

# Emerging Industry & Occupations Report

## Solar Study / 2008

In 2008, the Centers of Excellence conducted a survey of 212 solar and solar-related businesses throughout California, with regional perspectives for northern and southern California. Executive interviews, the creation of a solar employer database, and survey findings enabled the COE to identify the regions within California that exhibited the greatest need for workers: the Bay Area; the Greater Sacramento area; Southern California; and Los Angeles County.

### Solar Employers

Solar-related firms in California employ between 14,500 and 17,000 workers.

- 70% of surveyed employers plan to hire more employees over the next 12 months.
- Solar-related firms are expecting to increase employment by up to 29% or approximately 5,000 jobs.

### Employer Database

Partnering with multiple industry association groups and related research enabled the compilation of a solar employer database. As a result, the COE was able to identify approximately 770 solar businesses statewide.

- According to the survey, 86% of solar-related firms are relatively small businesses—less than 25 employees.
- The majority of solar-related firms (90-95%) are non-manufacturing; this group includes installers, contractors (where solar is a component of the business) and distributors of solar energy equipment.

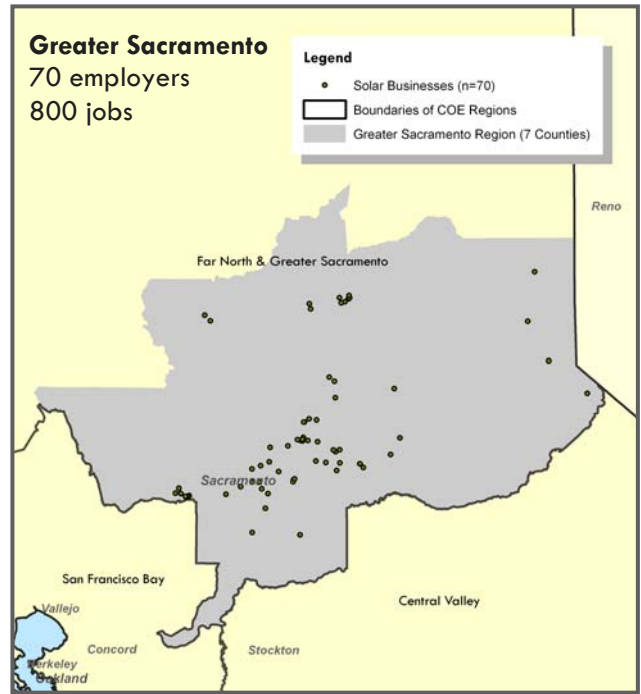
Mapping the location of the businesses revealed employer concentrations in four regions:

- 33% in Bay Area
- 16% in Greater Sacramento
- 26% in Southern California\*
- 14% in Los Angeles\*
- 11% balance of state



\*Southern California data includes: San Diego, Imperial, Orange, Riverside, San Bernardino, Ventura and Los Angeles counties. Los Angeles figure represents percent of county to statewide data.

## Regional Distribution of Employers



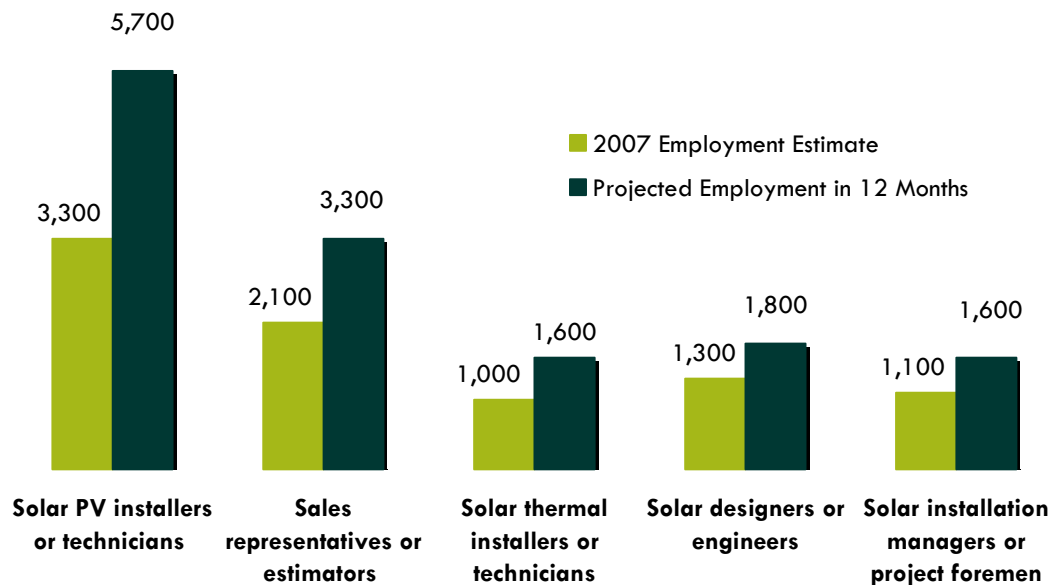
\*Southern California total includes Los Angeles employment.

## Occupational Employment

The following five occupations were identified by COE research and executive interviews to be emerging from more traditional occupations and as specific to the solar industry:

- Solar Photovoltaic (PV) Installer
- Solar Thermal Installer
- Solar Sales Representative/Estimator
- Solar Designer/Engineer
- Solar Installation Manager/Project Foreman

According to survey responses, employers expect to significantly increase hiring of these five occupations in the next 12 months. In the chart below, the estimated 2007 statewide employment levels and the 12-month projected employment level are shown.



Statewide, the largest growth is expected for solar PV installers (2,400 projected new jobs), followed by sales representatives or estimators (1,200 jobs). Thermal installers are projected to gain 600 jobs, while designers or engineers and installation managers or foremen are projected to increase by 500 jobs each.

The highest median wages statewide are for solar designers or engineers (\$50,000/entry-level; \$83,200/experienced) and solar installation managers or project foremen (\$50,000/entry-level; \$72,800/experienced), with the highest wages offered in the Bay Region.

In the survey, employers were asked what knowledge, skills, and abilities were important considerations when selecting employees for their businesses. Employers ranked the following as the top four:

Knowledge, skills, and abilities	Very Important	Somewhat Important
General construction experience	82.1%	10.8%
Ability to work on a roof	67.5%	23.6%
General understanding of the mechanics and engineering of solar power	60.4%	30.7%
Customer service skills	55.2%	39.2%

For more detailed information on the five target occupations—job growth, growth rate, and median wages by study region—see Appendix C. More survey findings for California and the four study regions can be accessed online at: [www.coecc.net/solar](http://www.coecc.net/solar).

## Industry Needs

In California's solar industry, employers are facing a number of challenges.

- Qualified employees are difficult to find. Employers are forced to train new employees on-the-job, relying on more experienced staff to instruct new staff as they go.

Employees are also difficult to retain. Several employers stated they often have to resort to "poaching" employees from their competition and expect their competition does the same to them.

- In December 2008, the federal tax credit that provides significant incentive for solar installations will expire. If the tax credit is not renewed, the number of solar systems purchased and installed by solar employers will be significantly impacted. As a result, the expected job growth may not materialize.

However, most industry experts consider this a small setback, not a crisis, and that the demand for alternative energy sources will only be temporarily affected. They caution employers and educators alike to monitor industry trends and to continue to train qualified solar workers.

## Community College Response to Industry

Historically, solar programs in the community college system have been attached or "nested" within programs or departments of a similar nature. These include, but are not limited to, construction; construction management; mechanical and electrical engineering; environmental (HVAC); etc.

As a result, locating and defining solar courses within each college's inventory can be challenging. At this time, a complete inventory of solar programs and courses statewide is not available. (For a listing of current and proposed solar programs and courses that have been identified, see Appendix A.)

When assessing the community college's ability to respond to the solar industry's need for qualified workers, it may be helpful to look at related existing programs. Appendix B details the degrees and certificates awarded in 2006-2007 in programs that share similar characteristics with the skill sets needed for solar installation work.

For an example of the program capacity within the community colleges, the Bay Region's environmental scan of programs in the region's colleges provided a detailed inventory of existing, planned, and related programs and courses. This information can be viewed as an example of how colleges are responding and striving to meet the industry's need for workers. The Bay Region's solar industry is the most concentrated and the largest of the four study areas and the relationship between industry and colleges may also be the most connected and proactive in the state.

Based on the data collected, the solar programs in the chart below have the capacity to produce up to 800 graduates by June 2009.

The projected need for solar workers for the Bay Region over the next 12 months totals 1,900.

– **Approximate gap between supply and demand: 1,100**

The table that follows contains an inventory of programs and courses as developed for the full environmental scan for the Bay Region (accessed through: [www.coecc.net/solar](http://www.coecc.net/solar)).

College	PV Solar Installer Course			Target Occupations (Based on 5 Occupations Studied)	Related Training and/or Planned New Courses
	Capacity Per Course	# of Courses Planned from 6/09	Est. Total # Graduates by 6/09		
<b>Cabrillo</b>	25 Currently 33 enrolled	3 Spring 08, Fall 08, Spring 09	75	PV Installer Preparation for Sales Representative; Preparation for Designer or Installation Manager	Sustainable Building & Environment; Fundamentals of RE Systems Solar Thermal Installer, Spring '09
<b>Chabot</b>	30 Currently 28 enrolled	4	120	PV Installer – Apprentice Level; PV Installer – Journeyman Level upgrade training; Installation Manager/ Foreman	None
<b>DeAnza</b> (Planned Course)	20-30	Up to 3 per quarter semester (depends on demand)	90	Will train for PV Installer	None
<b>Diablo Valley</b>	26 Enrollment often exceeds to 32	3 sections each semester = 9 (spring & fall 08 + spring 09) x 95 students each semester	285	PV Installer Sales Representative Solar Designer/Engineer (minimal –residential only) Installation Manager/Project Foreman (background info only)	Advanced PV course (design, installation & maintenance of large industrial, commercial systems). Spring '09, 2 credit units
<b>Napa Valley</b> (Planned Course)	20-24	1 x year	20-24	Will train for PV Installer	None
<b>Ohlone</b> (Planned Cert.)	25-30 (estimate)	1 x semester	25-30	Will train for PV Installer and for Solar Thermal Installer	Solar Thermal Installer
<b>San Jose</b>	22-30	4 Spring 08, Summer 08, Fall 08, Spring 09	88-120	PV Installer	Solar (Theory & Electronics prereq. To PV Solar Installer. Also have infrastructure to develop Solar Thermal Installer
<b>Skyline</b>	15	3 by December, 08	40-45	PV Installer	PV Solar Installation and Design institutionalized at the college Spring,'09.
<b>Total Estimated Number of Graduates</b>				<b>743-789</b>	

## Appendix A

In the table below, existing and proposed programs and course offerings are listed for EWD regions. Regions combined for study purposes are listed together; not all colleges are represented.

Region	Existing Program or Course Offerings Planned Programs or Course Offerings
<b>Bay Region (combines San Francisco Bay Region and Greater Silicon Valley Region)</b>	
Cabrillo	PV Solar Design and Installation course (3 credits)
Chabot	PV Installation course (30-hours)
DeAnza	<i>PV Solar Design and Installation course /Fall 2008 (credit)</i>
Diablo Valley	PV Solar Design and Installation course (2 credits)
Napa Valley	PV Installer course /Spring 2009
Ohlone	<i>PV Installation Certificate /Spring 2009 (17 credits); Thermal Installation /Spring 2009</i>
San Jose City	<i>PV Installer course (4.5 credits w/lab)</i>
Skyline	PV Installer course (incumbent worker training only) /Spring 2008 (3 credits)
<b>North Far North Region</b>	
American River	Currently offer solar courses; <i>Plan to develop a certificate program in Solar Technology /Spring 2009</i>
Butte College	PV Installer courses
College of the Siskiyous	<i>Environmental Sustainability Certificate /Spring 2009</i>
Sacramento City	PV Installer courses (currently inactive)
Shasta College	PV Installer course; <i>Plan to develop a PV Certificate /Fall 2009</i>
Sierra College	<i>Solar Energy Technician Certificate /Fall 2009</i>
<b>Central Valley Region</b>	
Cerro Coso	<i>PV and Thermal Installer course /Spring 2009</i>
<b>South Central Region</b>	
Cuesta College	Plan to develop a solar technology certificate program
<b>Inland Empire Region</b>	
Chaffey	Two solar related courses
<b>Orange County Region</b>	
Golden West	PV and Thermal Installer courses
Orange Coast	<i>Solar Technology Certificate</i>
<b>Los Angeles Region</b>	
LA Trade-Tech College	<i>PV and Thermal Courses /Fall 2008</i>

**Appendix B**

The following totals represent programs that share similar characteristics with the skill sets needed for solar installation work. For the fiscal year 2006-2007, 54 colleges supported 210 programs awarding degrees, certificates, or other awards to students completing these similar programs.

<b>Award Type</b>	<b>Total</b>
Associate of Arts (A.A.) degree	79
Associate of Science (A.S.) degree	248
Certificate requiring 18 to fewer than 30 units	623
Certificate requiring 30 to fewer than 60 units	1,003
Certificate requiring 6 to fewer than 18 units	271
Certificate requiring 60 or more semester units	22
Noncredit award requiring from 480 to fewer than 960 hours	4
Other Credit Award, under 6 semester units	221
<b>Total Degrees, Certificates, or Other Award</b>	<b>2,471</b>

## Appendix C

Occupation	Estimated 2007 Solar Industry Employment	Growth Next 12 Months	Openings from Growth	Median Annual Wage Entry / Experienced	
<b>Statewide</b>					
Solar thermal installers or technicians	960	71%	670	\$31,200	\$52,000
Solar photovoltaic installers or technicians	3,300	64%	2,420	\$31,200	\$52,000
Sales representatives or estimators	2,140	55%	1,160	\$40,000	\$62,400
Solar designers or engineers	1,250	42%	510	\$50,000	\$83,200
Solar installation managers or project foremen	1,110	48%	500	\$50,000	\$72,800
<b>Summary</b>	<b>8,760</b>	<b>60%</b>	<b>5,260</b>		
<b>Bay Region</b>					
Solar thermal installers or technicians	340	46%	150	\$31,200	\$52,000
Solar photovoltaic installers or technicians	1,590	56%	880	\$31,200	\$60,000
Sales representatives or estimators	890	51%	450	\$41,600	\$62,400
Solar designers or engineers	550	44%	220	\$50,000	\$83,200
Solar installation managers or project foremen	480	37%	180	\$52,000	\$77,500
<b>Summary</b>	<b>3,850</b>	<b>49%</b>	<b>1,880</b>		
<b>Greater Sacramento area</b>					
Solar thermal installers or technicians	100	46%	300	\$28,500	\$45,800
Solar photovoltaic installers or technicians	470	63%	260	\$31,200	\$52,000
Sales representatives or estimators	270	31%	140	\$35,400	\$70,000
Solar designers or engineers	160	22%	70	\$50,000	\$79,100
Solar installation managers or project foremen	140	32%	50	\$52,000	\$70,000
<b>Summary</b>	<b>1,140</b>	<b>50%</b>	<b>820</b>		
<b>Southern California (San Diego, Imperial, Orange, Riverside, San Bernardino, and Ventura counties)</b>					
Solar thermal installers or technicians	270	156%	420	\$31,200	\$52,000
Solar photovoltaic installers or technicians	1,270	76%	960	\$29,100	\$52,000
Sales representatives or estimators	750	80%	600	\$40,000	\$68,900
Solar designers or engineers	460	47%	210	\$52,000	\$83,200
Solar installation managers or project foremen	420	69%	290	\$45,800	\$72,800
<b>Summary</b>	<b>3,170</b>	<b>78%</b>	<b>2,480</b>		

Occupation	Estimated 2007 Solar Industry Employment	Growth Next 12 Months	Openings from Growth	Median Annual Wage Entry / Experienced	
<b>Los Angeles County*</b>					
Solar thermal installers or technicians	90	148%	130	\$31,200	\$52,000
Solar photovoltaic installers or technicians	360	76%	270	\$29,100	\$52,000
Sales representatives or estimators	270	76%	200	\$40,000	\$68,900
Solar designers or engineers	120	47%	60	\$52,000	\$83,200
Solar installation managers or project foremen	130	67%	90	\$45,800	\$72,800
<b>Summary</b>	<b>970</b>	<b>77%</b>	<b>750</b>		

\*Southern California includes San Diego, Imperial, Orange, Riverside, San Bernardino, and Ventura counties. \*\*Los Angeles County data included where possible; due to sample size, combined Southern California totals (including Los Angeles) were substituted where necessary to maintain the integrity of data.