

1 Define and target specific green jobs

Any green jobs initiative will need to identify the green jobs on which to focus. Without definition—a list of green industries and/or a list of high-demand occupations—initiatives will be too diffuse and success impossible to determine.

Definition and focus can be established by the state, or determined by local stakeholders within parameters prescribed by current labor market information. Targets might be identified as key occupations that directly respond to climate action plans, or occupations that support the development of new green industry. But remember, there is an enormous range of green industry—from clean tech to renewables and efficiency, to alternative fuels, and beyond. And cross-cutting these, research, manufacturing, construction, maintenance, and many other sectors. States need to determine their comparative advantage, focus their initiatives on clusters that make most sense for a particular region, and use that to guide tightly focused workforce development efforts, keeping in mind not only the economic, but the political dimensions of green jobs.

2 Use good data to drive green jobs initiatives

When targets are defined, the work is just beginning. Successful workforce and economic development demands detailed labor market analysis. States need to understand targeted green industries at the level of regional economies: what are the occupations, wage and benefit structures, and projected job growth? What are the education and skills requirements of these jobs? Further, they need to evaluate the employment and training delivery system at a regional level, identifying training gaps for identified jobs, curriculum development needs, and potential pathways in green careers.¹⁵⁹

3 Plan up front to measure green jobs programs and make them better

Green job training is new. We need to figure out what works and what does not. And because demonstrated results build both economic success and political credibility, states need to build meaningful performance measures and a serious evaluation component into every green jobs initiative.

4 Employ energy standards as green job creation tools

The alphabet soup of standards discussed throughout this report is a key state policy lever in building green markets. RPS, EERS, LEED, and the like should be advanced—and, indeed, marketed politically—as economic development and job-creation strategies. They are fundamental to the orderly development of markets for renewable energy and energy efficiency industries. But they cannot single-handedly promote the development of regional green economies, or offer any guarantee of job quality. To nurture the creation of sustainable, high-road jobs, states need to pursue the sort of intentional growth strategies outlined below.

5 Maximize green and community benefits by requiring them

The prevailing state economic development strategy of firm-by-firm recruitment is well under way for green industries, and it seems unlikely that this hoary policy approach will go away anytime soon. But tax subsidies for new energy industries should be connected to prevailing wage/benefit, job creation, and other labor standards; linked to community benefit agreement provisions, like first-source hiring and funded apprenticeship programs; and contingent on transparency and reporting requirements, with clawback agreements if necessary.¹⁶⁰

6 Promote green industry clusters

Beyond subsidies and smokestacks, a complete green jobs strategy will employ a broad range of economic development levers: venture capital funds, business incubators, and loans or grants targeting clean energy clusters. Clusters, as opposed to individual firms, will be the engine of 21st-century economic growth. States can help generate “virtuous circles” of innovation and growth by supporting networks of complementary and competing firms through investments in joint marketing, the commercialization and diffusion of new technologies, and workforce training partnerships.¹⁶¹

7 Save existing jobs and create new ones through green innovation

Not all green jobs are new jobs, per se. Current jobs can be saved, and new ones created, by helping industries retool for the new energy economy. Manufacturing conversion underlies a key aspiration of the new energy economy: revitalizing the industrial heartland in a manner both equitable and green, re-extending its promise of worker advancement while reversing its legacy of environmental degradation. Supply chains in declining industries can be realigned to feed green ones. The Renewable Energy Policy Project has convincingly documented the jobs potential for component part manufacturing, particularly in wind and solar, but no one is quite sure how to realize this potential.¹⁶² States will need to partner with labor and local intermediaries to determine an appropriate role in this transformation.

8 Link green economic and workforce development

As local leaders step forward to champion green jobs and green economies, it is critical that states develop concrete plans to connect the two. Worker training programs for renewable energy and energy efficiency industries must be explicitly linked to economic development and job-creation programs. The danger is that communities will rush to create green workforce development programs, producing skilled workers for jobs that do not yet exist in sufficient number or permanence. A green career pathway has a job at the end of the road.

9 Construct green industry partnerships

Green jobs initiatives should create or expand on regional partnerships organized by industry sector.¹⁶³ Including management and labor, technical colleges, workforce investment boards, community-based

organizations, and economic development agencies, such partnerships can undertake infrastructure and market analyses critical to green industry development and, at the level of regional labor markets, the sorts of workforce capacity analysis called for above. Indeed, green-sector partnerships will be critical in directing scarce training resources to efficiently narrow the substantial and growing gaps between workforce supply and workforce demand.

10 Integrate green jobs initiatives into existing workforce systems

Just as green jobs programs must take close note of the particular economic landscape they inhabit, it is essential that green-collar job training initiatives not develop as stand-alone, “boutique” programs divorced from broader workforce development efforts. The best way to prepare a green-collar workforce is to build on the full breadth of the state and local workforce development system through partnerships that leverage and align existing employment and training programs and resources toward green job ends.

11 Build greener career pathways

Working through the industry partnerships mentioned above, green workforce development should seek to develop career pathways—or add green skills to existing ones—whenever possible. Green jobs programs should support workers entering the industry with basic skills, but also serve workers at any stage in their career, helping them advance in pay and skills. This systemic framework is called career ladders or career pathways and, when fully realized, it allows workers with relatively low skills to combine work and learning in an accessible path upward to secure and sustainable employment.¹⁶⁴

12 Extend green ladders to build real pathways out of poverty

When greening career pathways, states should focus explicitly, though not exclusively, on first steps and early bridges from basic skills to better paying jobs. Indeed, an anti-poverty emphasis should be central to any state green jobs initiative—one that includes the un- and under-employed, the poor who are dissociated from labor markets, and incumbent low-wage workers in need of advancement. This is a high-road approach, at once just and instrumental. Given the nation’s persistent racial and economic inequities, some portion of limited funds should be targeted to those who need assistance the most.

How to Grow Green Collar Jobs

GREEN COLLAR WORKFORCE DEVELOPMENT PROGRAM MODELS

INTERNATIONAL MODEL:

Germany:

In 1999, the German Trade Union Confederation (DGB) partnered with the German government, employer federations, and environmental NGOs to create the Alliance for Work and the Environment. The Alliance created an ambitious retrofit program that aimed to make hundreds of thousands of residential units more energy efficient while creating thousands of union jobs in the process. The Alliance also developed a training component to ensure a strong, qualified workforce. The program was stimulated by government investment; Germany invested over U.S. \$10 billion since 2001 into energy efficiency and renewable energy. Through the program, thousands of new workers installed energy efficient windows, condensing boilers, and solar thermal technology, among other retrofit measures. The program not only retrofitted thousands of apartments, but created nearly 200,000 jobs.

US MODELS:

1. Washington State:

In 2007, [Washington State] Governor Christine Gregoire issued an executive order creating goals to reduce Washington's global warming pollution and increase the number of green jobs in the state to 25,000 by 2020. Washington is widely recognized as a national leader in designing and implementing workforce programs and holding those programs accountable via rigorous evaluation that tracks their outcomes over time. One program (administered by Washington's State Workforce Training and Education Coordinating Board [SWTECB]), Industry Skill Panels (ISPs), has become a model for state-supported sectoral workforce development: ISPs are regional partnerships of education, business, labor, and local workforce investment boards tasked with identifying skills gaps within particular industry clusters and developing proactive solutions to benefit multiple employers within industries—not just a single employer, as with the more traditional economic development and business recruitment practice—that offer career ladder jobs, and drive the state's regional economies, such as health care, manufacturing, and aerospace. Energy is a targeted sector, but as of 2007 there had been no skill panels dedicated to clean energy.

In late 2007, the Washington State Apollo Alliance, Climate Solutions, Solid Ground, and The Workforce Alliance led an effort to develop a proposal linking a green collar jobs training initiative and greenhouse gas reduction strategies in a single piece of legislation.

The proposal developed by this collaboration was included by Governor Gregoire as a high-profile part of her governor-request legislation for 2008's short session in Olympia—in no small part because of the broad cross-section of stakeholders that developed and supported the proposal.

Source: COWS, "Greener Pathways," p. 48

Components of the Washington State Legislation

A. Labor Market Research

- The legislature establishes a green jobs initiative that establishes a goal of 25,000 green economy jobs by 2020.

- The Dept. of Ecology consults with the Employment Security Dept. (Washington State's department of labor), the Workforce Board, the State Board of Community and Technical Colleges, and the Higher Ed. Coordinating Board to develop a defined list of terms, consistent with current workforce and economic development language, associated with green economy industries and jobs.
- The Employment Security Dept. consults with above-mentioned departments, plus Washington State University Business Development Center and Extension Energy Program to conduct research that examines:
 - the current labor market and projected job growth in the green economy
 - the current and projected skill requirements of green industry employers
 - the wages and benefits of green jobs
 - the education and training requirements of entry-level and incumbent workers.
 - opportunities for minority- and women-owned businesses
- Washington State University shall report to the Legislature on its research, analysis, and recommendations by December 1, 2008.
- The Employment Security Dept. consults with the Dept. of Ecology to propose, based on the above labor market research, which industries will be considered high-demand industries, taking into account their strategic importance to the development of Washington's green economy.
- The two departments will determine which jobs within high-demand green industries are good jobs and part of career pathways, based on family-sustaining wages, benefits, and opportunities for advancement. These designations shall inform the strategic planning of the Workforce Board, State Board for Community and Technical Colleges, and Higher Ed. Coordinating Board.
- The Dept. of Ecology will identify emerging technologies and innovations that are likely to contribute to the advancement of the green economy.
- The Dept. of Ecology will make recommendations for investments and/or incentives to attract green economy businesses and industries.

B. Green Industry Skill Panels

- The Workforce Board develops pilot green industry skill panels, consisting of representatives from business, labor unions, apprenticeship programs, educational institutions, and local workforce development councils, or other stakeholders. Panel applicants must provide market and industry analysis that demonstrate high demand for high-wage occupations in the green economy.
- Green industry skill panels
 - conduct labor market and industry analysis
 - plan strategies to meet the recruitment and training needs of the industry
 - leverage/align other public or private funding sources

C. Green Job Training Account

- A green industry training account is created in the state treasury. The funds in the account supplement the state opportunity grant program, and are distributed on a competitive basis.

Allowable uses of the funds include:

- curriculum development
- transitional green economy—job strategies for dislocated workers in declining industries
- workforce education for target populations
- linking adult education to occupation skills training

Courtesy: Patrick Neville, Economic Development Research and Policy, Worker Center Division, MLK Jr. County Labor Council, AFL-CIO and Coordinator of the Washington Apollo Alliance

2. Oakland, CA:

The Oakland Green Jobs Corps is a job training program that provides a pathway into green careers for Oakland residents facing barriers to employment. Beginning in the fall of 2008, it will provide young adults with job training, support, and hands-on work experience so they can independently pursue opportunities in the new energy economy. The Oakland Green Jobs Corps is a central achievement of the Oakland Apollo Alliance, co-convened by the Ella Baker Center for Human Rights and the International Brotherhood of Electrical Workers Local 595.

The Oakland City Council recently approved \$250,000 to fund the Corps, to be awarded competitively, providing a vital pool of seed funding for attracting matching funds over the long term. Local firms have joined an Oakland Green Employer Council and are playing a critical role by shedding light on their workforce needs and providing internship placement opportunities for Corps trainees.

Source: Green-Collar Jobs in America's Cities, pp. 12, 18

The Oakland Green Jobs Corps Curriculum

In consultation with local, regional, and national experts, the Oakland Apollo Alliance proposed the following components for the curriculum:

A. Recruitment and Outreach (40 young adults ages 18-35)

Using connections to community-based programs, labor unions, and educational institutions, the Oakland Apollo Alliance will recruit young adults (ages 18-35) facing barriers to employment, with the goal of accepting 40 people into the program.

B: Phase I: Three-Month Training

Those people go through a three-month training that provides wraparound services (life skills training, supportive services such as child care, etc). This phase will involve both hands-on training and classroom training. There will be a specific classroom module that covers "environmental global awareness," so that trainees understand the global climate crisis and see their work as part of a larger effort to save the planet. Participants spend half of each week in hard skills vocational training, and are paid a wage during these hours.

The training phase includes the following key components:

- Basic Literacy** (math and English)
- Life Skills and Job Readiness Skills Training**
- Environmental Sustainability and Environmental Justice** (for credit within the Peralta Community Colleges)
- Financial Management** (how to manage money and personal finances)
- OSHA Safety Training Certification**

- ☐ **Labor Unions 101** (how to get into union apprenticeship programs)
- ☐ **Other specialized support services** (assistance with child care, transportation challenges, nutrition, drug/alcohol problems, issues with drivers licenses, etc.)
- ☐ **Vocational Hard Skills with Paid Stipends** (Trainees will go through three 4-week rotations learning vocational hard skills related to green-collar work. Trainees will earn \$9 per hour, 20 hours per week)

C. Phase II: Six-Month Paid Internships

Trainees will be placed in six-month paid internships with employers from the Oakland Green Business Council. Trainees will be paid a **living wage** during the internships. **Case management and specialized support services** will be provided to ensure success for both trainees and employers during this phase.

D. Graduation

After completing the internships, Oakland Apollo Alliance and other involved partners will host a high-profile graduation to honor the trainees and generate further support for the program.

E. Career Options

After completing the internships, the Oakland Green Jobs Corps assist graduates with finding real opportunities in quality jobs with employers with whom we have partnered, union apprenticeship programs, and/or higher education. For at least one year after graduation, the Oakland Green Jobs Corps will continue to provide case management and job retention services.

Source: Ian Kim, Oakland Apollo Alliance Coordinator, Ella Baker Center for Human Rights, Oakland Green Job Corps Proposal, June 10, 2007

3. Los Angeles

Los Angeles adopted Leadership in Energy and Environmental Design (LEED) standards for all Department of Public Works building projects 7,500 square feet or larger, effective 2003. The city is also in the process of expanding its solar incentive program to align with the state's Million Solar Roofs Initiative, having committed \$150 million to the effort. The scope and scale of LA's policy efforts to promote renewable energy and energy efficiency are driven by a mayor, Antonio Villaraigosa, and a City Council who recognize the environmental and economic necessity of greening their city. [Rather than being] a top-down process, a remarkable cross-section of community leaders and stakeholders has forced this issue to center stage by organizing the Green Jobs Campaign, an ambitious effort to retrofit city buildings and other infrastructure while creating jobs for low-income communities of color.

The Campaign is spearheaded by the Los Angeles Apollo Alliance, a coalition that includes community-based organizations, labor unions, and environmental groups, and which is convened and led by SCOPE (Strategic Concepts in Organizing and Policy Education), a grassroots organizing and research organization based in South Los Angeles. In June of 2007, the city council established a City Retrofit Jobs Task Force that includes council members, city agencies, and LA Apollo Alliance representatives to coordinate and lead the city's building retrofit efforts, which include identifying workforce needs and financing mechanisms for the work.

Running on a parallel track has been the development of a Green Careers Training Initiative, with the inter-related goals of (1) connecting low-income inner-city residents to union apprenticeships and community college training programs that prepare them for living wage jobs

in building trades and energy utility industries, and (2) providing upgrade training to workers within those industries.

The Green Careers Training Initiative is being designed by the Los Angeles Infrastructure and Sustainable Jobs Collaborative, a public-private partnership of key stakeholders led by the Regional Economic Development Institute (REDI), an intermediary based at Los Angeles Trade Technical College (LATTC).

One of the most exciting components of the Green Careers Training Initiative is the LA Infrastructure Academy, an independent, non-profit organization, focused on moving young people into a career pipeline for greener infrastructure jobs. It will use an after-school/summer school/Saturday school model, targeting high school juniors and seniors. The curriculum design is built upon innovative approaches to career technical education, including contextualized and thematic education in small learning communities that prepare youth for multiple pathways to both post-secondary education and careers.

While the Academy focuses on youth and the entry-level workforce, entry-level adult and incumbent workers will also be the beneficiaries of [the Green Careers Training Initiative's] strategies... such as more clearly articulated career pathways, courses allowing them to gain certifications in new technologies, and more readily available guidance and supportive services.

Source: Greener Pathways, pp. 17-18

4. Chicago:

Greencorps Chicago is a job-training and community-greening program launched by the Chicago Department of Environment in 1994. Each spring, Greencorps hires up to 30 Chicagoans for a 10-month training program in landscaping and horticulture.

Participants get hands-on experience through more than 200 greening projects throughout Chicago each year. Greencorps helps place graduates in full-time jobs. To date, 225 participants have completed the program.

Mayor Richard Daley has declared his intention to transform Chicago into the “the greenest city in America,” and green jobs are a key component of this effort. Over the course of [the Greencorps program], program participants—primarily ex-offenders—receive training in one of four separate tracks: landscaping and urban gardening, computer refurbishing and recycling, household hazardous waste handling, and home weatherization. While receiving training, participants give back by building community gardens or refurbishing computers for underprivileged residents. Chicago’s programs have...made it a priority to reach the most underprivileged populations in the city—ensuring that ambitious green strategies also provide pathways out of poverty to those in need.

Source: Green-Collar Jobs in America’s Cities, p. 10

5. Richmond, CA:

A unique job training program in Richmond, California is moving low-income residents and youth of color into the green economy. This program is among the first to...provid[e] low cost and free solar system installation to low-income homeowners while training low-income residents from the community to do the work.

The Richmond program has three key partners:

- Solar Richmond, a community-based non-profit organization that forged the partnership for this program.
- The Richmond BUILD Program, which is the City of Richmond's low-income residential assistance and construction training program that is funded through federal, state, and foundation grants.
- GRID Alternatives, a non-profit that installs solar systems for low-income homeowners and provides solar training. Solar Richmond is also increasingly working with solar installation companies.

In 2007, a total of 32 Richmond residents completed the special training program—Richmond BUILD's existing eight-week construction skills training program with an additional two-week solar skills module added by Solar Richmond. All trainees interviewed with potential employers within several weeks of graduation. As of December 2007, all but five program graduates had been hired by local solar and construction firms.

Solar Richmond continues to coordinate regular trainings and facilitate job placement for graduates. In the coming years Solar Richmond plans to expand its program. Next year, with increased funding, green building techniques will be incorporated throughout the nine-week program.

Source: Green-Collar Jobs in America's Cities, pp. 9 and 18.

6. Newark, NJ:

The Lincoln Park Coast Cultural District (LPCCD) is a Community Development Corporation transforming a low-income neighborhood in Newark, NJ, into an arts and cultural district. The project will include 300 "green" mixed-income housing units, music festivals, historic restoration projects, and the Museum of African American Music —altogether over one million square feet of development. Sixteen of the buildings will be USGBC LEED-certified, and the entire project will participate in the USGBC LEED-Neighborhood Development pilot program. Essential to LPCCD's revitalization mission is the creation of green collar jobs. LPCCD has partnered with CentrALL, a New Jersey-based business that houses the trades of HVAC, electrical and plumbing in one company. LPCCD and CentrALL are collaborating with the local municipality, workforce development program, and vocational high school to form the Green Collar Apprenticeship Program (*Green-CAP*). *Green-CAP*'s goal is to provide 100 residents with a trade license in HVAC, plumbing and electrical. *Green-CAP* participants will receive on-the-job training on

LPCCD's housing development projects and enrollment in the respective trade programs. In addition to the license, *Green-CAP* graduates will receive a green certificate showing they have work experience and training on green construction projects, providing them with the opportunity to join trade unions or open their own green businesses.

Source: Green-Collar Jobs in America's Cities, p.16

NYC MODELS:

Consortium for Worker Education/Central Labor Council Training Center

The Consortium for Worker Education-Central Labor Council/AFL-CIO Training Center in Long Island City has a strong track record of developing programs that provide job readiness and

craft skills to New Yorkers who face barriers to employment. Since 2001, the Center has run the pre-employment training segment of the Edward J. Malloy Initiative for Construction Skills.

This program, featured in the Mayor's Commission on Construction Opportunity, prepares New York City public high school students and New York City Housing Authority residents to enter apprenticeships with the building trades. The program has placed over 800 apprentices to date, with an 82% retention rate in certified apprenticeship employment

Recently, the Center has begun to design a similar 10-week program called Sustainable, Mechanical, and Retrofitting Technologies (SMART) that will prepare entry-level workers for green collar jobs in the building trades, building operations, property maintenance, and engineering. The program will introduce key energy and building science concepts and place graduates with career and skill development opportunities in both existing jobs and new jobs with new titles (e.g. energy auditor).

The program designers have identified the core competencies needed to access many green collar jobs and job certifications in energy efficiency and renewable energy, including:

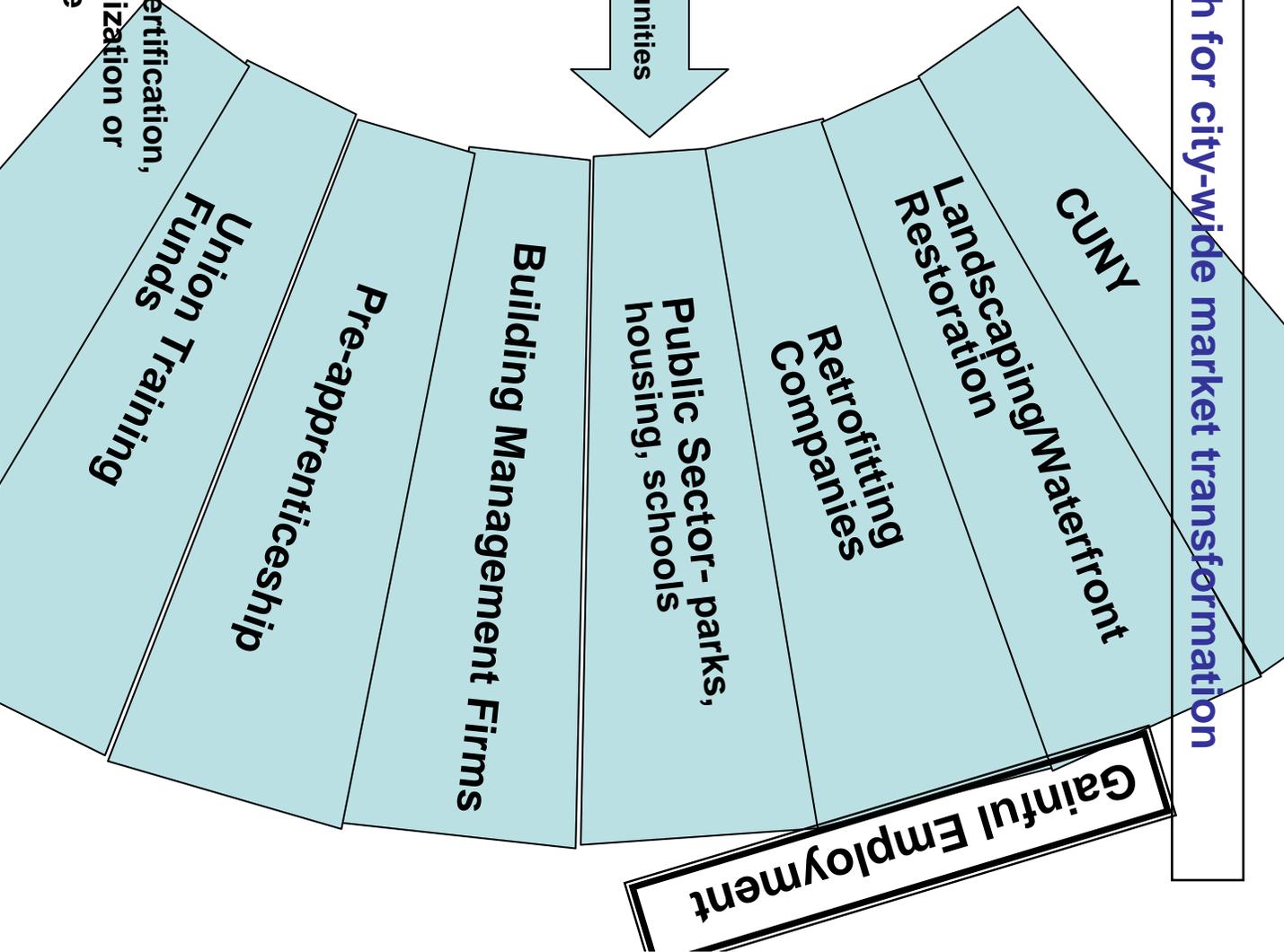
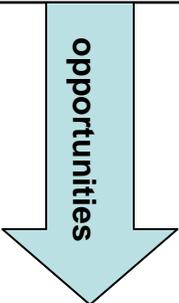
- * Math and science
- * Computers and technology
- * Mechanical reasoning/electrical theory
- * Basic tool usage
- * Employment fundamentals
- * Health and safety
- * Work site/hands on training
- * Career exploration
- * Business writing and communication
- * Sales and customer service
- * HSD/GED/College prep

Once running, the program will have the ability to refer graduates to a variety of industry certifications and employment in union apprenticeships, energy efficient retrofitting, building services, and community college degree programs.

Courtesy: Rebecca Lurie, Director, CWE/CLC Training Center

Policy, advocacy and research for city-wide market transformation

- Preparation for Green Collar Jobs*
- Pre-employment Training
 - SMART training at CWE
 - CTE Schools
 - Environmental Justice Orgs.
 - CBOs



Gainful Employment

The Association for Energy Affordability (AEA)

AEA is a not-for-profit training and technical services organization committed to the principle of using energy efficiency to maintain affordable and healthy housing for low- and moderate-income families and communities. AEA runs a variety of energy efficiency training programs at its Bronx facility. Several prepare for Building Performance Institute (BPI) certifications. BPI certification is the industry standard for residential building analysts (energy auditors) and residential building retrofit professionals (HVAC and building envelope technicians). Only contractors with certified BPI staffers can participate in New York State Energy Research and Development Authority (NYSERDA) supported efficiency programs. The AEA courses range from 36-41 hours depending on the targeted certification and are geared towards people with some building science or construction trades background. AEA has also provided customized building efficiency training for property management companies, Department of Housing Preservation & Development (HPD) staff, and SEIU 32BJ, the building services union.

SEIU 32BJ Thomas Shortman Training Program

SEIU Local 32BJ is the largest building service workers union in the country, representing more than 100,000 cleaners, doormen, porters, maintenance workers, superintendents, resident managers, window cleaners, and security guards. The Building Service 32BJ Thomas Shortman Training Program (TSTP), founded in 1971, is a non-profit education fund supported primarily by contributions from participating employers. Every year, the program provides industry, academic, and computer courses to thousands of Local 32BJ building service workers at over 20 locations in New York, New Jersey, Connecticut, Pennsylvania, the District of Columbia, and Maryland. Since 2005, the Shortman program has worked with the New York State Energy Research & Development Authority (NYSERDA) and other partners to offer a wide range of programming focusing on existing buildings. Its mainstay is an 11-session green building that includes basic instruction on green building concepts, energy and water efficiency, building controls, and green cleaning supplies as well as two building tours: an energy audit of a typical residential building and a tour of a LEED-certified green building. They have also launched a lighting retrofitting workshop, provided a recycling seminar, hosted a LEED-Existing Building (EB) Technical Review and worked with The Center for Sustainable Energy to prepare several 32BJ instructors for the Building Performance Institute's (BPI) Building Analyst Certification.

Over the next year, 32BJ plans to expand its training to give workers a deeper understanding of the connection between their jobs and the environment. They will offer a second green building course, prepare students for a series of new trades-oriented USGBC certifications, and launch a Green Diploma Program. This diploma program will offer an educational track for those who wish to work in green buildings or make improvements in the buildings where they currently work. Workers will learn how to run a building efficiently, use cleaning supplies and materials that have a low impact on indoor air quality, reduce waste, and recycle effectively in their buildings.

Courtesy: James Barry, Manager of Program Development, Building Service 32BJ Thomas Shortman Training Program

Building Service 32BJ Thomas Shortman Training Program

GREEN BUILDING COURSE

Class 1: Course Introduction

Introduction to NYSERDA and green/energy programs
Basic concepts of “green” and “high performance buildings”; why is this important?
Whole Systems Approach; Understanding of building as interrelated components
Introduction to basic theories of Thermodynamics
Stack and Wind Effect and Building Envelope
Understanding the components of a building envelope
Knowing proper window types and installation; knowledge of NFRC ratings

Class 2: Quantifying Energy and Water Usage

Introduction to Energy Usage Analysis
Identifying wasted energy usage in typical buildings
Calculating Base Energy Usage
Defining different types of fuels
Understanding typical bills for fuel usage
Understanding Heating Degree Days / Calculating BTU/ft²/HDD for a building
Class Exercise: Building Energy Usage
Analyze electric bills, usage, demand load and patterns
Energy Measure cost effectiveness

Class 3: Water & Domestic Hot Water (DHW) Usage/Conservation

Understanding major uses of water
Inspection and basic repairs of plumbing systems
Water conservation
Toilets, Showerheads, Sinks
Detecting and repairing water leaks
Hot Water Efficiency: Hot Water Makers vs. Boilers
All Hot Water Alternative Systems
Water Temperature and Safety
Washing Machines and Hot Water

Class 4: Health and Safety/Green Cleaning and Maintenance

Tobacco smoke; Carbon Monoxide CO; Detecting & responding to high CO levels
Low VOC paints
Mold - Prevention, Identification, Mitigation
Asbestos - Identification, Mitigation
Lead - Identification, Mitigation
Pest control; Fire safety
Material Safety Data Sheets; OSHA Guidelines
Green Cleaning Products: *Presented by Every Supply/Dino Leva*

Class 5: Lighting, Appliance & Electricity Usage

“Real world” costs of lighting
Lighting fixtures; Light levels
Controls: Timers, motion and light sensors
Motor electrical usage
Plug loads, Appliances; Refrigerators; Freezers
Dishwashers; Washing machines; Dryers
Air Conditioners; sizing and efficiency issues, Electric Heaters

Building Service 32BJ Thomas Shortman Training Program

Class 6: Heating, Ventilating, and Air Conditioning Systems

Introduction to different types of heating plants
Typical atmospheric gas appliance
Modular gas boilers; Modular atmospheric gas boilers
Typical scotch marine boilers; Power vented/ sealed combustion systems
System operations & maintenance
Identifying and Understanding different heating controls.
Boiler controls: Outdoor temperature reset
Burner modulation controls; Pressuretrols vs. Vaporstats
Combustion Efficiency and firing Rates

Class 7: Building Control and Operations

Heating Laws and Client Comfort
Reducing overheating
Boiler/Burner Modulation Controls
Modulating and Step firing controls
Chronic "Modular" Boiler problems
Thermostats, Off the shelf heating controls
Thermostatic Radiator Valves
Energy Management Systems (EMS)
The importance of instructions; Procure, Read, Follow
Logs and other record keeping systems

Class 8: On Site Energy Audit (of a participant's building)

Field Trip to a typical residential building to evaluate it's performance
determine where the building is wasting energy and water, types of improvements and the
measures that offer the best payback.

Class 9: Tour of a Green Building

Field Trip of the Solaire to see some of the features that are discussed in the course
including a green roof, solar panels, grey water treatment plant, and various green building
materials.

Class 10: Environmental Overview: Peak Oil, Global Warming, and Carbon Footprints

Provide a deeper context for why efficiency and sustainability is important
Basic calculation to determine building CO₂ emission
Oil production – when is it predicted to peak?

Class 11: Financing Green Building Strategies/Course Conclusion

Cost effectiveness of building improvements; calculating payback
Management Strategies
Green building rating systems
Recap of NYSERDA programs; other opportunities for financial incentives
Course conclusion/evaluation

Building Works

Building Works is a 17-week pre-apprenticeship training program targeted specifically toward young people of color from in and around New York City with a history of low-income employment. It is operated by the District Council of Carpenters and is nationally recognized as a model job training program. The program prepares its students for careers in the building trades, but specifically offers a green collar track in brownfield cleanup. All students must have a high school diploma or a GED and must enter a competitive process in order to be accepted to the program. Students are held to very high standards while enrolled in the program. The training consists of three principal components: work readiness, environmental remediation, and carpentry. Work readiness includes work values, job search and retention skills, industry-related mathematics (measurements, simple geometry, etc.), computer literacy, and basic writing for the workplace. This is followed by worker health and safety training that leads to certifications or licenses in HAZWOPER-40, OSHA-10, Asbestos and Lead Abatement, Confined Space Entry, Air Sampling, and Mold Remediation. Finally, the program uses retired veteran journeyman carpenters to provide several weeks of construction industry coursework. The program's job placement rate has averaged 85% over the past five years, with placement above 95% for the past two years.

Sustainable South Bronx

The Bronx Environmental Stewardship Training is one of the nation's first and most successful green collar job training and placement systems. Focused on the need for urban horticultural infrastructure, and the lack of skilled labor, the 10-week program includes green-roof installation and maintenance, brownfield remediation, urban forestry design and maintenance, wetland/estuary restoration, and stream bank stabilization. These green solutions to stormwater management and reducing urban heat island effect are cost-effective strategies now, and will only become more important as global warming consequences like more intense rains and higher average temperatures become the norm. In addition, studies have proven the social and health benefits of increased greenery in an urban context. Nearly all of the students were on some form of public assistance, and about half have prison records. Now in the fifth year of operation, 85% of its graduates are still employed and 10% have gone on to higher education. The model is currently being expanded to include energy audits, efficiency retrofits, and alternative energy solutions training.

Courtesy: James Chase, Director of Communications, Sustainable South Bronx

Youth Ministries for Peace and Justice (YMPJ)

YMPJ is a community-based environmental justice organization that works to rebuild the neighborhoods of Bronx River and Soundview/Bruckner in the South Bronx by preparing young people to become prophetic voices for peace and justice. YMPJ offers "Greenternships" to graduates of their youth organizing program. Greenternships are training and apprenticeships that bridge the critical gap between YMPJ's youth programs and the job market. YMPJ specifically focuses on green collar public- and private-sector career tracks in stormwater management, street beautification, urban forestry, urban planning, and gardening. A Youth Organizer who, for example, received YMPJ's Citizen Street Tree Pruner certification, can further pursue this career track to a well-paying entry-level job with NYC's Parks Department through a Greenternship.

The Parks Opportunity Program of the City of New York

Since 1994, the City of New York/Parks & Recreation (DPR) has provided workforce development services to public assistance recipients and successfully transitioned over 9,000 people from welfare to work. As one of the nation's largest and most successful welfare-to-work transitional employment programs, the Parks Opportunity Program (POP) is exclusive to other programs due to its ability to offer a paid wage, work experience, and employment preparation within the same agency.

Job Training Participants (JTP) at DPR work in 6-month assignments for 40 hours a week and earn an hourly wage of \$8.52. JTPs range in age from 18-55 and 77% are female. POP's mission is to provide training, job search assistance, and paid work experience for Temporary Aid to Needy Families and Safety Net recipients, ultimately placing them in unsubsidized private sector employment.

JTPs spend four days a week gaining work experience in the field and one day a week in workshops ranging from counseling, education, training and case management. The workshops include resume writing, interviewing techniques, customer service skills, time management, budgeting, computer skills and keyboarding. Through extensive partnerships with the Department of Education, the City University of New York, and private training providers, POP is able to offer education and training classes to JTPs at locations citywide.

JTPs work in various assignments including horticulture, custodial maintenance, technical services, security, office administration, and customer service four days a week. While JTPs build upon their experience, increase their skills and plan for their future, JTPs serve as DPR's front-line staff, contributing daily to the "greening" of city neighborhoods.

Courtesy: NYC Department of Parks and Recreation

United States Green Building Council, NYC

The New York City chapter of the United States Green Building Council (USGBC) is developing a series of green building skills curricula specifically for contractors, trades, and building managers in the greater New York area. The overall goal of this project is to increase the knowledge of green building methods and the use of sustainable materials and practices in new construction, renovation projects, and ongoing building maintenance in both commercial and residential markets.

Key contractor, union, and building operator representatives from across the greater New York City construction industry are being invited to work in a partnership focused on defining the need and content for green skills training. Direction on how and where best to deliver the resultant curriculum will follow. Subject matter experts will be enrolled to develop general segments on green building principles as well as individual trade and/or building systems specific modules for those skill and application areas determined most important and useful.

The overall product will be hands-on technical training materials made available to interested contractors, unions, colleges, and high schools for use in their construction skills programs. A green building skills certification process will be incorporated for those successfully completing these trainings. A complementary outcome will be the development of a means for concerted industry engagement in further adopting green building practices in New York City.

Courtesy Scott M. Sears, Sears Associates and the U.S. Green Building Council, New York Chapter



CUNY and Sustainability Training

The City University of New York is committed to leading the way to a greener future. CUNY is developing and implementing environmentally sustainable practices in every aspect of its operations. Already, the university is one of the top 10 U.S. universities in its use of energy from renewable sources. Offering green energy and other training programs for individuals, unions, employers and other organizations is a key element of this commitment to sustainability.

No single institution offers CUNY's range and depth of knowledge in so many sustainability-related fields. As well, with 23 colleges throughout the five boroughs, serving 230,000 degree program students and over 200,000 continuing education students, CUNY has unmatched capacity to offer credit-bearing courses, certificate programs, degrees, and non-credit training programs.

These programs meet the needs of many different audiences, including: engineering, design and development professionals; companies providing energy services, building management, and construction; government officials engaged in oversight, construction management and retrofitting; construction trades and building management unions; individual entrepreneurs; and individual home and apartment-owners. These programs can be customized to meet the needs of specific organizations, and can be offered on campus, in the workplace, online, at other locations, and on flexible schedules.

Among the programs currently offered throughout CUNY are the following:

- **Energy services and renewable energy** programs at Bronx Community College
- **Building Performance Analysis and sustainable real estate management and development** at the Newman Real Estate Institute - Baruch College
- **Environmental Control and Facilities Management** degree programs at New York City College of Technology
- **Photo-voltaic system installation training** at Bronx Community College, LaGuardia Community College and New York City College of Technology
- **Waste management and recycling** programs at Kingsborough Community College
- **Green design** courses at LaGuardia Community College

CUNY is working to create a sustainable future for New York City by building on this expertise and these accomplishments – we want to expand into the full range of sustainability-related areas and to train the “green collar” workforce of the future. The University seeks additional partners for the development and implementation of renewable energy and other sustainability-related training programs.

For more information, contact Suri Duitch, University Director of Adult and Continuing Education (suri.duitch@mail.cuny.edu), or Tria Case, Executive Director of the CUNY Sustainability Task Force (tria.case@mail.cuny.edu).

Sustainability-Related Programs at CUNY

Building Management

CUNY Building Performance Lab

CUNY Institute for Urban Systems, Baruch College – Newman Real Estate Institute

Environmental Control Technology Associate Degree Program

Environmental Control Certificate Programs

Facilities Management Bachelor's Degree Program

Green Home courses

Facilities 101 courses

Sustainable Technology Certificate Program

New York City College of Technology

Construction

Construction Management Technology Degree Program

New York City College of Technology

Construction Management Certificate Programs

Borough of Manhattan Community College, LaGuardia Community College,
New York City College of Technology

Green Advantage Certification

Kingsborough Community College, LaGuardia Community College

Project HIRE Construction Trades training

Bronx Community College

Design

How to Design and Sell Greener Products course

Introduction to Sustainable Design

LaGuardia Community College

Energy Services

Building Performance Institute

Energy Services & Technology Associate Degree Program

Renewable Energy Technology (RET) Screen Project Analysis Software

Bronx Community College

Building Systems and Energy Management courses

CUNY School of Professional Studies

Photovoltaic Installation Training

Bronx Community College, LaGuardia Community College, New York City College of Technology

Engineering and Architecture

Sustainability in the Urban Environment Masters Degree Program (currently under development)

City College

Real Estate Development and Management

Introduction to "green" high performance building course

Sustainable real estate development- developer's role course

Existing building, sustainable improvement and management course

Green residential design, site analysis, and budgeting course

Sustainable property management course

Newman Real Estate Institute-Baruch College

Other Programs

Urban Ecotourism

Sustainable Leadership

Urban Solutions for the Environment (USE)

Kingsborough Community College

FEDERAL PROGRAMS AND RESOURCES

Excerpted from: "Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy", Center on Wisconsin Strategy & The Workforce Alliance & Apollo Alliance, 2008

PROGRAMS

Resources–Employment and Training

Integrating green-jobs initiatives into the nation's established workforce development system, which we argue here and elsewhere is essential to the success of such initiatives, brings green career pathways into the contested federal labyrinth of the 1998 Workforce Investment Act (WIA). WIA aimed to rationalize employment and training programs through a national one-stop career center system. In practice, states have struggled to bring together siloed programs with disparate funding streams, constituencies, performance measures, and service cultures, including WIA Title I (adult, dislocated worker, and youth programs), Wagner-Peyser, adult education and literacy, post-secondary vocational training (Carl D. Perkins), vocational rehabilitation, veterans employment and training, Trade Adjustment Assistance, and others. In an increasingly constrained federal funding environment—the Bush administration has been particularly vigorous in its attempts to cut key workforce education and training programs—green jobs will need to be integrated into existing programs, rather than launched as stand-alone projects competing for scarce resources.¹⁴⁸ This makes sense from a systems perspective too, as we articulate in the declaration of policy principles below.

Outside of standard workforce funding streams, which green jobs initiatives can and should leverage, the Department of Labor's Employment and Training Administration has in recent years launched a number of discrete grant programs for regional workforce development. Few of them to date have focused on renewable energy, but some have, and more could.

Green jobs initiatives need to be integrated into existing workforce programs, rather than launched as stand-alone projects competing for scarce resources

RECENT JOB TRAINING INITIATIVES

The President's High Growth Job Training Initiative (HGJTI) identifies energy as a critical industry sector for labor market intervention, including the development of career ladders.¹⁴⁹ But of the 157 grants made to date through the HGJTI, just 11 went to energy projects, and none of those support renewables or efficiency.¹⁵⁰

Taking a small step in the right direction, the 2008 Department of Labor (DOL) grant solicitation addresses regional workforce development challenges in the energy industry—including the renewable energy sector—by targeting related occupations in the construction and the building trades. The current round will distribute some \$10 million in grants to strategic regional partnerships. Successful models will bring together public and private stakeholders to address industry skill shortages and prepare workers for good jobs expanding the nation's energy infrastructure. How many of those jobs will be dedicated to building a clean energy infrastructure remains to be seen.

To further address skill shortages in high growth industries, the Bush Administration targeted community colleges, with their close ties to local labor markets, as a key conduit for demand-driven workforce training. Unfortunately, the ensuing Community-Based Job Training (CBJT) grants offered little to the burgeoning clean energy sector.

In 2005, DOL awarded \$125 million in Community-Based Job Training grants to 70 community and technical colleges in 40 states. In 2006, 72 institutions in 34 states received a total of \$125 million in grants. Of the 141 currently active programs, 13 target energy, and just two of those renewables.¹⁵¹

A \$2 million grant to Mesalands Community College in New Mexico will fund the instruction of over 1,200 individuals in wind energy careers, the development of a curriculum and certification programs for wind energy technicians, as well as the acquisition of a wind power turbine that will serve as both a training tool for workers and a research tool for North American Wind Research and Training Center partners.

Northeast Community College in Norfolk, NE, will use \$2 million in CBJT funds to train incoming and incumbent workers in biofuels. The College and its partners plan to implement a statewide initiative establishing career pathways in the ethanol industry. According to their projections, the program will train 1,380 participants, support opportunities for secondary school students to obtain dual credits and explore careers in the ethanol industry, and develop an associate degree in ethanol production and management, with potential links to a related bachelor's program.

Resources—Energy & Economic Development

State energy agencies can and should serve as a clearinghouse of federal opportunities. A good example is the list maintained by Wisconsin's Office on Energy Independence, which also includes federal incentives and private funding opportunities. See: <http://power.wisconsin.gov/section.asp?linkid=1127&locid=131>.

Navigating the federal labyrinth can be daunting. While state commerce departments are a logical place to troll for worker training incentive funds, things are different in Washington. A Kansas Federal Reserve study counts 180 federal economic development programs scattered in "virtually every corner of the government, including the Department of Defense." With no single coordinator, they are united only by a decidedly 20th-century focus: building physical infrastructure in a homogenous economic landscape.¹⁵⁵

The most direct way to research current funding opportunities related to green job development is the federal government grant website, <http://www.grants.gov>. The site includes all 26 federal grant-making agencies, and searches can be conducted by category, such as energy, natural resources, or regional development.

While few programs outside the purview of the federal government's big three for employment and training—DOL, Health and Human Services, and Education—focus explicitly on worker training, many can drive the development of green jobs, particularly in the Department of Energy (DOE).

DOE's federal laboratories promote the efficiency and wind industries through a variety of grants, from the development of large fuel cell systems to providing home weatherization assistance for low-income individuals. In addition, the DOE Office of Energy Efficiency and Renewable Energy provides financial opportunities for business, industry, and universities.¹⁵⁶ These have included, for instance, funding for a national accreditation and certification program for photovoltaic system installation, but there appears to be little sustained effort to include employment and training provisions in such grants.

The DOE also co-sponsors funding opportunities—primarily for research and development—with the U.S. Department of Agriculture (USDA) for bio-industry development. Grants have focused primarily on improving production of biomass-based products, bioenergy, and biofuels, in order to make them economically competitive with fossil fuels. Given the state of ethanol, it makes sense that current funding focuses on genomic-based research to improve biomass and plant feedstocks for fuel production. The USDA is also offering funding directed towards the sustainability of all components of U.S. agriculture; while this grant may not explicitly identify bio-industry development as its aim, it could support research on bio-based products and bioenergy production.

DOE has also partnered with the National Science Foundation (NSF) in funding green development. These grant programs are designed to build states' capacity to conduct competitive, energy-related research and to cultivate talent in science and engineering. The Energy for Sustainability program, for example, supports research and education in renewable energy production, conversion, and storage. NSF grants come in many guises, and are the only ones that appear to regularly include workforce development projects.

NEW LEGISLATION: THE GREEN JOBS ACT OF 2007

On December 19, 2007, President Bush signed into law the Energy Independence and Security Act (EISA). The EISA is a broad-ranging piece of legislation that will have major implications for green job development in the United States in coming decades. Although it is beyond the scope of this report to summarize the EISA in detail, some of its provisions that will most significantly affect employment in renewable energy and energy efficiency sectors include:

Increased fuel economy standards for cars and trucks, new incentives for the domestic development and production of advanced technology vehicles, vehicle batteries, and plug-in hybrid vehicles.

An increased renewable fuels standard, which sets annual requirements for the amount of renewable fuels produced and used in motor vehicles, while ensuring that biodiesel and cellulosic sources are a significant proportion of that increase.

The creation of a new Solar Energy Curriculum Development and Certification Grant Program within the DOE, authorized at \$10 million per year, for competitive grants to create and strengthen solar industry workforce training and internship programs in the installation, operation, and maintenance of solar energy products.

A new Energy Efficiency and Conservation Block Grant Program within the Department of Energy, authorized at \$2 billion per year, to be allocated to state and local governments to be used for innovative best practices to reduce fossil fuel emissions and energy use and to achieve greater energy efficiency in the building, transportation, and other appropriate sectors. These grants could be used for building and home energy conservation programs, energy audits, fuel conservation programs, planning and zoning to promote energy efficiency, and the use of renewable energy resources for government buildings. In addition, subgrants could be made to nonprofit organizations and governmental agencies for the purpose of performing energy efficiency retrofits.

A requirement for improved federal and commercial building energy efficiency.

The subtitle of the legislation that is most explicitly focused on employment in green energy sectors is the Green Jobs Act (GJA).

Approved in December 2007 as Title X of the EISA and authorized at \$125 million per year, the Green Jobs Act creates an Energy Efficiency and Renewable Energy Worker Training Program as an amendment to the Workforce Investment Act. GJA targets a broad range of populations for eligibility and a host of energy efficiency and renewable energy industries, including clean-energy jobs in areas such as energy efficient building, construction and retrofits; renewably generated electric power; energy efficient vehicles; biofuels; and manufacturing that produces sustainable products and uses sustainable processes and materials. Authorized at \$125 million per year, the program will be administered by DOL in consultation with DOE, and includes both national and state-level components.

The Green Jobs Act: National Components

National Research Program. DOL, acting through the Bureau of Labor Statistics, will collect and analyze the labor market data necessary to track workforce trends in energy efficiency and renewable energy, and provide technical assistance and capacity building to partnerships. Ten percent of the amount appropriated for the GJA will be dedicated to this program (\$12.5 million if fully funded). As we've said elsewhere in this paper, there's a lot we don't know about these jobs and the labor markets; this investment could help fill the vacuum.

National Energy Training Partnership grants. DOL will award competitive grants to nonprofit partnerships to carry out training that leads to economic self-sufficiency and to develop an energy efficiency and renewable energy industries workforce. The partnerships must include the equal participation of industry and labor, and may include related stakeholders such as local workforce investments boards, educational institutions, and community-based organizations. Thirty percent of the amount appropriated for GJA will be dedicated to these grants (\$37.5 million if fully funded).

The Green Jobs Act: State Components

State Labor Market Research, Information, and Labor Exchange Research Program. DOL will award competitive grants to states to administer labor market and labor exchange information programs, in coordination with the one-stop delivery system. Activities will also include the identification of job openings; the administration of skill and aptitude testing; and counseling, case management, and job referrals. These programs will be administered by the state agency that administers the employment service and unemployment insurance (UI) programs and services can only be delivered by state merit staff. Ten percent of the amount appropriated for GJA will be dedicated to this program (\$12.5 million if fully funded).

State Energy Training Partnership Program. DOL will award competitive grants to states to enable them to administer renewable energy and energy efficiency workforce development programs via the state agency that administers employment service and UI programs. It will award grants to partnerships that essentially mirror the national partnerships. Priority will be given to states that demonstrate that their activities meet state and national policies associated with energy efficiency, renewable energy, and reduction of emissions. Thirty percent of the amount appropriated for GJA will be dedicated to this program (\$37.5 million if fully funded).

Pathways Out Of Poverty Demonstration Program. DOL will award at least 10 competitive grants to training partnerships that serve individuals living at under 200 percent of poverty or a locally defined self-sufficiency standard.¹⁵⁷ The partnerships must include community-based organizations, educational institutions, industry, and labor; demonstrate experience implementing training programs and recruiting and supporting participants to the successful completion of training; and coordinate activities with the WIA system. In awarding grants priority will be given to partnerships that target low-income adults and youth and plan to implement various strategies that enable access to, and successful completion of, training, including ensuring that supportive services are delivered by organizations with direct access to and experience with targeted populations. Twenty percent of the amount appropriated for GJA will be dedicated to this program (\$25 million if fully funded).

The national and state partnership grant programs, and the pathways out of poverty demonstrations, all give priority to applicants (whether the state or partnerships) that can leverage additional public and private resources. For this reason, state and local governments and private-sector partners that have already invested in their own green jobs initiatives will be in a more competitive position to be awarded GJA grants.

It is important to note that while funds were authorized for the GJA, they were not appropriated, so full funding will have to be secured in the next appropriations cycle. However, the legislation does require that DOL, in consultation with DOE, establish the Energy Efficiency and Renewable Energy Worker Training Program by May 2008. It remains unclear how DOL will respond to this requirement. Because the GJA amends WIA's Section 171 for Demonstrations, Pilots, and Research, DOL could draw on funds from this budget line, which in the 2008 Labor-HHS-Education Omnibus Appropriations bill was funded at \$48.5 million. Although much of that money is already committed to earmarks, DOL could presumably allocate some of the funds toward preliminary grant-making for the GJA. Alternatively, DOL could focus on creating a regulatory framework and developing a bare bones program in anticipation of dedicated funding in the future.