

Sustainable Jobs and Green Careers

Center for Workforce Development
Maricopa Community Colleges

Introduction

There has been much discussion in recent years regarding environmental sustainability and its potential impact on the economy. The 2008 U.S. presidential campaign heightened awareness of proposals to transform our economy through investments in energy efficiency, alternative energy generation and pollution reduction. Indeed, the economic stimulus package of 2009 includes an emphasis on creating green jobs. The Greater Phoenix, Arizona region is expanding and diversifying its economy by promoting the growth of a strong green sector. The Maricopa Community Colleges supports this effort by continuing to produce a skilled labor pool that meets the workforce needs of the employer community.

Sustainability and green technologies are broad terms used to describe the design and transformation of products and processes in all sectors of the economy to have a lighter impact on the environment. One who works on such products and processes is said to have a green job or a green career. However, no single definition currently exists to identify all the different types of jobs and careers that should be considered green. Accordingly, government data sources do not adequately capture or report information on green jobs within their current categorical schemes. This presents a challenge when compiling an inventory of the existing workforce or projecting future demand and growth. For the foreseeable future, other methodologies will have to be used to quantify this emerging classification.

In the coming years, there will be a growing demand for workers at every skill level to fill jobs in sustainability and green technologies. Regardless of whether they are in professional/managerial positions or production labor (green collar) positions, these workers may enjoy greater job security because many green jobs are location specific. As industries and jobs adjust to reflect a greater emphasis on sustainability, some will change very little, while others will be transformed completely. The majority of these jobs are in the same areas of employment that people already work in today, and millions of U.S. workers have the majority of skills and experience necessary to fill them. Similarly, many existing workforce development programs already teach the majority of skills needed in the respective area and may only need to be modified to address new skill sets.

For the purpose of occupational program planning at Maricopa Community Colleges, green careers can be organized by broader, local industry segments that have been or will be most impacted by green initiatives. Those industries include: renewable energy; construction/building; transportation and environmental services.

Renewable Energy

The one industry sector that is most impacted by the green movement is renewable energy. This is due to: the inevitable depletion of the finite supply of fossil fuels; the highly debated, yet undeniable negative effects of hydrocarbon pollution on human health and world climate; and the strong national desire to reduce dependency on foreign energy sources. Energy generated from sources like wind, solar, thermal and biofuels is absolutely essential to creating a sustainable society in this country.

The United States finally seems poised to make the required investments in renewable energy needed for long-term viability. Federal and state standards now require that a minimum percentage of energy be generated from renewable sources by certain dates. These standards will result in tremendous economic development opportunities for those regions willing to do what it takes to leverage existing strengths into strategic competitive advantages. While several public policy issues have yet to be resolved, the Greater Phoenix region intends to capitalize on its strengths to become a leader in renewable energy. These strengths include an abundance of solar energy for power generation, expertise in solar and other renewable energy technologies, and a well-established capacity for high tech manufacturing.

It seems only natural that Arizona's deserts should harness the power of the sun. Solar energy can be generated in two basic ways: large-scale, concentrated utility projects; and distributed production across many rooftops. Solana, one of the world's largest solar power plants, is currently under construction in Arizona through a partnership between Arizona Public Service and a Spanish company called Abengoa. The region has plenty of undeveloped land to build more of these concentrated, utility-scale generating plants. Greater Phoenix also represents a huge market opportunity for distributed solar power generation using rooftop panels that employ thin-film or silicon-based photovoltaic (PV) technologies. With the combination of concentrated and distributed generation, it is quite possible for Arizona to produce more than enough solar energy to meet its own needs. This represents an opportunity for Arizona to export its excess power to neighboring states -- at a profit.

Greater Phoenix, Arizona can leverage its intellectual capital in solar and other renewable energy technologies by expanding research and development activities and transferring technological advances into the commercial marketplace. For example, Arizona State University has the nation's only accredited solar PV testing lab and is perfecting the use of fast-growing algae to produce biofuel. There are many other private and publicly funded research efforts in processes and materials that pose similar opportunities.

Renewable Energy (continued)

Another strength that can be leveraged in the renewable energy industry is the region’s high tech manufacturing capacity. Greater Phoenix is home to world-class semiconductor, electronics, aerospace, composite materials and precision machining operations. The current infrastructure and skilled workforce are easily transferrable to similar processes used in the production of thin film and silicon-based PV solar panels, components for wind generators and a myriad of other green products.

The Arizona Department of Commerce and the Greater Phoenix Economic Council have cited multiple studies by Navigant Consulting Incorporated (NCI) which projects significant growth in Arizona’s solar employment. The lowest estimate is over 3,000 direct solar jobs by 2020. The higher range is between 10,000 and 40,000 in solar related employment (which includes construction) by 2016. By all accounts, it appears there will be ample demand for workers seeking solar energy jobs in Arizona.

The Maricopa Community Colleges currently offer several programs that support the renewable energy industry, including:

Automated Manufacturing Systems	Electromechanical Manufacturing
General sciences (biology, chemistry, physics)	Electrical Utility Technology
Biotechnology	Industrial Operations Technology
Biotech/Molecular Biosciences	Machining
Composite Technology	Manufacturing Management
Construction Trades	Manufacturing Productivity
Construction Management	Manufacturing Technology
Electrical Technology	Micro Circuit Mask Design
Electricity	Occupational Safety (OSHA)
Electronics Technologies	Power Plant Technology
Electronics Manufacturing	Welding
Electromechanical Automation	

Construction/Building

Existing buildings can be weatherized and remodeled to reduce energy consumption. Such conservation efforts are key to reducing the country’s dependence on finite, foreign energy sources. Energy savings are often measured and expressed in terms of Negawatts.

New building design and construction methods have been impacted by a green building initiative called, Leadership in Energy Efficiency and Design (LEED). The desired result is a structure that is certified to use less energy and water through design, materials and techniques such as gray water recycling.

Several careers are impacted by green building efforts. Construction trades like carpenters, plumbers, electricians, and HVAC technicians are adjusting to new materials and methods by including new skills. Similarly, building inspection, engineering, drafting and architecture professions have adopted new skills and professional certifications to verify competencies. Entirely new careers have yet to emerge in this sector, but some jobs and job titles have been altered to reflect recent changes.

<i>The Maricopa Community Colleges currently offer several occupational programs that support the construction/building industry, including:</i>	
Architecture	Construction Trades
Architectural Drafting	Construction Management
Architectural Technology	Facilities Maintenance/Management
Drafting Technology	Home Inspection
Building Safety	Industrial Operations
Certified Residential Appraiser	Landscape Aid/Specialist
Civil Engineering	Mechanical Trades/HVAC
Computer Aided Drafting (CAD)	Project Management
CAD Applications	Residential Drafting
CAD Technology	Surveying and Civil Drafting
Construction Drafting	Surveying Technology



Transportation

For residents of Maricopa County, the days of commuting to work, all alone, at speeds well in excess of the posted limits, in an oversized sport utility vehicle are quickly coming to an end. Speed cameras notwithstanding, demand for smaller, fuel-efficient, hybrid and electric vehicles continues to increase due to concerns over future costs of fuel and a genuine desire to lead a more sustainable, environmentally friendly lifestyle. These same reasons have also increased interest in the region’s public transportation assets, which include buses and the newly operational light rail commuter train system.

The transportation industry moves freight as well as people. Today, intermodal transportation systems move goods from container ships at port to distribution centers by rail and truck, and ultimately to the end consumer by truck. Sophisticated planning and tracking systems are used to ensure accurate delivery on precise schedules.

Some of the careers impacted by these changes include urban planning, vehicle design, engineering, materials scientists, manufacturing, road/track construction, mechanical repair, vehicle operators and logistics.

<i>The Maricopa Community Colleges currently offer several occupational programs that support the transportation industry, including:</i>	
Automotive Technology	Diesel/heavy Equipment Operations
Aviation Technology	Distribution Logistics Technology
Architectural Drafting Technology	Geographical Information Systems (GIS)
Civil Engineering Technology	Power Plant Maintenance (Aviation)
Computer Applications	Surveying and Civil Drafting
Construction Trades	Surveying Technology
Construction Management	Tractor-trailer Driving



Environmental Services

Certainly no inventory of green industries would be complete without the inclusion of the environmental services sector itself. This sector focuses on the interactions between physical, chemical and biological aspects of our world, with an emphasis on protecting the air, water and soil from the negative impact of human activities. This also includes remediating any damage that has already occurred. Many different public and private entities are engaged in conservation efforts, recycling, waste management, pollution control and water treatment. Careers associated with the environmental industry include engineering and scientific fields such as physics, biology, chemistry, hydrology, forestry and agriculture.

Once again, it seems only natural that the Greater Phoenix region, due to its desert climate, should become a world leader in the most efficient use and reuse of water. Competencies and expertise should include: groundwater and watershed management; wastewater treatment and maximized effluent reuse; and enhanced conservation through building and landscape design.

The Maricopa Community Colleges currently offer several programs that support the environmental industry, including:

Agribusiness	Landscape and Turf Technology
General Sciences (biology, chemistry, physics)	Landscape and Pest Management
Biotechnology	Occupational Safety (OSHA) and Health Technology
Biotech/Molecular Biosciences	Recreational Resources and Facilities Management
Environmental Science Technology	Safety, Health and Environmental Studies
Environmental Health and Safety Technology	Urban Horticulture
Geographical Information Systems (GIS)	Water/Wastewater Treatment
Geospatial Technology: Environmental Services	Water Distribution
Hydrologic Studies	Water Purification
Industrial Operations Technology	Water Technologies
Landscape Aid/Specialist	

Conclusion

In the midst of the worst economic downturn since the Great Depression, the United States seems ready to make the necessary investments to help create a more sustainable economy and society. If promised federal government policy and spending actually stimulate additional private sector investments in green initiatives over the next few years, then tremendous opportunities await those regions that are prepared to facilitate the growth of their green industries sector.

Greater Phoenix, Arizona is well-positioned to leverage its existing regional assets and strategic advantages to rapidly expand a sustainable economy centered on the renewable energy, construction/building, transportation and environmental services industries. One of those strategic advantages is the existing, high-skilled workforce. Another is the local workforce development system that produces workers with skills that meet current needs, and one that can quickly adapt programs to produce workers with skills that meet emerging needs.

The Maricopa Community Colleges are a key component of the Greater Phoenix workforce development system and are committed to providing the employer community with a supply of labor that facilitates economic growth. The Maricopa Community Colleges currently offer many occupational programs that support sustainability and green technologies industry segments. These programs are continuously reviewed and modified to ensure relevancy to rapidly changing industry demands. The Maricopa system has a long history of providing a rapid response to emerging industry needs by marshaling the resources necessary for new program development, once sufficient employment demand is established.