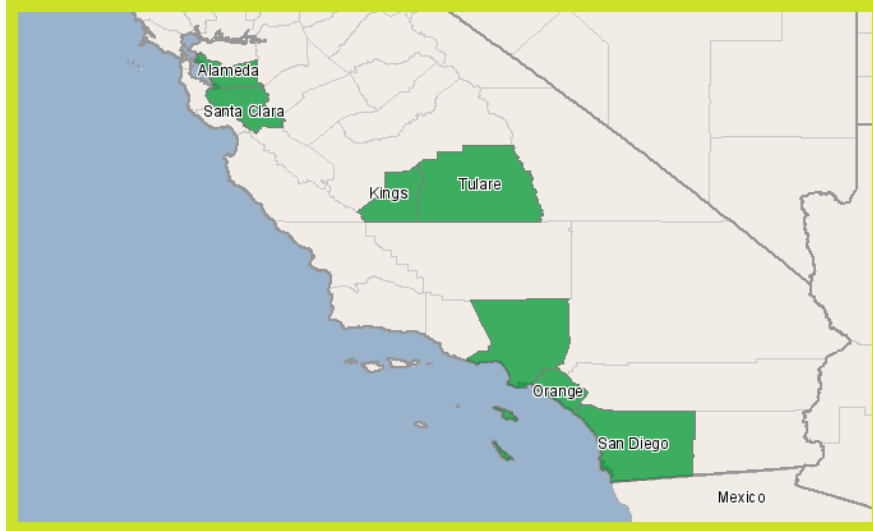




Manufacturing in Bay Area, Central and Southern California Counties



Submitted to Cerritos College
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Overview

The purpose of this summary report is to provide an overview of four manufacturing sectors: Aerospace, Biotechnology, Food Processing, and Renewable Energy Equipment. This information will support Cerritos College’s application for the Trade Adjustment Assistance (TAA) grant. The geographic region for the analysis includes Alameda, Kings, Los Angeles, Orange, San Diego, Santa Clara, and Tulare counties.

Aerospace Manufacturing

The aerospace manufacturing sector is projected to decline by 11 percent over the next five years, shedding about 6,000 jobs across the region. However, several industries within the aerospace sector are expected to grow during this time frame, such as the Bolt, Nut, Screw, Rivet, and Washer Manufacturing; Other Aircraft Parts and Auxiliary Equipment Manufacturing; and Guided Missile and Space Vehicle Manufacturing.

As shown below, the majority of jobs are in Los Angeles & Orange counties, followed by Santa Clara & Alameda counties and San Diego County. Tulare and Kings counties have about one percent of the total aerospace jobs. For additional detail about each location, please refer to Appendix A, B & C.

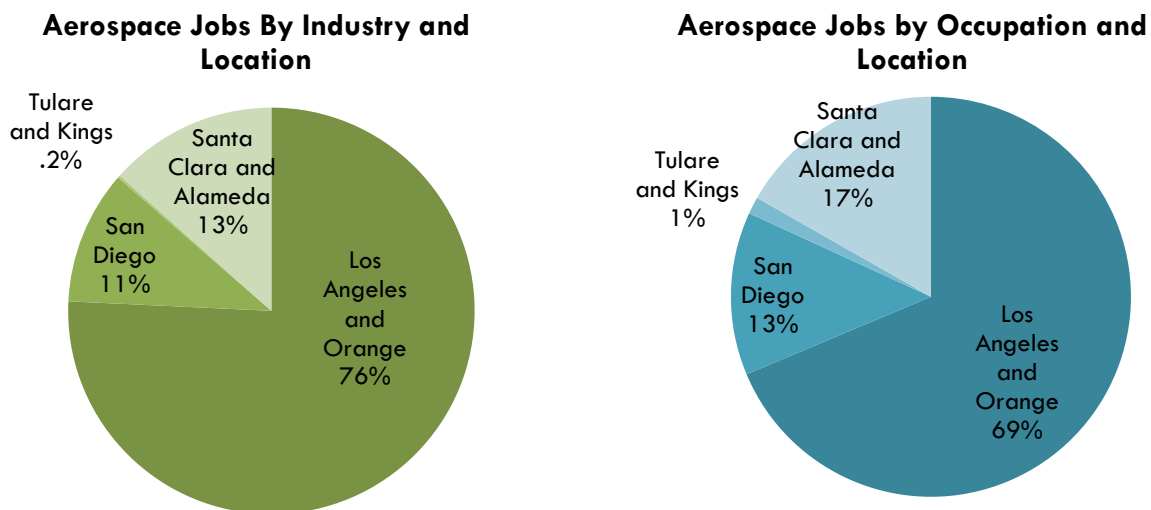


Table 1: 2010 – 15 Employment Change for the Aerospace Manufacturing Sector

Data reflects industry employment totals, representing all jobs within the sector irrespective of occupation.

NAICS Code	Description	2010	2015	2010-15 Change	Percent Change	Business Count
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	37,405	36,140	(1,265)	-3.4%	289
336411	Aircraft Manufacturing	22,476	15,886	(6,590)	-29.3%	167
332710	Machine Shops	22,039	19,008	(3,031)	-13.8%	1,840
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	21,414	23,497	2,083	9.7%	399
336414	Guided Missile and Space Vehicle Manufacturing	15,524	16,709	1,185	7.6%	102

NAICS Code	Description	2010	2015	2010-15 Change	Percent Change	Business Count
332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing	8,080	10,008	1,928	23.9%	113
488190	Other Support Activities for Air Transportation	4,049	4,710	661	16.3%	280
332912	Fluid Power Valve and Hose Fitting Manufacturing	3,424	3,954	530	15.5%	78
334519	Other Measuring and Controlling Device Manufacturing	3,034	3,580	546	18.0%	116
336412	Aircraft Engine and Engine Parts Manufacturing	2,940	2,656	(284)	-9.7%	59
332510	Hardware Manufacturing	1,942	1,111	(831)	-42.8%	64
332721	Precision Turned Product Manufacturing	1,922	1,509	(413)	-21.5%	93
336360	Motor Vehicle Seating and Interior Trim Manufacturing	979	706	(273)	-27.9%	39
339993	Fastener, Button, Needle, and Pin Manufacturing	611	552	(59)	-9.7%	39
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Mfg.	578	580	2	0.3%	12
332995	Other Ordnance and Accessories Manufacturing	499	687	188	37.7%	8
336321	Vehicular Lighting Equipment Manufacturing	354	188	(166)	-46.9%	9
333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing	232	116	(116)	-50.0%	15
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	216	83	(133)	-61.6%	9
Total		147,718	141,679	(6,039)	-4.1%	3,730

Four of the five aerospace occupations are expected to decline in the next five years. However, employers will need to hire replacement workers for all five of the aerospace occupations due to retirements and general separations. As shown below, aerospace occupational wages range from \$16 to \$29.50 per hour. The median hourly wage across all occupations in the region is \$21.34 per hour.

Table 2: 2010 – 15 Employment Change for Aerospace Occupations

Data reflects occupational employment totals, representing all jobs in the occupation within the region irrespective of industry sector.

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings
Aircraft mechanics and service technicians (49-3011)	5,690	5,618	(72)	(1%)	627
Maintenance workers, machinery (49-9043)	2,278	2,333	55	2%	247
First-line supervisors/managers of production and operating workers (51-1011)	36,334	34,776	(1,558)	(4%)	2,748
Computer-controlled machine tool operators, metal and plastic (51-4011)	7,284	7,195	(89)	(1%)	874
Machinists (51-4041)	24,231	23,025	(1,206)	(5%)	1,720
Total	75,817	72,947	(2,870)	(4%)	6,217

Table 3: Wages and Education Level for Aerospace Occupations

Description	2010 Median Hourly Wage	Education Level
Aircraft mechanics and service technicians (49-3011)	\$29.52	Postsecondary vocational award
Maintenance workers, machinery (49-9043)	\$16.78	Short-term on-the-job training
First-line supervisors/managers of production and operating workers (51-1011)	\$25.58	Work experience in a related field
Computer-controlled machine tool operators, metal and plastic (51-4011)	\$15.99	Moderate-term on-the-job training
Machinists (51-4041)	\$17.75	Long-term on-the-job training

Based on the current output of training programs and projected demand, there is a gap in supply for three of the five aerospace occupations. There is a significant need for first-line supervisors/managers of production and operating workers.

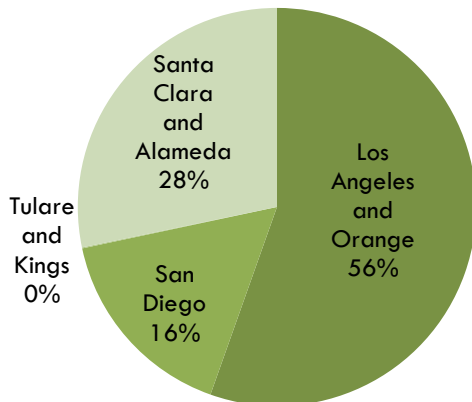
Table 4: Supply and Demand Gap Analysis for Aerospace Occupations

Description	Annual Openings	Degrees Conferred Annually	Gap
Aircraft mechanics and service technicians (49-3011)	125	424	299
Maintenance workers, machinery (49-9043)	49	No Data	(49)
First-line supervisors/managers of production and operating workers (51-1011)	550	4	(546)
Computer-controlled machine tool operators, metal and plastic (51-4011)	175	No Data	(175)
Machinists (51-4041)	344	1019	675

Biotechnology Manufacturing

The biotech manufacturing sector is expected to grow by 11 percent over the next two years. The subsector, medical devices, equipment and supplies, is expected to add the most jobs, followed by the pharmaceuticals and related manufacturing subsector. General biotech will remain fairly steady with a loss of about 200 jobs. Los Angeles and Orange have the most biotech jobs, followed by Santa Clara/Alameda Counties, and San Diego County.

Biotech Jobs By Industry and Location



Biotech Jobs By Occupation and Location

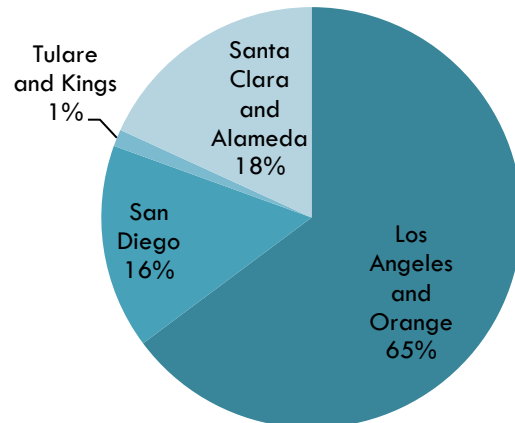


Table 5: 2010 – 15 Employment Change for the Biotech Industry

Data reflects industry employment totals, representing all jobs within the sector irrespective of occupation.

General Biotech						
NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
325193	Ethyl Alcohol Manufacturing	15	28	13	87%	3
325199	All Other Basic Organic Chemical Manufacturing	736	880	144	20%	23
325221	Cellulosic Organic Fiber Manufacturing	10	22	12	120%	3
325222	Noncellulosic Organic Fiber Manufacturing	112	144	32	29%	9
325611	Soap and Other Detergent Manufacturing	1,848	1,911	63	3%	86
325612	Polish and Other Sanitation Good Manufacturing	1,778	1,504	(274)	(15%)	76
325613	Surface Active Agent Manufacturing	467	272	(195)	(42%)	17
Total		4,966	4,761	(205)	(4%)	217
Medical Devices, Equipment and Supplies						
NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	9,963	11,023	1,060	11%	194
334516	Analytical Laboratory Instrument Manufacturing	6,304	6,839	535	8%	116
334517	Irradiation Apparatus Manufacturing	759	967	208	27%	30
339112	Surgical and Medical Instrument Manufacturing	15,429	17,287	1,858	12%	266
339113	Surgical Appliance and Supplies Manufacturing	9,036	10,517	1,481	16%	246
Total		41,491	46,633	5,142	12%	852
Pharmaceuticals and Related Manufacturing						
NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
325411	Medicinal and Botanical Manufacturing	1,981	1,931	(50)	(3%)	55
325412	Pharmaceutical Preparation Manufacturing	11,948	13,710	1,762	15%	230
325413	In-Vitro Diagnostic Substance Manufacturing	5,020	6,701	1,681	33%	71
325414	Biological Product (except Diagnostic) Manufacturing	2,146	1,430	(716)	(33%)	40
Total		21,095	23,772	2,677	13%	396
Total - All Biotech Industries		67,552	75,166	7,614	11%	1,465

Three of the four biotech occupations are expected to grow in the next five years, adding about 1,800 jobs. As shown below, the overall demand for replacement workers is 10 times the demand for new workers. Team assemblers is expected to have the most job openings due to retirements and general turnover in the industry.

Table 6: 2010 – 15 Employment Change for Biotech Occupations

Data reflects occupational employment totals, representing all jobs in the occupation within the region irrespective of industry sector.

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings
Medical and clinical laboratory technologists (29-2011)	8,462	9,331	869	10%	1,674
Maintenance workers, machinery (49-9043)	2,278	2,333	55	2%	247
Team assemblers (51-2092)	54,905	53,884	(1,021)	(2%)	7,200
Mixing and blending machine setters, operators, and tenders (51-9023)	8,433	9,301	868	10%	1,600
Total	74,078	74,849	771	1%	10,721

Table 7: Wages and Education Level for Biotech Occupations

Description	2010 Median Hourly Wage	Education Level
Medical and clinical laboratory technologists (29-2011)	\$35.65	Bachelor's degree
Maintenance workers, machinery (49-9043)	\$16.78	Short-term on-the-job training
Team assemblers (51-2092)	\$12.27	Moderate-term on-the-job training
Mixing and blending machine setters, operators, and tenders (51-9023)	\$14.34	Moderate-term on-the-job training

As shown below, there is a significant gap for all four of the occupations. Because medical and clinical laboratory technologists require a four year degree, employers will likely have the most difficulty finding qualified applicants for this occupation. Applicants for the other three occupations may be hired and trained on the job.

Table 8: Supply and Demand Gap Analysis for Biotech Occupations

Description	Annual Openings	Annual Degrees Conferred	Gap
Medical and clinical laboratory technologists (29-2011)	335	28	(307)
Maintenance workers, machinery (49-9043)	49	No Data	(49)
Team assemblers (51-2092)	1,440	No Data	(1,440)
Mixing and blending machine setters, operators, and tenders (51-9023)	320	No Data	(320)

Food Processing

The food processing sector is projected to grow by four percent over the next five years, adding 3,400 jobs. Some food processing industries are expected to outperform the overall sector, while others are expected to decline. Wineries, soft drink manufacturing, perishable prepared food manufacturing, and cheese manufacturing are expected to add the most jobs.

As shown below, the majority of the food processing jobs are in Los Angeles & Orange Counties. However, unlike the previous two industry sectors, Tulare and Kings Counties have a much larger share of the total jobs with about 12 percent of the industry jobs and 20 percent of the occupation specific jobs.

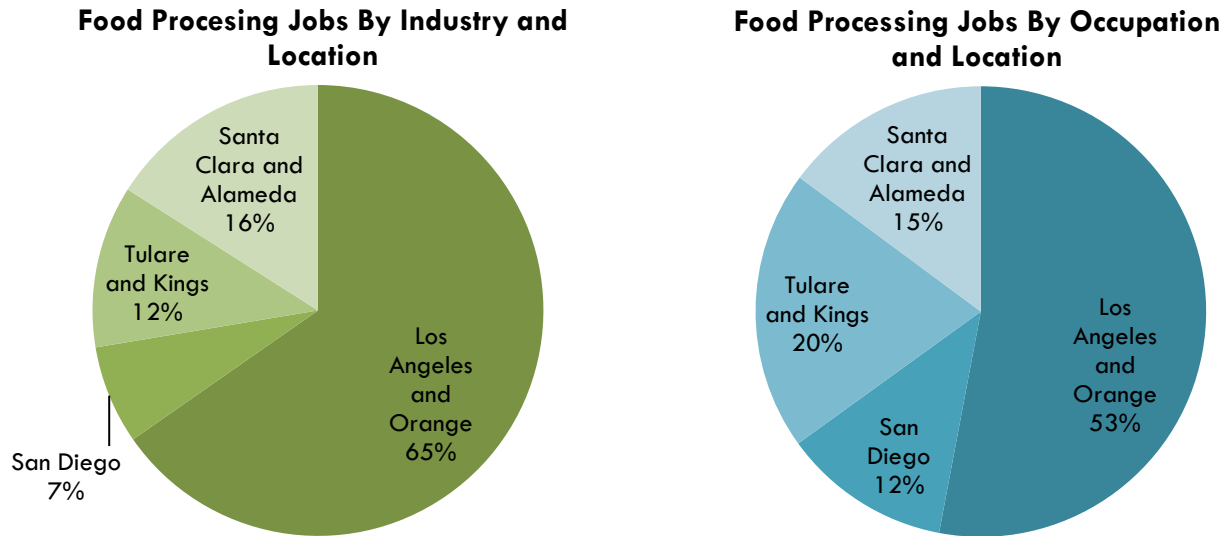


Table 9: 2010 – 15 Employment Change for the Food Processing Sector¹

Data reflects industry employment totals, representing all jobs within the sector irrespective of occupation.

NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
311111	Dog and Cat Food Manufacturing	668	264	(404)	(60%)	26
311119	Other Animal Food Manufacturing	1,219	1,826	607	50%	40
311211	Flour Milling	313	255	(58)	(19%)	14
311212	Rice Milling	60	101	41	68%	2
311222	Soybean Processing	42	51	9	21%	3
311223	Other Oilseed Processing	310	180	(130)	(42%)	6
311225	Fats and Oils Refining and Blending	162	149	(13)	(8%)	3
311230	Breakfast Cereal Manufacturing	137	122	(15)	(11%)	5
311320	Chocolate and Confectionery Manufacturing from Cacao Beans	913	1,085	172	19%	16
311330	Confectionery Manufacturing from Purchased Chocolate	1,663	1,388	(275)	(17%)	53
311340	Nonchocolate Confectionery Manufacturing	969	700	(269)	(28%)	39
311411	Frozen Fruit, Juice, and Vegetable	1,135	1,183	48	4%	21

¹ There are fewer than 10 jobs are reported for NAICS codes 311213; 311221; 3113111; 311312; and 311313.

NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
	Manufacturing					
311412	Frozen Specialty Food Manufacturing	5,210	5,567	357	7%	63
311421	Fruit and Vegetable Canning	4,513	4,843	330	7%	69
311422	Specialty Canning	449	386	(63)	(14%)	11
311423	Dried and Dehydrated Food Manufacturing	223	125	(98)	(44%)	11
311511	Fluid Milk Manufacturing	5,091	5,639	548	11%	65
311512	Creamery Butter Manufacturing	14	19	5	36%	--
311513	Cheese Manufacturing	3,270	4,060	790	24%	34
311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing	626	763	137	22%	15
311520	Ice Cream and Frozen Dessert Manufacturing	1,044	1,145	101	10%	36
311611	Animal (except Poultry) Slaughtering	2,194	2,347	153	7%	17
311612	Meat Processed from Carcasses	4,203	4,027	(176)	(4%)	95
311613	Rendering and Meat Byproduct Processing	239	177	(62)	(26%)	6
311615	Poultry Processing	888	1,091	203	23%	25
311711	Seafood Canning	58	22	(36)	(62%)	7
311712	Fresh and Frozen Seafood Processing	450	268	(182)	(40%)	17
311811	Retail Bakeries	8,402	8,715	313	4%	682
311812	Commercial Bakeries	9,956	8,365	(1,591)	(16%)	235
311813	Frozen Cakes, Pies, and Other Pastries Manufacturing	1,577	1,867	290	18%	26
311821	Cookie and Cracker Manufacturing	1,366	1,300	(66)	(5%)	42
311822	Flour Mixes and Dough Manufacturing from Purchased Flour	1,210	1,109	(101)	(8%)	21
311823	Dry Pasta Manufacturing	868	685	(183)	(21%)	33
311830	Tortilla Manufacturing	3,521	3,654	133	4%	80
311911	Roasted Nuts and Peanut Butter Manufacturing	1,140	1,292	152	13%	21
311919	Other Snack Food Manufacturing	724	738	14	2%	23
311920	Coffee and Tea Manufacturing	1,085	1,372	287	26%	32
311930	Flavoring Syrup and Concentrate Manufacturing	515	373	(142)	(28%)	29
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	1,227	1,280	53	4%	30
311942	Spice and Extract Manufacturing	1,225	1,249	24	2%	43
311991	Perishable Prepared Food Manufacturing	3,141	4,001	860	27%	82
311999	All Other Miscellaneous Food Manufacturing	1,596	1,271	(325)	(20%)	53
312111	Soft Drink Manufacturing	6,693	7,797	1,104	16%	71
312112	Bottled Water Manufacturing	303	162	(141)	(47%)	14
312113	Ice Manufacturing	303	304	1	0%	15
312120	Breweries	1,560	1,475	(85)	(5%)	23
312130	Wineries	2,080	3,206	1,126	54%	97
312140	Distilleries	54	46	(8)	(15%)	3
	Total	84,609	88,044	3,435	4%	2,354

Four of the eight food processing occupations are expected to decline in the next five years. However, there is a significant demand for replacement jobs across all eight occupations with over 3,800 annual openings. Farm laborers (SOC 45-209A) is expected to have the highest replacement demand.

Table 10: 2010 – 15 Employment Change for Food Processing Occupations

Data reflects occupational employment totals, representing all jobs in the occupation within the region irrespective of industry sector.

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings
Miscellaneous agricultural workers (45-209A)	44,172	43,941	(231)	(1%)	7,122
Maintenance workers, machinery (49-9043)	2,278	2,333	55	2%	247
First-line supervisors/managers of production and operating workers (51-1011)	36,334	34,776	(1,558)	(4%)	2,748
Bakers (51-3011)	12,511	12,533	22	0%	1,739
Food batchmakers (51-3092)	9,546	10,336	790	8%	1,948
Inspectors, testers, sorters, samplers, and weighers (51-9061)	34,605	33,503	(1,102)	(3%)	3,328
Cooling and freezing equipment operators and tenders (51-9193)	344	364	20	6%	55
Production workers, all other (51-9199)	14,526	14,357	(169)	(1%)	1,964
Total	154,316	152,144	(2,172)	(1%)	19,151

Table 11: Wages and Education Level for Food Processing Occupations

Description	2010 Median Hourly Wage	Education Level
Miscellaneous agricultural workers (45-209A)	\$9.68	Short-term on-the-job training
Maintenance workers, machinery (49-9043)	\$16.78	Short-term on-the-job training
First-line supervisors/managers of production and operating workers (51-1011)	\$25.58	Work experience in a related field
Bakers (51-3011)	\$12.83	Long-term on-the-job training
Food batchmakers (51-3092)	\$11.16	Short-term on-the-job training
Inspectors, testers, sorters, samplers, and weighers (51-9061)	\$16.02	Moderate-term on-the-job training
Cooling and freezing equipment operators and tenders (51-9193)	\$15.87	Moderate-term on-the-job training
Production workers, all other (51-9199)	\$13.97	Moderate-term on-the-job training

The following table displays the potential gap between supply and demand. As shown, there may be a training shortage for all eight occupations. It's important to note, however, that many employers do not require applicants to have formal training, instead they are provided on-the-job training.

Table 12: Supply and Demand Gap Analysis for Food Processing Occupations

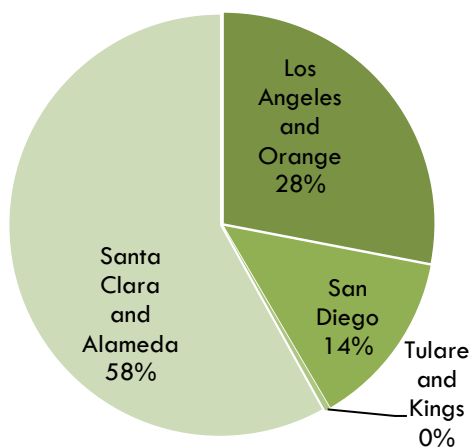
Description	Annual Openings	Annual Degrees Conferred	Gap
Miscellaneous agricultural workers (45-209A)	1,424	36	(1,388)
Maintenance workers, machinery (49-9043)	49	No Data	(49)
First-line supervisors/managers of production and operating workers (51-1011)	550	4	(546)
Bakers (51-3011)	348	304	(44)
Food batchmakers (51-3092)	390	41	(349)
Inspectors, testers, sorters, samplers, and weighers (51-9061)	666	33	(633)
Cooling and freezing equipment operators and tenders (51-9193)	11	No Data	(11)
Production workers, all other (51-9199)	393	70	(323)

Renewable Energy Equipment Manufacturing

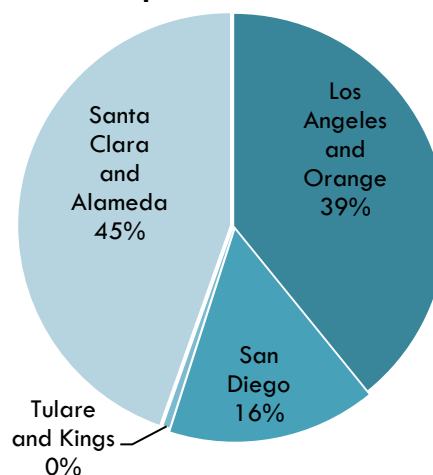
Because the Renewable Energy Equipment Manufacturing is primarily composed of emerging industries, the North American Industry Classification System has not developed codes that reflect the core functions of this sector. Rather, the renewable energy equipment industries are embedded into traditional energy equipment manufacturing industries or other related industries. For example, solar panel manufacturing is often coded in the semiconductor and related device manufacturing industry. That being said, there is still an advantage to analyzing the related industries as it provides some insight on the workforce and employment needs of the green and clean economy.

As shown below, the majority of this sector's jobs are located in Santa Clara and Alameda Counties, followed by Los Angeles and Orange Counties. Tulare and Kings Counties have very few renewable energy equipment manufacturing jobs.

Renewable Energy Jobs By Industry and Location



Renewable Energy Jobs By Occupation and Location



The Renewable Energy Equipment Manufacturing sector is projected to decline over the next five years, shedding a little over 4,500 jobs. Nearly all of the industries in this sector are expected to decline, except Turbine and Turbine Generator Set Units Manufacturing; Primary Battery Manufacturing; and All Other Miscellaneous Electrical Equipment and Component Manufacturing. However, as mentioned previously, it is not possible to identify the types of establishments that are driving growth or decline within these industries. It may be the traditional energy manufacturing industries or the renewable energy manufacturing industries that are driving the overall decline. If it were possible to isolate the renewable energy employment, the projections would likely be different.

Table 13: 2010 – 15 Employment Change for the Renewable Energy Equipment Manufacturing Sector

Data reflects industry employment totals, representing all jobs within the sector irrespective of occupation.

NAICS Code	Description	2010 Jobs	2015 Jobs	Change	Percent Change	Business Count
332410	Power Boiler and Heat Exchanger Manufacturing	142	107	(35)	(25%)	9
333414	Heating Equipment (except Warm Air Furnaces) Manufacturing	399	219	(180)	(45%)	25
333611	Turbine and Turbine Generator Set Units Manufacturing	4,489	4,738	249	6%	36
334413	Semiconductor and Related Device Manufacturing	41,640	38,511	(3,129)	(8%)	637
335311	Power, Distribution, and Specialty Transformer Manufacturing	1,738	1,262	(476)	(27%)	56
335312	Motor and Generator Manufacturing	1,510	1,144	(366)	(24%)	43
335314	Relay and Industrial Control Manufacturing	1,479	1,281	(198)	(13%)	79
335911	Storage Battery Manufacturing	741	486	(255)	(34%)	23
335912	Primary Battery Manufacturing	323	355	32	10%	9
335929	Other Communication and Energy Wire Manufacturing	467	450	(17)	(4%)	19
335931	Current-Carrying Wiring Device Manufacturing	2,147	977	(1,170)	(54%)	58
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	3,664	4,540	876	24%	135
	Total	58,741	54,069	(4,672)	(8%)	1,128

All three renewable energy equipment manufacturing occupations are expected to decline over the next five years, eliminating about 2,200 jobs. However, there is a significant demand for replacement jobs. Median wages range from \$14 to \$26 per hour, with the two occupations that require an Associate degree earning a higher wage.

Table 14: 2010 – 15 Employment Change for Renewable Energy Equipment Manufacturing Sector

Data reflects occupational employment totals, representing all jobs in the occupation within the region irrespective of industry sector.

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings
Electrical and electronic engineering technicians (17-3023)	13,902	13,589	(313)	(2%)	1,505
Electrical and electronic equipment assemblers (51-2022)	16,509	15,086	(1,423)	(9%)	1,407
Semiconductor processors (51-9141)	4,812	4,344	(468)	(10%)	551
Total	35,223	33,019	(2,204)	(6%)	3,463

Table 15: Wages and Education Level for Renewable Energy Equipment Manufacturing Sector

Description	2010 Median Hourly Wage	Education Level
Electrical and electronic engineering technicians (17-3023)	\$26.43	Associate's degree
Electrical and electronic equipment assemblers (51-2022)	\$14.00	Short-term on-the-job training
Semiconductor processors (51-9141)	\$16.02	Associate's degree

As shown below, there may be an oversupply of electrical and electronic engineering technicians in the next five years, mainly in the Los Angeles/Orange area. Conversely, there may be a need for additional trained workers in the field of electrical and electronic equipment assembly and semiconductor processing.

Table 16: Supply and Demand Gap Analysis for Renewable Energy Equipment Manufacturing Sector

Description	Annual Openings	Annual Degrees Conferred	Gap
Electrical and electronic engineering technicians (17-3023)	301	526	225
Electrical and electronic equipment assemblers (51-2022)	281	27	(254)
Semiconductor processors (51-9141)	110	1	(109)

Data Limitations

There are several limitations to supply and demand analysis with the use of EMSI data as following:

The dataset does not track the number of graduates that are moving in and out of the region, which may have a significant impact on the supply side of the workforce.

The dataset does not assess employer education and training preference for each occupation. For example, the minimum education requirement may be long-term on-the-job training, but there may be a hiring preference for applicants with a formal education.

The dataset uses a CIP to SOC crosswalk to estimate the number of graduates for each occupation. However, the crosswalk is somewhat generalized which may create some inaccuracies when looking at specific industry segments.

The dataset utilizes IPEDS to report number of degrees completed by program. IPEDS data is often flawed due to the self-reporting aspect of the data collection process. However, it is the most comprehensive public system for tracking degree completion data at a national level. All private and public institutions that receive financial aid are required to report degree completion data.

Additional research is necessary to fully assess the workforce supply and potential training gap. This report is a good starting point for analyzing the manufacturing employment in the southern and central regions of California.

Data Sources, Terms and Calculations

Industry Data

In order to capture a complete picture of industry employment, EMSI combines covered employment data from Quarterly Census of Employment and Wages (QCEW) produced by the Department of Labor with total employment data in Regional Economic Information System (REIS) published by the Bureau of Economic Analysis (BEA), augmented with County Business Patterns (CBP) and Nonemployer Statistics (NES) published by the U.S. Census Bureau. Projections are based on the latest available EMSI industry data, 15-year past local trends in each industry, growth rates in statewide and (where available) sub-state area industry projections published by individual state agencies, and (in part) growth rates in national projections from the Bureau of Labor Statistics.

Occupation Data

Organizing regional employment information by occupation provides a workforce-oriented view of the regional economy. EMSI's occupation data are based on EMSI's industry data and regional staffing patterns taken from the Occupational Employment Statistics program (U.S. Bureau of Labor Statistics). Wage information is partially derived from the American Community Survey. The occupation-to-program (SOC-to-CIP) crosswalk is based on one from the U.S. Department of Education, with customizations by EMSI.

Change

Change refers to projected new job creation or projected decline in an industry or occupation over the period identified.

Replacements

Replacement jobs are an estimate of the number of openings created when workers retire, change occupations, or otherwise separate from employment. These figures represent a share of existing employment and cannot therefore be referred to as “growth.”

Openings

For this report, the term “openings” refers to the combined potential job opportunities created by “Change” or “Replacements.”

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department.

Appendix A: Industry Data by Location

Table 1: Total Industry Employment for Aerospace Manufacturing

Location	2010 Jobs	2015 Jobs	Change	Percent Change	2010 Wages, Salaries, & Proprietor Earnings	2010 Establishments
Los Angeles and Orange	111,887	105,484	(6,403)	(6%)	\$83,405	2,572
San Diego	15,737	17,115	1,378	9%	\$78,819	431
Tulare and Kings	291	299	8	3%	\$42,841	36
Santa Clara and Alameda	19,804	18,782	(1,022)	(5%)	\$103,724	691

Table 2: Total Industry Employment for Biotech Manufacturing

Location	2010 Jobs	2015 Jobs	Change	Percent Change	2010 Wages, Salaries, & Proprietor Earnings	2010 Establishments
Los Angeles and Orange	37,439	41,367	3,928	10%	\$74,792	831
San Diego	10,966	12,725	1,759	16%	\$88,345	272
Tulare and Kings	55	70	15	27%	\$57,149	7
Santa Clara and Alameda	19,088	21,004	1,916	10%	\$104,191	353

Table 3: Total Industry Employment for Food Processing

Location	2010 Jobs	2015 Jobs	Change	Percent Change	2010 Wages, Salaries, & Proprietor Earnings	2010 Establishments
Los Angeles and Orange	55,252	57,218	1,966	4%	\$47,337	1,624
San Diego	5,984	6,557	573	10%	\$41,056	214
Tulare and Kings	9,850	10,906	1,056	11%	\$44,050	123
Santa Clara and Alameda	13,524	13,367	(157)	(1%)	\$46,456	393

Table 4: Total Industry Employment for Renewable Energy Equipment Manufacturing

Location	2010 Jobs	2015 Jobs	Change	Percent Change	2010 Wages, Salaries, & Proprietor Earnings	2010 Establishments
Los Angeles and Orange	16,462	13,671	(2,791)	(17%)	\$75,131	449
San Diego	7,943	7,776	(167)	(2%)	\$82,932	144
Tulare and Kings	231	297	66	29%	\$52,070	3
Santa Clara and Alameda	34,104	32,326	(1,778)	(5%)	\$142,398	532

Appendix B: Occupation Data by Location

Table 1: Total Occupational Employment for Aerospace Manufacturing

Location	2010 Jobs	2015 Jobs	Change	Percent Change	Openings	Percent Openings	2010 Median Hourly Wage
Los Angeles and Orange	52,060	50,116	(1,944)	(4%)	4,265	8%	\$21.45
San Diego	10,000	9,985	(15)	0%	847	8%	\$23.17
Tulare and Kings	1,045	1,074	29	3%	116	11%	\$22.74
Santa Clara and Alameda	12,712	11,772	(940)	(7%)	989	8%	\$24.38

Table 2: Total Occupational Employment for Biotech Manufacturing

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings	Percent Openings	2010 Median Hourly Wage
Los Angeles and Orange	47,997	48,555	558	1%	6,947	14%	\$15.19
San Diego	11,661	12,134	473	4%	1,834	16%	\$13.45
Tulare and Kings	965	1,059	94	10%	189	20%	\$16.56
Santa Clara and Alameda	13,455	13,100	(355)	(3%)	1,751	13%	\$17.26

Table 3: Total Occupational Employment for Food Processing

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings	Percent Openings	2010 Median Hourly Wage
Los Angeles and Orange	81,742	80,132	(1,610)	(2%)	9,170	11%	\$16.95
San Diego	18,630	18,872	242	1%	2,312	12%	\$16.28
Tulare and Kings	31,010	31,515	505	2%	5,274	17%	\$9.98
Santa Clara and Alameda	22,933	21,624	(1,309)	(6%)	2,394	10%	\$18.59

Table 4: Total Occupational Employment for Renewable Energy Equipment Manufacturing

Description	2010 Jobs	2015 Jobs	Change	Percent Change	Openings	Percent Openings	2010 Median Hourly Wage
Los Angeles and Orange	13,790	13,200	(590)	(4%)	1,359	10%	\$18.33
San Diego	5,565	5,458	(107)	(2%)	577	10%	\$20.36
Tulare and Kings	163	165	2	1%	19	12%	\$15.64
Santa Clara and Alameda	15,705	14,196	(1,509)	(10%)	1,509	10%	\$19.55

Appendix B: Gap Analysis by Location

Table 1: Occupational Gap Analysis for Los Angeles and Orange Counties

SOC Code	Description	Annual Openings	Annual Degrees Conferred	Gap
Aerospace				
49-3011	Aircraft mechanics and service technicians	82	366	284
49-9043	Maintenance workers, machinery	36	0	(36)
51-1011	First-line supervisors/managers of production and operating workers	380	0	(380)
51-4011	Computer-controlled machine tool operators, metal and plastic	116	0	(116)
51-4041	Machinists	239	949	710
Biotech				
29-2011	Medical and clinical laboratory technologists	335	11	(324)
49-9043	Maintenance workers, machinery	49	0	(49)
51-2092	Team assemblers	1,440	0	(1,440)
51-9023	Mixing and blending machine setters, operators, and tenders	320	0	(320)
Food Processing				
45-209A	Miscellaneous agricultural workers	231	19	(212)
49-9043	Maintenance workers, machinery	36	0	(36)
51-1011	First-line supervisors/managers of production and operating workers	380	0	(380)
51-3011	Bakers	241	275	34
51-3092	Food batchmakers	270	39	(231)
51-9061	Inspectors, testers, sorters, samplers, and weighers	407	30	(377)
51-9193	Cooling and freezing equipment operators and tenders	7	0	(7)
51-9199	Production workers, all other	261	63	(198)
Renewable Energy Equipment Manufacturing				
17-3023	Electrical and electronic engineering technicians	123	423	300
51-2022	Electrical and electronic equipment assemblers	119	26	(93)
51-9141	Semiconductor processors	30	0	(30)

Table 2: Occupational Gap Analysis for San Diego County

SOC Code	Description	Annual Openings	Annual Degrees Conferred	Gap
Aerospace				
49-3011	Aircraft mechanics and service technicians	27	44	17
49-9043	Maintenance workers, machinery	5	0	(5)
51-1011	First-line supervisors/managers of production and operating workers	69	4	(65)
51-4011	Computer-controlled machine tool operators, metal and plastic	18	0	(18)
51-4041	Machinists	50	15	(35)
Biotech				
29-2011	Medical and clinical laboratory technologists	31	17	(14)
49-9043	Maintenance workers, machinery	5	0	(5)
51-2092	Team assemblers	261	0	(261)
51-9023	Mixing and blending machine setters, operators, and tenders	71	0	(71)
Food Processing				
45-209A	Miscellaneous agricultural workers	167	10	(157)
49-9043	Maintenance workers, machinery	5	0	(5)
51-1011	First-line supervisors/managers of production and operating workers	69	4	(65)
51-3011	Bakers	45	29	(16)
51-3092	Food batchmakers	27	0	(27)
51-9061	Inspectors, testers, sorters, samplers, and weighers	108	0	(108)
51-9193	Cooling and freezing equipment operators and tenders	1	0	(1)
51-9199	Production workers, all other	41	5	(36)
Renewable Energy Equipment Manufacturing				
17-3023	Electrical and electronic engineering technicians	69	79	10
51-2022	Electrical and electronic equipment assemblers	39	0	(39)
51-9141	Semiconductor processors	8	0	(8)

Table 3: Occupational Gap Analysis for Tulare and Kings Counties

SOC Code	Description	Annual Openings	Annual Degrees Conferred	Gap
Aerospace				
49-3011	Aircraft mechanics and service technicians	3	0	(3)
49-9043	Maintenance workers, machinery	5	0	(5)
51-1011	First-line supervisors/managers of production and operating workers	13	0	(13)
51-4011	Computer-controlled machine tool operators, metal and plastic	1	0	(1)
51-4041	Machinists	2	0	(2)
Biotech				
29-2011	Medical and clinical laboratory technologists	5	0	(5)
49-9043	Maintenance workers, machinery	5	0	(5)
51-2092	Team assemblers	17	0	(17)
51-9023	Mixing and blending machine setters, operators, and tenders	11	0	(11)
Food Processing				
45-209A	Miscellaneous agricultural workers	952	7	(945)
49-9043	Maintenance workers, machinery	5	0	(5)
51-1011	First-line supervisors/managers of production and operating workers	13	0	(13)
51-3011	Bakers	4	0	(4)
51-3092	Food batchmakers	55	2	(53)
51-9061	Inspectors, testers, sorters, samplers, and weighers	14	0	(14)
51-9193	Cooling and freezing equipment operators and tenders	2	0	(2)
51-9199	Production workers, all other	11		(11)
Renewable Energy Equipment Manufacturing				
17-3023	Electrical and electronic engineering technicians	1	0	(1)
51-2022	Electrical and electronic equipment assemblers	2	0	(2)
51-9141	Semiconductor processors	1	0	(1)

Table 4: Occupational Gap Analysis for Santa Clara and Alameda Counties

SOC Code	Description	Annual Openings	Annual Degrees Conferred	Gap
Aerospace				
49-3011	Aircraft mechanics and service technicians	14	14	0
49-9043	Maintenance workers, machinery	4	0	(4)
51-1011	First-line supervisors/managers of production and operating workers	87	0	(87)
51-4011	Computer-controlled machine tool operators, metal and plastic	39	0	(39)
51-4041	Machinists	53	55	2
Biotech				
29-2011	Medical and clinical laboratory technologists	48	0	(48)
49-9043	Maintenance workers, machinery	4	0	(4)
51-2092	Team assemblers	262	0	(262)
51-9023	Mixing and blending machine setters, operators, and tenders	37	0	(37)
Food Processing				
45-209A	Miscellaneous agricultural workers	74	0	(74)
49-9043	Maintenance workers, machinery	4	0	(4)
51-1011	First-line supervisors/managers of production and operating workers	87	0	(87)
51-3011	Bakers	58	0	(58)
51-3092	Food batchmakers	38	0	(38)
51-9061	Inspectors, testers, sorters, samplers, and weighers	136	3	(133)
51-9193	Cooling and freezing equipment operators and tenders	1	0	(1)
51-9199	Production workers, all other	80	2	(78)
Renewable Energy Equipment Manufacturing				
17-3023	Electrical and electronic engineering technicians	108	24	(84)
51-2022	Electrical and electronic equipment assemblers	122	1	(121)
51-9141	Semiconductor processors	71	1	(70)