

GREEN-COLLAR JOBS

The promise of an economic that creates good jobs improves environmental quality is an alluring one. In this article, we briefly summarize the existing research on green-collar jobs. More specifically, we discuss the debates over defining these jobs, strategies communities use to promote them, and the economic and workforce development opportunities and challenges we face in generating green jobs.

TOWARD A GREEN ECONOMY

As more and more people recognize the need to address the threat of climate change and other environmental challenges, established businesses and entrepreneurs are positioning themselves to take advantage of the opportunities that will result. Although climate change is often cited as the major driver for companies and entrepreneurs to develop new green products and services, there are several others. The top ten environmental issues facing business today include climate change; energy; water; biodiversity and land use; chemicals, toxics, and heavy metals; air pollution; waste management; ozone layer depletion; oceans and fisheries; and deforestation (Esty & Winston 2009). The demand for innovative solutions to address the breadth of these challenges has led many commentators to conclude that we are on the cusp of a “green wave” in terms of job growth and economic opportunity. Companies and entrepreneurs that develop solutions to these challenges our economy will create millions of new green jobs, ranging from renewable energy installers to mass transit employees to water technicians. The promise of a green economy is that we can successfully grow new economic opportunities while solving environmental challenges and perhaps even addressing issues of equity by providing pathways for low-income earners out of poverty (Jones 2008). Environmental

benefits might include fewer carbon emissions, preservation of working lands, less pollution, and improved water quality. Economic benefits might include cost savings related to energy efficiency, job creation, and new opportunities for disadvantaged populations including inner city and rural populations with lower than average household incomes and educational attainment levels. A green economy thus provides communities with an opportunity to address broad sustainability goals, build community capacity, and create economic opportunity. It is premised on the idea that not only is there not a necessary conflict between jobs and environmental quality, but that a truly healthy and sustainable economy is dependent on a healthy, sustainable environment with sufficient natural capital to support our economic system (Hawken, Lovins, & Lovins 1999).

DEFINING GREEN-COLLAR JOBS

There is no consensus on how to define green-collar jobs. A very broad interpretation of green jobs would include all existing and new jobs that contribute to environmental quality through improved efficiencies, better resource management, and other technologies that successfully address the environmental challenges facing society. Probably the most concise, general definition is “well-paid, career track jobs that contribute directly to preserving or enhancing environmental quality” (Apollo Alliance 2008, 3). This definition suggests that green-collar jobs directly contribute to improving environmental quality, but would not include low-wage jobs that provide little mobility. Most discussion of green-collar jobs does not refer to positions that require a college degree, but they typically do involve training beyond high school. Many of the positions are similar to skilled, blue-collar jobs, such as electricians, welders, carpenters, etc. The difference is they apply these skills to green industries. Examples of green industries

might include smart grid construction, expansion of freight and passenger rail, wind, solar, and biofuel production, and energy efficiency industries.

Thus far, research documenting the number of green-collar jobs has been quite varied. Conservative estimates that include only renewable-energy and energy-efficiency industries suggest about 8.5 million jobs. These estimates focus on specific activities rather than traditional job or industry characteristics (Pinderhughes 2007). According to the American Solar Energy Society, this figure could grow by as many as 40 million by 2030.

Differences in estimates of the number of green-collar jobs can be attributed to several issues. First, a few analyses include all jobs related to promote a green economy. Thus, they would include workers in the plastics and steel industry, for example, because these materials are used to construct products like wind turbines and solar panels. These reports tend to overestimate the number of green-collar jobs because most of these jobs would not be considered green. Second, even if these related jobs are considered, they probably should not be considered as full-time equivalents because much of their output, in most cases, may not go to green activities. A more accurate accounting method might try to take into consideration the proportion of their product that is used to promote environmental quality. Third, some analyses attempt to consider the multiplier effect of the green economy. These analyses assess the direct and indirect impacts on a regional economy by estimating the number of jobs and income that are created through investments in green-collar jobs (Pollin & Wicks-Lim 2008). These estimates typically include service sector jobs that most people would not consider career-track jobs.

Finally, data collected through the Census Bureau and other official sources do not collect information in a manner that would allow researchers to identify green-collar jobs.

STRATEGIES FOR PROMOTING GREEN-COLLAR JOBS

Communities seeking to promote green-collar jobs need to identify their environmental and economic goals and niche in the green economy. This does not have to be an extensive process, but it is essential to build on local strengths and opportunities (Green and Haines 2007). Next, localities need to identify public policies that will encourage businesses and residents to meet the demand for green products and services. Finally, it is essential to prepare the workforce for green-collar jobs. These programs should be linked to local opportunities and provide workers with skills that will allow them to move up the career-track (Apollo Alliance 2008).

Below we have identified four broad strategies that communities might consider as they enact policies to generate green-collar jobs. These strategies are largely demand-driven. They are seen as crucial to the successful development of the green economy because they provide a stable, secure funding environment for companies to take root and thrive in. By investing in these strategies communities often hope to achieve multiple goals including environmental quality and green job creation.

1. Energy Efficiency. Approximately 40% of our energy use is associated with buildings. Jobs related to energy efficiency are often concentrated in traditional building trades and construction industries. Estimates suggest that about 10 jobs are created per \$1 million investments in high-performance buildings (Center on Wisconsin Strategy 2007). Jobs are created not only through the economic activity associated with retrofitting buildings, but also through the energy savings (Goldstein 2007).

2. Renewable Energy. Renewable energy jobs normally include several different sources: biomass, solar thermal, wind, solar PV, hydropower and geothermal. Worldwide, the largest number of jobs in this sector is in biomass (Worldwatch 2008). Three countries (Brazil, U.S., and China) account for the vast majority of jobs in biomass. Jobs in solar industries are the second highest, with most of the jobs located in China. Overall, renewable energy sources are growing rapidly, especially in developed countries (Worldwatch 2008).

3. Transportation. Transportation accounts for about one-fourth of the world's energy use. Green-collar jobs in this sector are related to fuel efficiency and public transportation. There are few reliable estimates of the number of jobs in the transportation sector. Discussion of transportation in the green economy tends to focus on the improvements made through manufacturing green vehicles and through public transportation. Green vehicles include electric hybrids, compressed natural gas, low sulfur diesel. At this point, the number of jobs in manufacturing green vehicles is relatively small, with most of the jobs concentrated in Europe. Public transportation, however, is a significant employer in many developed countries. Many of these counts, however, include employment with traditional petroleum-based bus systems.

4. Smart Grid. The current electrical grid is widely seen as a barrier to achieving real improvements in both energy efficiency and renewable energy growth. The system prevents the full deployment of wind, for example, because the transmission lines simply don't exist to connect our nation's largely rural high plains wind resource to our urban population centers. The grid is also highly localized and disjointed which prevents the effective movement of power throughout the country when demand exceeds supply in a

given region. Finally, a newer more modern smart grid can take advantage of recent improvements in information technologies to better manage electrical loads.

CHALLENGES AND SOLUTIONS

There are many challenges to green job creation including workforce, political, technical, and environmental issues. As communities look at growing green job opportunities they may need to confront these issues head on in order to be successful. Although many of the green job opportunities hinge on development of future technologies including cellulosic ethanol, many more do not. In large part the solutions to the challenges facing green job growth are policy-related. For example the lack of a coherent federal policy has led to a very chaotic growth in the wind industry. Because the tax credits that make wind financially competitive have only been reauthorized for two years at a time, the industry is in a constant state of flux between rapid project growth and dramatic scale backs in investments depending on the biannual whims of federal policy makers. The challenge for local governments is to focus on those areas over which they have control while seeking to minimize the negative impacts of state and Federal policies over which they have little control

Workforce development is a key challenge. Many of the green-collar jobs that will be created do not require major changes in training programs because they will most likely require trades and advanced manufacturing skills. However, these programs still face some of the same obstacles that workforce development efforts have experienced in the past. It is difficult to recruit youth into these programs even though they tend to be good paying jobs with opportunities for income mobility. In addition, because there are relatively few students obtaining training, it may be too costly for small communities to

develop specialized training programs for emerging green-collar jobs. A more likely strategy is that green-collar jobs will require more intensive use of apprenticeships and school-to-work programs to provide on-the-job training.

In our discussion of green strategies, we did not include the recycling industry. Many states and localities have been very successful in promoting recycling programs. Unfortunately, most of the jobs in this sector are low-wage positions with few opportunities for mobility. Recycling markets also appear to be quite sensitive to economic conditions. The 2008-2009 economic recession led to dramatically lower prices for recycled products. One of the lessons is that green industries will still be market-driven and may experience many swings as they mature. It also shows that not all green industries will produce good jobs for workers.

Jobs in the renewable energy sector will be tied in the short run to regions that have considerable sources of renewable energy, such as biomass, wind, and even solar. For example, the Midwest has a large concentration of biomass that could be used for biofuels. Currently over 80% of biofuel facilities are located in the Midwest. Similarly, many coastal communities can harness wind energy. And the Southwest has a significant potential for solar energy. These regions are likely candidates for renewable energy production and manufacturing. Another strong predictor of green job growth is local renewable energy policy. Those states with strong incentives, including New Jersey and California, have leapt to the lead in renewable energy deployment. Not surprisingly, they have also benefitted from new green industry creation, especially in sales, servicing, and installation of renewable systems.

One of the current difficulties is transmitting energy across long distances. It is likely that the renewable energy sector will be more decentralized and based in smaller units than our current system. This technical challenge will likely be overcome through development of a smart grid system.

Green buildings include both energy efficiency and renewable energies. There is general agreement that retrofitting existing buildings and improving energy efficiency offer the greatest potential for the environment and jobs, at least in the short run. Yet this may be the most challenging sector with which to grow jobs. The cost of retrofitting will be prohibitive for low-income residents in most countries and will require substantial government subsidies (Jones 2008). Cost is also a major challenge for individuals to install renewable energy at their home including solar pv, hot water, and solar space heating. Americans are extremely mobile and may be reluctant to pay for these technologies because they are concerned they will not get their investment back before they sell their homes. A solution to this problem is being adopted in communities across the country. Local governments are bonding and then using the funds to lend out to homeowners at very low interest rates to install renewable energy systems. These systems are then paid off over a 10-20 yr. period through the property tax bill. When the homeowner moves the payment stays with the home and the new homeowner continues payment.

Developing countries face enormous challenges in reducing energy expenses for buildings, while growth in the number of energy efficient green buildings is much higher in developing countries. These problems are exacerbated by the continuing rural-to-urban migration patterns in much of Asia and Africa.

Green vehicles continue to draw a great deal of interest among environmentalists. Only a very small percentage of the workforce is now employed in automobile manufacturing that would be considered green. There have been significant breakthroughs in automotive technology that may significantly increase the potential for green vehicles. Moving this new technology to mass-productions, however, could take a long time and significant capital investment. A major hurdle to green vehicle growth is battery technology. Without adequate storage the concept of plug in vehicles is limited. Efforts are underway to reduce the size of battery storage. With better batteries green vehicles may be capable of charging themselves at night taking advantage of lower electricity rates and then using that energy during the day for driving, or for powering household appliances. When combined with renewable energy sources, such as solar power, green vehicles could have a significant impact on carbon emissions.

Much of the current literature focuses on the dilemmas associated with corn ethanol. Research focusing on cellulosic ethanol offers the potential of avoiding the tradeoff between food and fuel, and overcoming many of the economic and environmental costs associated with corn ethanol.

Green-collar jobs are expanding, but not rapidly enough. Worldwide, green jobs tend to be concentrated in a few development countries. The U.S. has not invested as much in research and development in the green sector as many western European countries. Investments in research will be critical to the growth of green-collar jobs over the next decade. Government support for the public and private sector to adopt new technology will also be an essential factor in the transition to this new economy. Finally,

educational programs have been proven to be an important element in increasing the public's awareness of environmental issues and in changing attitudes and behavior.

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FURTHER READING

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