

CAREER CURRENTS

Green Jobs – What They Are and What You Need to Know to Get One

It's hard not to read an article about careers and job opportunities these days without seeing mention of "green jobs." Many states have been conducting studies on the effects of green jobs and how these new career opportunities can help revive their sagging economies. It seems to be a win-win type of career opportunity that is attracting interest from people in many different fields.

In spite of growing interest, there is still confusion over exactly what a "green job" is. The definition appears to vary not just by industry, but by the person you talk to about it. For example, Phil Angelides, the chair of the Apollo Alliance, says that a green job "has to pay decent wages and benefits that can support a family. It has to be part of a real career path, with upward mobility. And it needs to reduce waste and pollution and benefit the environment." A research brief from the Heldrich Center for Workforce Development says that green jobs "can be broadly defined as jobs that involve protecting wildlife or ecosystems, reducing pollution or waste, and reducing energy usage and lowering carbon emissions." In his book *The Green-Collar Economy*, Van Jones writes that a green-collar job is "A family-supporting, career-track job that directly contributes to preserving or enhancing environmental quality." The Interstate Renewable Energy Council says that green jobs "are found in industries and organizations dealing with renewable energy, energy efficiency, and energy conservation. Jobs include products, services, research and design that contribute to environmentally sustainable practices. Jobs include new jobs and greening of conventional jobs with training set to industry standards and with opportunities for economic advancement."

Putting these and other definitions of "green jobs" together, a few common themes emerge. One is that these jobs deal with protecting the environment and reducing energy use. Another is that these are jobs that offer solid opportunities for career advancement. In addition, the popular definitions usually make it clear that while some green jobs require very specialized skills, many require the same basic skills that are needed in traditional jobs. Additional experience and training can make these skills more applicable to green jobs. The Center for Energy Workforce Development (CEWD), for example, notes that an engineer who designs process flow in a conventional generating station can be trained to design emission control systems in the same station, or a worker who now installs air-conditioning systems can be trained to install efficient, energy-saving equipment. *(continued on next page)*



Many basic electrical skills are needed to install PV systems on a rooftop, but there are some things the average electrician might not do all the time, as these students are learning. Photo courtesy of Solar Energy International.

(Green jobs, continued from page 1)

Contrary to some myths that say that green-collar jobs are only for professionals like scientists and researchers, the reality is that companies with a green focus need workers with skills similar to those in conventional businesses, including accountants, marketing experts, sheet metal workers and service technicians.

CEWD also predicts that the largest number of green jobs will be those that require a professional certificate, an apprenticeship, or a year or two of post-secondary education to teach the basic industry fundamentals as well as specific skills for green jobs.

While there will be many opportunities for workers with trade and professional skills to move into “green” occupations, there will also be many opportunities in the coming year for people specializing in renewable energy and energy-efficiency careers. A 2009 report from the American Solar Energy Society on green-collar jobs estimates that there are about nine million green-color jobs in the U.S. today and many more being created. In fact, renewable energy and energy efficiency jobs have created an industry with more than one trillion dollars in revenue in 2007 – more than the combined sales of the three largest U.S. corporations (Wal-Mart, Exxon-Mobil and General Motors). In addition, a recent federal stimulus package worth tens of billions of dollars will help generate a number of new jobs in the coming years.

So how do you get started with a green job? Start by asking yourself what type of work you enjoy doing. Do you like to work in an office or on a job site? With computers and technical equipment, or with tools and your hands?

Check your local newspaper, specialized publications and web sites in your field of interest and look for workshops, classes, articles or other educational materials. Talk to people at your local community college or university to find out if they offer courses in the field. Look into certificate programs or on-the-job training opportunities.

It’s going to take thousands of workers at all job levels to turn our country’s economy into a green one, with a healthier environment and reduced use of energy. There are jobs out there now, and many more will be needed in the future. It appears that the way to get into the field is to develop skills and expertise in the type of work you like to do, then supplement this with additional training in a specialized area.

One other thing to keep in mind. Many of today’s energy industry workers are within 10 years of retiring, opening up a tremendous number of job opportunities for young people with an interest to work in the field. With the basic skills and specialized knowledge needed to operate power plants, design wind turbines, help improve the electric grid and use other technical skills, you can be on the road to improve the country’s infrastructure while modernizing our energy technologies.

Community Colleges Offer a Great Path to Green Careers

“Because of the mission of America’s community colleges to provide training and education for jobs in their local businesses and industry,” Kirk Laflin explained, “they are playing a major role in both preparing high school graduates for green jobs and giving older students new skill sets needed for those types of jobs.”

Laflin, who is Executive Director of the Partnership for Environmental Technology Education (PETE), said that a key to finding a green job is to look at just about any discipline and see where sustainability, recycling, resource conservation or other energy strategy can be added. “Take a field of study like business,” he said, “and you’ll quickly see that since so many businesses are moving toward the wise use of energy resources, you need people with green skills from top down in the company.” He noted that asking an employer what kind of green jobs they have available will often get you a blank look back with the explanation that they’re not in the energy or environment business. But looking at the types of jobs they have available will often show that there are a number of jobs that fall into the green category. When the employer describes the skill sets needed for various jobs, you’ll often see that these are essentially green opportunities.

Community colleges have long been seen as the major pipeline of workers looking to get into jobs in their communities. When local businesses are looking for technicians or others in a new area, for example, community colleges respond by offering programs to meet those needs, as opposed to the more global, long-term focus universities usually have.

“Since the average age of a community college student today is around 29, it is clear that many of them are people coming back to school to get additional skills,” Laflin added. “What better opportunity is there than for their community college to offer the skill sets needed for a career in a green job?”

Green Jobs in the Energy Efficiency & Renewable and Clean Energy Sectors

Energy efficiency is not just about putting on a sweater and turning off the lights. It's about weatherizing homes, doing energy audits on businesses, and investing in more efficient equipment and lighting. It's about creating systems to track energy usage and manufacturing efficient appliances.

Weatherization and building retrofits will provide the greatest number of green jobs. For residential weatherization, most jobs require low-to moderate- skills preparation, while in commercial and industrial retrofitting, there is a wider range of educational and training needs. Common occupations in these areas include the following:

Residential Weatherization: Electricians; Heating/Air Conditioning Installers; Carpenters, Carpenter Helpers; Construction Equipment Operators; Roofers; Insulation Workers; Construction Managers, and Building Inspectors, Auditors.

Commercial and Industrial Retrofits: Building Weatherization Occupations; Electrical Engineers; Mechanical Engineers; Cogeneration Construction and Operation; Measurement and Verification Technicians, and Energy Management Analysts.

For renewable and sustainable energy occupations, the distribution of required education and training preparation is more varied, and specific to the type of renewable energy. While the majority of renewable energy occupations are in manufacturing, there are also jobs associated with heavy construction and installation, and operations and maintenance.

For example, in the wind energy sector, the occupations vary from entry-level construction laborers to advanced engineers. Wind energy jobs include Environmental, Energy Engineers; Iron and Steel Workers; Sheet Metal Workers; Machinists, Millwrights; Electrical Equipment Assemblers; Construction Equipment Operators; Industrial Truck Drivers; Industrial Production Managers, and Operators, Maintenance Technicians.

The occupations above are some examples of those that could become "green" jobs in energy efficiency and renewable energy with additional worker training and education. Reprinted with permission from "Preparing the Workforce for a 'Green Jobs' Economy," a Research Brief from the John J. Heldrich Center for Workforce Development, 2009.

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Career Currents provides educators and students with resources to introduce energy careers. Each issue focuses on a different sector of the energy industry. No single issue is meant to be all-inclusive to either the sector profiled or all careers in energy.

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Q&A

Jana Jones, ComEd



Jana Jones is Environmental Education (K-12) Program Manager for ComEd Marketing and Environmental Programs. ComEd is an electric utility company servicing north and central Illinois. She also manages ComEd's employee and customer outreach and ENERGY STAR "Change the World" pledge campaign.

Can you give us an example of green job opportunities you see in the utility field?

That's a hard one to answer since just about every job at a utility company could be turned into a green job by doing the work differently in the future. Green jobs are very similar to traditional jobs, but with more of an emphasis on smart energy use, renewable energy and environmental benefits. At ComEd, we have an environmental group that established company-wide environmental policies. Like many utilities, we have a huge commitment to reducing Greenhouse Gas (GHG) emissions. We tackle this goal in several ways. For example, we have one of the country's largest fleet of biodiesel and hybrid vehicles, along with a few plug-in hybrid vehicles. ComEd's energy efficiency programs have already helped customers save more than \$44 million in energy costs by recycling more than 5,000 refrigerators and purchasing more than 1.8 million CFLs. I get directly involved in GHG reduction by managing ComEd's pledge-driving efforts in the ENERGY STAR "Change the World" Campaign. You can see that green jobs in the utility field can be different from one another but all have a common commitment to the environment.

What kinds of opportunities are there today for a student who'd like to work in a green job?

Looking around our company, I see green jobs touching on many different positions. Everyone here has to know how to do their jobs in a traditional manner, but they also have to be well-versed in the green aspects of their department and corporate initiatives. There's a big push at our company to operate efficiently and greener, so everyone who works here has some environmental responsibility directly or indirectly.

Do you see many new green job opportunities in the future at utility companies?

Absolutely. Some are pretty obvious, like the many engineers who are working in areas related to energy efficiency and demand control. I recently worked with an engineer on a project to engage students in energy

reduction and promote long-term thinking of green jobs. We worked with a handful of schools in our service territory holding a day-long workshop for teachers where we offered resources such as NEED materials and taught them how to do a school energy audit. Then we were called upon to help the students with their projects and develop district-wide energy efficiency outreach. This kind of work will be a major green activity in the future, and it's only one example of where utility companies are going.

Is it strange that a utility company promotes green strategies since your mission is to distribute electricity?

We often get puzzled looks when we talk to people about ways to save energy and money, but once they are educated on the topic, it makes sense to them. We benefit when people use less energy since it cuts down on the need to build new power plants. If people learn how to use energy more wisely, it will cut down on a lot of backup the grid runs into when there is heavy demand. We spend a lot of time educating people on how the country's electric grid works and how it will serve them better if people use electricity wisely.

What would you recommend students do to prepare for green job?

Get started by doing as much research as possible and proactively network. Don't be afraid to call people and ask questions. I've had a number of students contact me to ask for energy related materials for class projects or to ask me to speak to their class about what we're doing here. If you're really interested in being a part of the green future, be open to new ideas and explore opportunities for creating a green job based on your interests or find an existing job that you might enjoy. We're in a constantly changing environment and jobs will go to students who take initiative and get involved.

What would you have said about green job opportunities if we'd interviewed you five years ago?

Five years ago it would have been hard to predict the mindset of companies today. Environmental and energy-efficiency fields have been around for a while, but now we're seeing an explosion in green jobs and career opportunities.

Q&A

Doug Keaton, Russell ATC



Doug Keaton has been an electrical technology instructor at Russell (KY) Area Technology Center for the past 13 years. He recently joined NEED as Director of Career and Technical Education (see the back cover of this issue).

What do you tell students who are interested in working in green jobs?

There is a general misconception that a green job is one based on a different skill set than any other job, and that's not really true. For example, if a student comes into my program and studies the basic courses to be a lineman or line technician for a utility company, he'll find that those same skills could be used to be a wind turbine technician. I explain that if you take my basic circuits class, for example, you can use that knowledge to be a photovoltaics technician or installer, not just end up doing standard electrician work.

What do you recommend to your students as green jobs?

New jobs and new careers have opened up in the past few years, and continue to be created as federal and state programs promote the need for certified and trained installers and technicians in these new fields. More and more new buildings are being built with LEED (Leadership in Energy and Environmental Design) certification. New energy measures are being put into place to create zero-energy buildings. You cannot just pick up a phone book and find thousands of contractors to help with these projects. I tell students there has never been a better opportunity than today for someone with their electrical and other technical skills. Go out and become a North American Board of Certified Energy Practitioners (NABCEP)-certified installer. Take your skills and put them to work in the fields that are really taking off right now.

What careers do you see as especially desirable for your students to pursue?

I'm especially excited about renewable energy. Take a person who has been working in their family's heating, ventilating and air conditioning business for a while. He or she could take that

basic electric background and put it to work in the geothermal field, for example, and use his or her knowledge to now install those systems. I tell my students to take what we have today and make it better. Consider the example of a coal-fired plant that uses the same boilers that we used more than 50 years ago. If we could make those boilers more efficient, we wouldn't burn as much coal and we'd reduce greenhouse gases. Now those would be green jobs to work on. Sure, coal itself isn't a renewable resource, but green also means management and conservation of all of our energy resources.

Are students coming to you asking about green careers?

Absolutely. The first year I taught an energy class, it had such demand that it quickly filled. The next year, the high school added a second section and that too quickly filled. Now this year we've added a third section open only to female students to get women more interested in the engineering and technology areas, and that course is filling up as well.

What would you have said five years ago if we had asked you about green jobs?

I think most people would have laughed at the idea back then of having a green training program at the high school, community college or university level. About four years ago, my principal asked me to come up with some new courses to teach electricity in ways that we hadn't before. I saw an old derrick-style windmill pumping water on a farm, so I thought we could build a wind turbine to generate electricity. That spring we built a 1-kW turbine on a 60-foot tower outside of my classroom and put it into production. The next year we installed a 1-kW PV panel and built an energy-efficient control room. This became a pilot program for six other schools around the state. It all started with NEED material. I had attended a NEED workshop at Morehead State and thought I could use some of the information and materials to teach electricity and integrate it into my electricity program. It was simple and good. It really gave me a different way of looking at electricity – instead of resistors and power supplies to solder, we were now taking a solar panel or wind turbine and making it work.

Q&A

Ann Randazzo, Center for Energy Workforce Development



Ann Randazzo is Executive Director of the Center for Energy Workforce Development (CEWD), a non-profit consortium that helps utilities develop solutions to the coming workforce shortage in their industry.

Where do green jobs fit within the utility industry?

When you look at this from a utility perspective, we tend to talk more about “greening” of our current jobs. We see lots of new technology coming down the pike, whether it’s renewable energy, Smart Grid or lowering emissions on our current generation processes, and the workforce will need new skills to work with this new technology. At CEWD, we think in terms of green projects, not necessarily green jobs. For example, meter technicians might install Smart Meters or demand meters one day and work on a traditional metering project the next. We have a pretty broad definition here of green jobs, and we like to stress adding green skills to traditional skills. As a result, one thing we think about is how to change the education system to prepare people for the jobs of today and for the future. The type of skills needed for a lineworker or wind technician or someone in transmission on a Smart Grid all start with the same basic skills. From there, you move into fundamental skills that you need regardless of what section or function you work in, involving areas like safety, quality control, trouble-shooting, and others throughout our industry, and then you add very specific job skills on top.

Is there demand in the utility industry for green jobs today?

Even with the work being done to be more efficient, there will still be growth in the demand for energy and we will need to replace almost half of our existing workforce within the next 5-8 years as people retire or take other positions. These are great jobs. They pay well, have good benefits, and they can’t be outsourced. Plus they’re in every state and community in America. Whether you want to work in a city or in a rural area, there is a utility there. An added benefit of our jobs is that we are very focused on the environment. I think we primarily see people who want a job, not necessarily a green one, but are excited to get this type of work as part of it.

What are some examples of how job skills can be broadened to encompass green aspects?

Take the skills needed to be a lineworker, for example. Add to that the job specific skills you need to install,

maintain and repair equipment required by Smart Grid technology and that becomes a “greener” job. Other examples include an HVAC technician who can learn to install more efficient heating and cooling systems. A substation mechanic can learn how to install and maintain Smart Grid technologies at substations and switching stations. You train for one job and as technology becomes available, you can add to your skills with additional training. We call this stackable credentials – you add skills that can make you employable in the future.

What changes do you see in the job market of the future?

There’s no doubt that our actual positions will change as new skills are needed and new technology comes on board. We need to still define the Smart Grid and what technologies are involved and what the needed skills are. As technology changes, you need new skills. When you think about it, think in terms of green projects and skills needed for these new projects. A mechanic is a mechanic, but he or she may need new skills to do tomorrow’s jobs.

If we’d asked you about green projects five years ago, would you have said there were opportunities for them then?

Yes. Utilities have always been aware of energy and the environment and there have always been jobs in our field like energy auditors who help commercial buildings become more efficient. We are very aware of impacts on the environment in our generation facilities and always have been. Frankly, I think this is one of the key things about our industry that has appealed to young people. When you talk about energy, it is an absolute foundation to our way of life. Caring about the environment and working to find cleaner and more efficient ways to generate electricity is a key part of that. However, what I wouldn’t have imagined five years ago is the tremendous focus that the country would have on green and renewable sources. The public awareness today is having a big impact on what companies do and how they do them.

NOTE: For more information on the Smart Grid and the impact it will have on our country’s power generating and transmission system, see the May 2009 issue of Career Currents at <http://www.need.org/needpdf/May09CareerCurrents.pdf>

Q&A

Jane Weissman, Interstate Renewable Energy Council



Jane Weissman is Executive Director of the Interstate Renewable Energy Council (IREC), a non-profit organization that supports activities to accelerate the sustainable utilization of renewable energy sources and technologies in and through state and local government and community activities.

What do you say to students who want to go to work in a green career?

Without a doubt, this is an enormously exciting time for the green movement, green economy, and all types of green opportunities. I think this is the chance for so many students to take the time to see the many different aspects of what our green economy has to offer, especially in terms of jobs. My first recommendation is that they find a general course that talks about all the different energy technologies, including the technologies that have been working for so many years as well as new ones just coming to market. Students should get an overview of what's out there with some sort of general course or maybe an online opportunity that goes through all the different technologies and possibilities before they make any decision on what they want to do with their lives.

What kinds of typical green jobs are there?

There are opportunities in all kinds of occupations, such as installers, designers, engineers and contractors. There are also many jobs in the public sector, including regulatory work being addressed toward green technologies, building and code officials, architects, building designers, and so many other ways of looking at the green market. A student should start by taking their current interests and think about ways they can use jobs like these to help the environment, for example.

Is it easy to find a green job?

Yes, but it can be a lot more involved than it might seem at first. Take the case of someone who thinks they would like being an installer of solar electric systems. Because all electrical power systems are governed by the North American Electric Safety System, students need to be familiar with national codes, Occupational Safety and Health Administration (OSHA) guidelines, and many other regulations. A student has to be careful when they take a course that they really know what they are being trained to do. For example, a 3-day course does not teach all aspects of the electrical system. The same goes for solar thermal installation work with many plumbing codes and

standards that the installer needs to know. In addition, the technicians need to know about the many jurisdictional licenses and other legal requirements needed to do their work. We're seeing a lot of licensed electricians, plumbers and others asking how they can enhance their skills and offer not just their traditional work but also install photovoltaic and solar thermal systems. They already know the ins and outs of their trade, so the additional training and experience will help move them into a green job.

What's the value of a professional certification to someone wanting a green job?

One of our driving goals in renewable energy jobs is safety and consumer protection. You can't just take a course and think you're ready to get into the business. The public needs to be well aware of who they are hiring. Certification shows there has been some third-party verification of someone's skills, and it raises the bar for the practitioner and makes it higher so customers are better served. That is our driving force for being so active with NABCEP (the North American Board of Certified Energy Practitioners). Earning their certification gives tangible evidence that you are trained with the needed skill sets for your job and you will participate in ongoing professional development. Codes change, standards change, products change, and practitioners must keep up with what is going on. Furthermore, NABCEP has earned American National Standards Institute (ANSI) accreditation that shows they are doing everything in accordance with international accrediting guidelines.

What would you have said about green jobs five years ago?

"Green" has become a pretty common word today to refer to the environment, but that's not really new to those of us who have been in the energy field for a while. We have long felt that what we promote in renewable energy is better for the environment, our country's security and the economy. The problem is that there are really different shades of green, and our work and our goal is to make it better and sharper defined so when someone says they have a green job or use a green product that it really means they are reducing their footprint and following strict standards to ensure that the environment is not impacted as much as it has been.



Doug Keaton Named NEED's Director of Career and Technical Education

The newest member of the NEED team is Doug Keaton, recently named Director of Career and Technical Education and a Regional Coordinator for Kentucky NEED activities. His responsibilities include developing curriculum for NEED vocational training at the secondary level. He will also be working with local schools to improve their energy conservation and efficiency.

Doug, formerly the electrical technology instructor at Russell ATC in Kentucky for the past 13 years (see the Q&A with him on page 5 of this issue), went to work as an apprentice electrician after high school and earned his master electrician rating before spending 10 years working for an electrical contractor.



Doug Keaton

At the age of 28, he decided he wanted to use his work experience and become a teacher. He earned his associates and bachelor's degrees in education and curriculum and instruction from Eastern Kentucky University.

NEED is pleased to welcome Doug to our team.