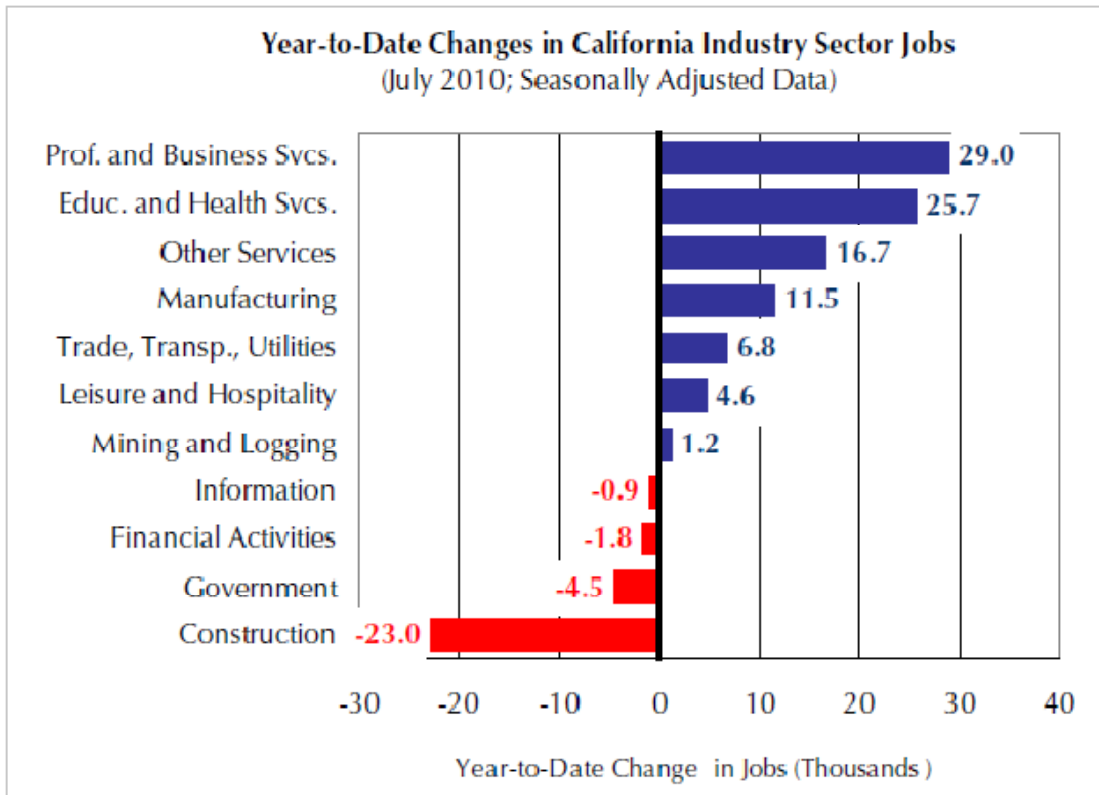


California's Emerging Sustainable/Green Occupations in Manufacturing, Transportation & Logistics, and Construction Career Pathways

While no one would argue that California's economy has fully recovered from the 2008 recession, the California Labor & Workforce Development Agency has announced that we are on the mend; that there has been job and income growth in seven of the eleven industry sectors over the past year.



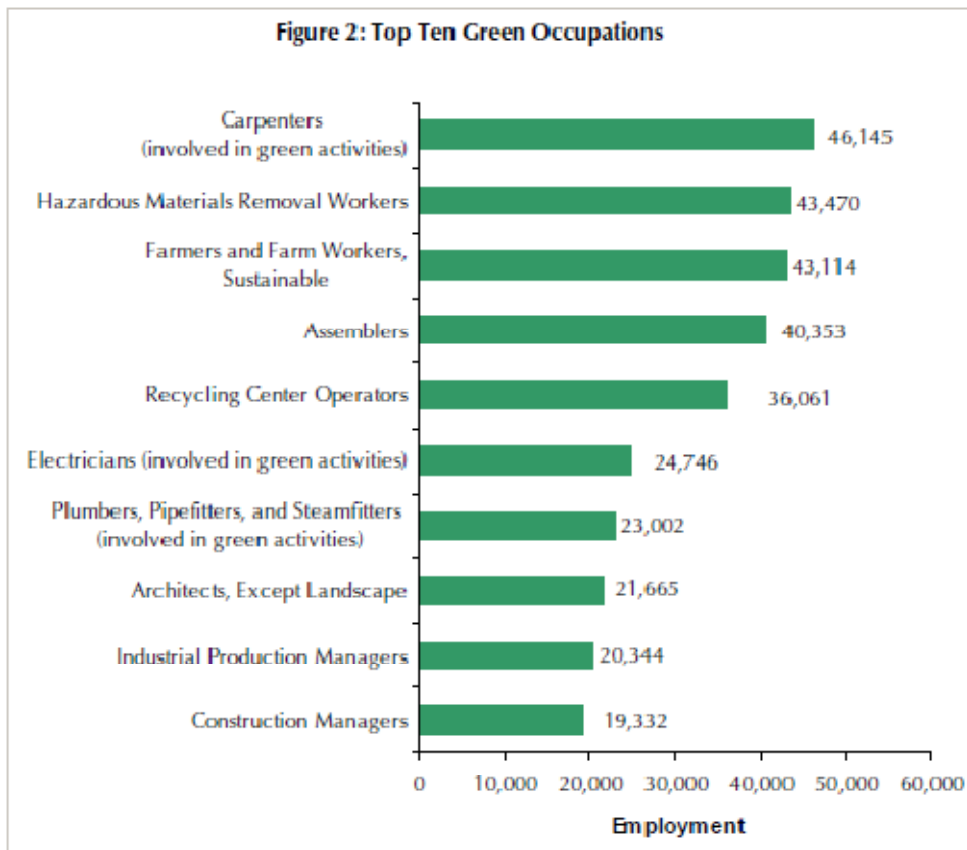
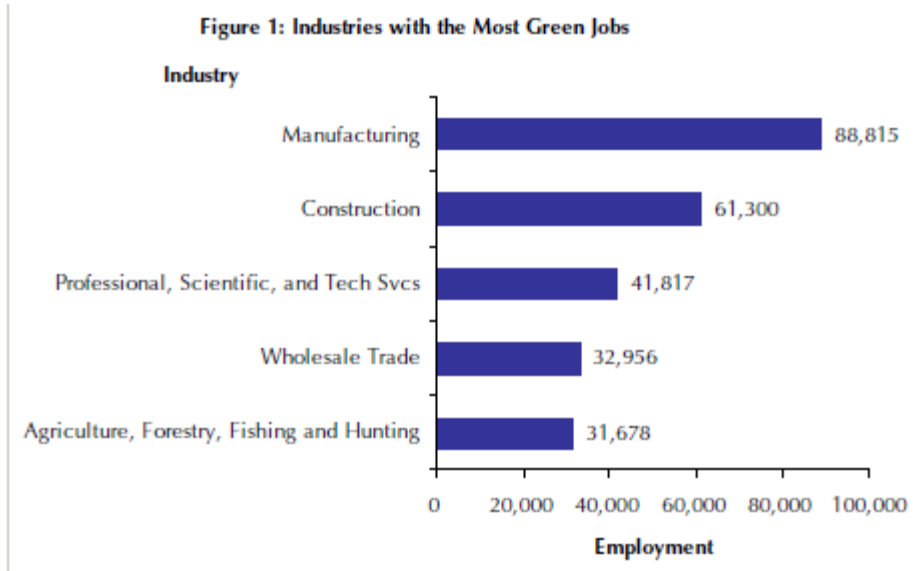
Source: California Employment Development Department. A Labor Day Briefing. September 2010

In the agency's September 2010 Labor Day Briefing (1), two bright spots are noted:

1. State exports are expected to remain strong despite the financial crisis in Europe, providing a boost to manufacturing, and the high technology and information sectors.
2. **California is well positioned to lead the country in developing new green and alternative energy technologies.**

Our green economy is driven by multiple factors, including public policy (e.g. AB 32, Title 24) and voter support (e.g. defeat of AB 23), venture capital investments and industry practice, and incentives such as consumer rebates and tax credits.(2) Across every industry sector, new and emerging green occupations

are rising, and existing occupations are changing to incorporate green principles and practices. Nowhere is this stronger than in California’s manufacturing and construction sectors.



Source: California Employment Development Department. A Labor Day Briefing. September 2010

At the national level, the U.S. Department of Labor has recognized the “intellectual and capital investments” in the growing green economy, and has identified new and emerging occupations that are related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing energy efficiency, recycling materials, and using renewable energy sources.(3) These “Bright Outlook” occupations are 1) Projected to grow faster than average (20%+ from 2008-2016), 2) Projected to have 100,000 or more job openings from 2008-2016, 3) New and emerging careers in a high-growth industry, and/or 4) are Green economy activities and technologies shaping the work and worker requirements needed for occupational performance, or generating new and emerging occupations.

O-NET Bright Outlook Occupations in Manufacturing Careers



Green increased demand occupation, green enhanced skills occupation, or green new and emerging occupation

SOC Code	Occupation	Type	Median Hourly Wage (CA)	Percent Change 2008-2016	Job Openings (CA)
19-2041.03	Industrial Ecologists	Rapid Growth, New & Emerging	33.82	+28%	4840
51-9199.01	Recycling & Reclamation Workers	New & Emerging	13.46	+24%	1960
13-1199.05	Sustainability Specialists	Numerous Job Openings, New & Emerging	30.14	+23%	6270
19-4099.01	Quality Control Analysts	New & Emerging	21.63	+21%	300
53-1021.01	Recycling Coordinators	New & Emerging	21.53	+18%	880
17-3029.02	Electrical Engineering Technologists	New & Emerging	29.94	+16%	420
17-3029.03	Electromechanical Engineering Technologists	New & Emerging	29.64	+16%	420
17-3029.04	Electronics Engineering Technologists	New & Emerging	29.94	+16%	420
17-3029.05	Industrial Engineering Technologists	New & Emerging	29.94	+16%	420

17-3029.06	Manufacturing Engineering Technologists	New & Emerging	29.94	+16%	420
17-3029.09	Manufacturing Production Technicians	New & Emerging	29.94	+16%	420
17-3029.12	Nanotechnology Engineering Technicians	New & Emerging	29.94	+16%	420
17-3029.11	Nanotechnology Engineering Technologists	New & Emerging	29.94	+16%	420
17-3029.01	Non-Destructive Testing Specialists	New & Emerging	29.94	+16%	420
17-3029.08	Photonics Technicians	New & Emerging	29.94	+16%	420
51-4121.07	Solders & Brazers	Numerous Job Openings	16.94	+14%	1090
51-4121.06	Welders, Cutters & Welder Fitters	Numerous Job Openings	16.94	+14%	1090
49-1011.00	First-Line Supervisors/Managers of Mechanics, Installers, Repairers	Numerous Job Openings	31.50	+11%	1540
47-2111.00	Electricians	Numerous Job Openings	25.96	+10%	2470
17-3024.01	Robotics Technicians	New & Emerging	24.67	+5%	60
11-3051.04	Biomass Production Managers	New & Emerging	43.47	+5%	750

Source: <http://online.onetcenter.org/>

O-NET Bright Outlook Occupations in Transportation & Logistics Careers

SOC Code	Occupation	Type	Median Hourly Wage (CA)	Percent Change 2008-2016	Job Openings (CA)
43-5011.01	Freight Forwarders	Rapid Growth, New & Emerging	19.03	+21%	720
13-1081.00	Logisticians	Rapid Growth	35.40	+21%	360
13-1081.02	Logistics Analysts	Rapid Growth, New & Emerging	35.40	+21%	360
17-3029.10	Fuel Cell Technicians	New &	29.94	+16%	420

		Emerging			
53-3032.00	Truck Drivers, Heavy & Tractor-Trailer	Numerous Job Openings	19.64	+15%	4780
49-3023.00	Automotive Service Technicians and Mechanics	Numerous Job Openings	18.63	+14%	2710
49-3023.02	Automotive Specialty Technicians	Numerous Job Openings	18.63	+14%	2710
11-919.06	Logistics Managers	Numerous Job Openings, New & Emerging	52.15	+13%	3310
53-7062.00	Laborers & Freight, Stock & Materials Movers	Numerous Job Openings	11.53	+11%	12090
43-5071.00	Shipping, Receiving & Traffic Clerks	Numerous Job Openings	13.74	+10%	3650
17-3027.01	Automotive Engineering Technician	New & Emerging	23.93	+10%	180
51-8099.01	Biofuels Processing Technician	New & Emerging	27.93	+8%	90
19-3099.01	Transportation Planners	Rapid Growth, New & Emerging	34.43	+8%	100
53-7051.00	Industrial Truck & Tractor Operators	Numerous Job Openings	15.40	+7%	2300
11-3051.03	Biofuels Production Managers	New & Emerging	43.47	+5%	750

Source: <http://online.onetcenter.org/>

O-NET Bright Outlook Occupations in Construction Careers

SOC Code	Occupation	Type	Median Hourly Wage (CA)	Percent Change 2008-2016	Job Openings (CA)
47-2031.01	Construction Carpenters	Numerous Job Openings	24.92	+12%	5410
13-1199.01	Energy Auditors	Numerous Job Openings, New & Emerging	30.14	+23%	6270

47-1011.00	First-Line Supervisors/Managers of Construction Trades & Extraction Workers	Numerous Job Openings	34.84	+12%	2240
47-2073.00	Operating Engineers & Other Construction Equipment Operators	Numerous Job Openings	30.63	+12%	11820
47-2152.01	Pipefitters & Steamfitters	Numerous Job Openings	24.62	+12%	1850
47-2152.02	Plumbers	Numerous Job Openings	24.62	+12%	1850
49-9021.02	Refrigeration Mechanics & Installers	Rapid Growth, Numerous Job Openings	23.20	+13%	600
47-4099.01	Solar Thermal Installers & Technicians	New & Emerging	17.16	+13%	300
47-4099.01	Solar Photovoltaic Installers	New & Emerging	17.16	+13%	300
47-4099.03	Weatherization Installers & Technicians	New & Emerging	17.16	+13%	300

Source: <http://online.onetcenter.org/>

California Community College Green Degree and Certificate Programs

California Community College Industrial and Technical Educational programs throughout the state have responded to the need for degree and certificate programs in green/sustainable career pathways. The number of new degree and certificate programs has grown exponentially over the last four years. While not a comprehensive listing, the following directories identify college programs and contact information.

Source	URL
Chancellor's Office Inventory of Approved Programs: archived as of March 1, 2010.	https://misweb.cccco.edu/webproginv/prod/invmenu.htm This database is being revised and will be reposted as the California Community Colleges Curriculum Inventory in 2011.
Green Technology	http://www.green-technology.org/ccsummit/directory.html
Sustainability, Education & Economic Development Center	http://theseedcenter.org/Colleges-in-Action/Green-Program/Course-Listings?keyword=&state=CA

Instructional Resources

Background - Resources that include best practice models for creating curricula include:

- Building Effective Green Energy Programs in Community Colleges. May 2010. Available online at <http://cccco.edu/Portals/4/EWD/BuildingEffectiveGreenEnergyProgramsinCCs.pdf>
- The Green Curriculum. California Community College Chief Instructional Officers. Available online at <http://www.ccccio.org/documents/CCLCGreenCurriculum.ppt>
- Creating Curriculum for Green Jobs. Website presentation by Valerie Karnes, Dean of CTE at Cero Coso College. Available online at <http://www.greenstreetscene.com/channel/conferences/california-community-college-summit/concurrent-sessions/idx7/creating-curriculum-green-jobs-cerro-coso>
- Teachinglean.org and the Lean Education Academic Network. Online at www.teachinglean.org

Sustainable Manufacturing/Lean Enterprise - A natural match for Industrial and Technical Education (TOP 09) programs is the integration of Lean principles and practices (the reduction of waste and improvement in meeting customer needs) into existing curricula.

- Sustainable Peralta: Green Curriculum Resources. Available online at <http://sustainableperalta.org/programs/curriculum/curriculum-resources/>
- The Lean and Energy Toolkit. October 2007. U.S. Environmental Protection Agency. Available online at <http://www.epa.gov/lean/toolkit/LeanEnergyToolkit.pdf>
- The Lean and Environment Toolkit. October 2007. U.S. Environmental Protection Agency. Available online at <http://epa.gov/lean/toolkit/LeanEnviroToolkit.pdf>

Sustainable/Green Construction – including skilled trades, project management and supervision.

- Certification bodies such as the Green Building Certification Institute's Leadership in Energy and Environmental Design (LEED)(www.gbci.org), and the National Association of Homebuilders, National Green Building Program (NAHBGreen)(www.nahbgreen.org).
- Teaching tools and materials are available at <http://www.campusgreenbuilder.org/Educational>
- Resource links for green construction are featured at http://www.constructionweblinks.com/Industry_Topics/Engineering_Environment/greenbuilding/greenbuilding.html
- Green Building Construction in California (2009) by Green Technology features educational and career pathways, best practice models, and resources. (<http://www.green-technology.org/greentech-report-june09r.pdf>)

- Lesson plans developed by high school teachers are available at CTE Online (<http://www.cteonline.org/portal/default/default>). Lessons include Air Movement: Refrigeration, Air Conditioning, Solar Technology, Cabinetmaking, and Construction Technology.

Sustainable/Green Logistics – including materials handling and transportation occupations.

- Professional development for faculty to become a Certified Green Supply Chain Professional is offered at both public and private venues. Examples include CSU East Bay's continuing education program (http://www.ce.csueastbay.edu/certificate/green_professional/supply_chain/index.shtml), or Cal Poly's online program (<http://www.continuing-ed.calpoly.edu/professional/green.html>).
- A Federal Highway Administration University Course on Bicycle and Pedestrian Transportation (206) is available at <http://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/toc.cfm#toc>
- Well Measured: Developing Indicators for Comprehensive and Sustainable Transport Planning (February 2008) may provide a framework for curriculum development. Available online at <http://courses.washington.edu/cee587/Readings/sustainability.pdf>
- The U.S. Army Environmental Command lists Green Procurement online catalogs at <http://aec.army.mil/usaec/sustainability/gp00.html> Green Procurement (GP) means purchasing environmentally preferable products and services in accordance with one or more of the established Federal procurement preference programs.
- Lesson plans developed by K-12 teachers across a variety of green subjects, including waste reduction, transportation and recycling, are available at <http://www.greeningschools.org/resources/curricula.cfm>

References

- (1) A Labor Day Briefing for California. September 2010. Employment Development Department, Labor Market Division.
- (2) 2010 California Green Innovation Index. Available online at <http://www.Next10.org>.
- (3) Greening of the World of Work: Implications for O*Net SOC and New and Emerging Occupations. February 12, 2009. U.S. Department of Labor. Available online at http://www.onetcenter.org/dl_files/Green.pdf.