California Postsecondary Education Commission

Going Green: Developing the Green-Collar Workforce

Agenda Item • December 2008 • www.cpec.ca.gov

Part of any effort made by the California Postsecondary Education Commission to better understand the nexus between postsecondary education and the workforce is learning more about emerging economic and workforce trends. The emergence of the "green economy" — economic activity based on environmentally-friendly, sustainable principles and practices — is likely to fuel and transform new and existing educational programs and careers.

Earlier Commission research papers on the postsecondary education–workforce nexus discussed the multiple roles played by the state's public and independent colleges and universities in supporting workforce development, including general academic preparation for a wide variety of jobs, direct training of workers in specific occupations, and research that supports innovation and technological advances that, in turn, spur economic growth. This multi-layered connection between meeting California's economic and workforce needs and the postsecondary institutions that help do that, is particularly visible in the green economy. This paper is an overview of what is happening in the green economy and how it affects California's colleges and universities.

Green California Community College Summit

Commission staff attended the Green California Community College Summit, October 8–9, 2008 in Pasadena. The summit focused on the emergence of the green-collar workforce and how California can address economic needs while meeting the demand to address climate change and environmental degradation. Discussions from the summit are the basis for much of the information contained in this paper.

More than 600 people from community colleges, businesses, educational agencies, and community organizations attended the summit. Workshops addressed workforce demands for careers in green building design and construction, alternative energy such as solar and wind, renewable fuels, environmental protection and research, waste management, water conservation, and mass transit and rail.

Discussions included programs and initiatives at community colleges to educate and train students for green-collar careers. Additionally, community colleges presented information on their efforts to make campuses greener. These projects include incorporating career technical training certificate programs into existing curricula, constructing and retrofitting buildings to meet green building standards, installing alternative energy sources such as solar panels and wind turbines, and promoting efforts to go paperless.

The summit is one of many conferences that occur across the state on a regular basis to raise awareness and bring people together to discuss this booming industry. Others include the Green California School K-12 Conference, scheduled for December 2008, and the annual Sustainability Conference hosted by the University of California, which focuses on social, environmental, and economic sustainability to campus practices, policies and culture, and preparing future generations for green-collar jobs.

The Green California Community College Summit, primarily sponsored by the statewide organization Green Technology and the Chancellor's Office, was the first to spotlight community colleges, but it is likely not the last. It generated many conversations and strategies that colleges could pursue to address the state's need for a green workforce, the challenges of climate change and other environmental threats, and opportunities to make campuses greener and more sustainable while saving money.

Green-Collar Workforce

The green economy has started to grow rapidly as the state, nation, and world are moving toward energy efficiency, independence from fossil fuels, and the creation of sustainable products and services that reduce harm to the environment. The green economy is quickly becoming a focus of colleges in research, training, and education as well as in the way campuses build and operate facilities. The increasing awareness that investing in the green economy can be cost effective as well as environmentally sound has convinced many in the public and private sectors that this trend holds great economic value.

In order to make this transition, new products and services are being designed, and existing products and services are moving in the direction of increased sustainability — the capacity to maintain a certain process. Green technology — the continuous evolvement of methods and materials used to decrease environmental impacts — is the means that leads the movement. The green workforce and "green-collar jobs" are what makes it all happen. Most green-collar jobs pay a living wage, provide healthy and safe working environments, and offer career advancement opportunities.

Green jobs are found in traditional employment sectors such as manufacturing, agriculture, forestry, installation, fabrication, and operations. Other occupations exist in urban and rural communities, such as renewable energy, energy-efficient auditing, power plant operations, facilities management, engineering, legal, research, consulting, and construction.

Green buildings are constructed to reduce energy use and increase efficiency, decrease operating costs, and decrease the environmental impacts on their communities. Such facilities can be used as interactive classroom and teaching tools in fields ranging from alternative energy, research, building design, architecture, and environmental planning.

Green job training and education is being provided by public and independent higher education systems, apprenticeship programs, unions, and private companies, helping people with little to no experience gain access to a rewarding career. UC Berkeley and a statewide organization called Next 10 recently reported that California's green economy policies will create as many as 403,000 jobs in the next 12 years, increase household incomes by $48 billion, and increase the Gross State Product by $76 billion.

The U.S. Conference of Mayors predicted that within 30 years, 40% of the electricity generated in the nation will come from alternative fuels like wind, solar, hydropower, geothermal, and biomass. There will be a 35% reduction in electricity use in existing buildings and 30% of gasoline and diesel consumption will be satisfied with alternative fuels. This will result in the creation of 4.2 million new green jobs.

Most occupations in the green economy require an associate degree, certificate, or on-the-job training, though some are concentrated in science and mathematics and require a four-year or advanced degree in biology, chemistry, environmental science, physics or mathematics. Employment opportunities extend to people across private and public sectors, income levels, and skill levels. However, California and the nation lack the engineers, scientists, and mathematicians to fill these jobs and advance these fields. The higher education systems will need to increase education, research, and training in these areas to keep up with economic trends.

Legislation and Initiatives

California has recognized the need to move forward in the green economy, as evidenced by the passage of Assembly Bill 32 — the California Global Warming Solutions Act of 2006, considered the toughest climate change legislation in the nation, if not the world. The Act contains a plan to reduce greenhouse gas emissions to 1990 levels by 2020, which is a reduction close to 25%. It also calls for an 80% reduction below 1990 levels by 2050. UC Berkeley found that the proposed package of policies in the state's green energy plan achieves all of the reductions in greenhouse gas emissions mandated by AB 32. The

enactment of AB 32 has spurred the creation of green-collar jobs across the state and will continue to fuel the economy by generating career opportunities.

Other legislation includes AB 118 (Núñez, Chapter 750, Statutes of 2007), which created the Alternative and Renewable Fuel and Vehicle Technology Program. The program intends to increase the use of alternative and renewable fuels and innovative technologies to meet the goals established by AB 32.

AB 118 allocates $120 million annually as incentives to a diverse spectrum of public agencies, including academic institutions and workforce training partnerships. The funding is intended to support projects that establish workforce training programs, conduct public education and promotion, and create technology centers.

The Governor's Executive Order S-20-04, known as the "Green Building Initiative," requires public buildings to be 20% more energy-efficient by 2015, and encourages the private sector to do the same. This action has already created jobs and changes in occupations where knowledge of green building standards and technology is now a necessity. For example, a construction worker who is accustomed to installing foam or fiberglass insulation must now know about the use of recycled denim and other products for insulation.

AB 3018 (Nunez, Chapter 312, Statutes of 2008) establishes the Green-collar Jobs Council to address the workforce needs of California's growing green economy. Participants include representatives of state agencies, higher education systems, K–12 education, workforce agencies, labor, energy, environmental justice, and others.

AB 2855 (Hancock, Chapter 685, Statues of 2008) establishes two categories in the partnership academies program, where high school students can focus their education in specific industry areas. Starting in the 2009–10 school year will be the Green Technology Partnership Academies and the Goods Movement Partnership Academies. The bill requires the Superintendent of Public Instruction to prioritize grants to programs that focus on these areas.

SB 1672 (Steinberg), if passed, would allocate $2.25 billion in bonds to fund building projects at institutions offering career development related to clean technology, renewable energy, or energy efficiency. It would provide loans for projects by public and private entities involved in this type of career development. The bill was passed in the Senate but was held in committee in the Assembly at the end of this year's session. Senator Steinberg said he will continue to pursue this issue in future sessions.

Governor Schwarzenegger recently announced the state's partnership with SunEdison — California's largest solar energy provider — to provide affordable solar power at 15 CSU campuses and the CSU executive office. This partnership is directly aligned with green economy standards in moving campuses toward more sustainable means of operating.

What the Systems are Doing

University of California

UC's "Presidential Policy on Green Building Design and Clean Energy Standards" has been expanded in renovation projects, climate protection, sustainable operations, waste reduction, and purchasing. The policy moves all campuses toward sustainable practices. UC Berkeley completed a climate action plan that is being used as a national model for other universities. UC Irvine has converted its bus shuttle fleet to run on 100% biodiesel.

UC incorporates green education into many courses and degrees and promotes research and development of technologies. Two examples are the Institute of Environment at UCLA and the Agricultural Sustainability Institute at UC Davis.

UC San Diego has an on-campus bicycle loan program and supports a graduate research project to procure and operate a 99% biodiesel bus on campus. The project will collect emissions data and detailed mileage and maintenance records to compare the 99% biodiesel option to the current 20% biodiesel-fueled buses.

California State University

California Polytechnic State University, San Luis Obispo has developed a program to make compost from leftovers from the campus dining hall for its 11-acre organic vegetable and fruit farm. The farm serves as a classroom and laboratory to courses and research programs in the Horticulture and Crop Science Department and the College of Agriculture, Food and Environmental Sciences.

Many campuses have committed to reduce greenhouse gas emissions and become "climate neutral" in their effects on the environment by joining 50 other independent and public California campuses in signing the American College & University Presidents Climate Commitment.

At CSU Chico, a student-run recycling center collected 512 tons of paper and bottled products in 2007. The center also operates a program to return recycled school and office supplies back to the campus for further use.

San Francisco State University and the City of San Francisco are working to divert 75% of waste from the landfill by 2010 and to reach zero waste by 2020. As of 2008, the recycling efforts have diverted over 76% of waste. SFSU offers a bachelor's degree program in environmental studies with a concentration in environmental sustainability and social justice, and a master's degree in business with an emphasis in sustainable business.

California Community Colleges

The community colleges are aligned to meet some of the needs for training the green workforce. With 111 campuses and educational centers, they offer access to classes in every region. Many community colleges offer associate degrees and certificates specific to the green economy.

More than 40 campuses already offer green or environmental-oriented career technical training. In 2006–07, the community colleges awarded 4,060 degrees and certificates in career technical training fields and the green aspects of those degrees and certificates are expanding. Community colleges are uniquely aligned to advance the green workforce because a large portion of the new jobs will require more than a high school education but less than a four-year degree.

The environmental studies department at De Anza Community College has a strategic plan that addresses the goals of AB 32. The plan includes offering 70 courses in environmental studies and environmental sciences that incorporate all aspects of sustainability and environmental protection. DeAnza offers certificate programs in environmental compliance and pollution prevention, energy management and climate policy, biodiversity, and environmental stewardship.

Ohlone College offers programs in biotechnology and environmental sciences in the new Newark Center for Health Sciences and Technology. This LEED-certified (Leadership in Energy and Environmental Design) building is used for student training. It is equipped with solar power, thermal heating and cooling, and building materials made from recycled products.

Butte Community College operates three green buildings and has two others under construction. Solar panels on the roofs of covered parking areas provide more than 25% of the campus' electricity. Butte College is located in a 250-acre wildlife refuge in a rural area. The campus uses green technology to train students and raise awareness in the community. Students can complete coursework on the 80 acres of land used for farming and grazing, and elementary school children can take a tour of the solar panels.

Los Angeles Trade-Tech College, which focuses almost entirely on career technical training, provides degrees and certificates in four green industry occupations: chemical technology, water technology, solid waste management, and solar design, installation and maintenance. The college offers courses in more than a dozen areas including Architecture, Construction, Community Planning, Chemical Technology, and Diesel Technology.

Independent Colleges and Universities

A number of independent colleges and universities have signed the American College & University Presidents Climate Commitment. Universities that have joined the effort include Santa Clara University, Point Loma Nazarene University, University of LaVerne, Antioch University, Alliant International University, University of Redlands, Claremont McKenna College, Pitzer College, Pomona College, Whittier College, Mills College, Monterey Institute, Charles Drew University, and Harvey Mudd University.

Additional efforts toward sustainability may extend campus-wide. The California Institute of Technology is constructing three green buildings and installing solar panels, a deionized water production and distribution plant, a steam generation and distribution plant, and a compressed air system that distributes air to buildings. These projects serve as learning laboratories for students. Cal Tech offers courses like Environmental Sciences and Engineering, Global Environmental Sciences, and Physics and Chemistry of Renewable Energy.

The University of Southern California Marshall School of Business recently hosted a Sustainability Conference, which focused on economic, social and environmental sustainability. USC's Center for Sustainable Cities and Sustainability/Fair Trade task force educate students about sustainability issues in the local community and the world.

University of the Pacific School of Engineering hosted a sustainability conference this summer that addressed solid waste management. The workshop focused on leadership through sustainable innovation and provided opportunities for collaboration with business partners. The University Center meets LEED Green Building Standards by using recycled construction products such as used tires for roofing, recycled glass tile in restrooms, and recycled wood and fabric for furniture. The building will use 50% less water than regular buildings and is equipped with retractable skylights to let in natural light.

Implications for the State

California has already committed to aggressive policies that have resulted in economic growth and will continue to provide jobs and fuel the economy for decades to come. The California Global Warming Solutions Act encourages investment in energy savings and innovation by requiring the development of products and services and amending existing products and services to meet energy demands. This will require continuous research, innovation and training provided by California's higher education systems that align with the business needs of the state.

UC, CSU, independent colleges and community colleges are rapidly moving toward sustainable campuses and providing education and training that will support the green economy. The Commission's role is to ensure that legislation and initiatives support the capacity of the postsecondary systems to do their part in greening the state. The Commission also has a role in raising awareness of the issues and needs of the state in order to ensure that future generations have the educational tools necessary to move California forward. The Commission will continue to monitor legislation to ensure that the interests of the higher education systems and the state are met.

Economic efficiency is one of the criteria for program planning and facility review in assessing proposals of new campuses, universities, and off-campus centers. The Commission will continue to promote

economic efficiency in building plans and expansion projects. The Commission needs to anticipate the latest green technologies that will require new programs and policies on college campuses across the state.

Lastly, the Commission should make efforts to participate, to the extent possible, in statewide discussions, planning, and implementation efforts led by groups such as the Green-collar Jobs Council and others. The role and impact of the many elements of the green economy should continue to be considered by the Commission as it studies the nexus between postsecondary education and workforce and economic development.