

LABOR MARKET OVERVIEW: SOUTH CENTRAL VALLEY/ SOUTHERN MOTHER LODGE SUBREGION

Prepared by the
Central Valley/Mother Lode Region
Center of Excellence

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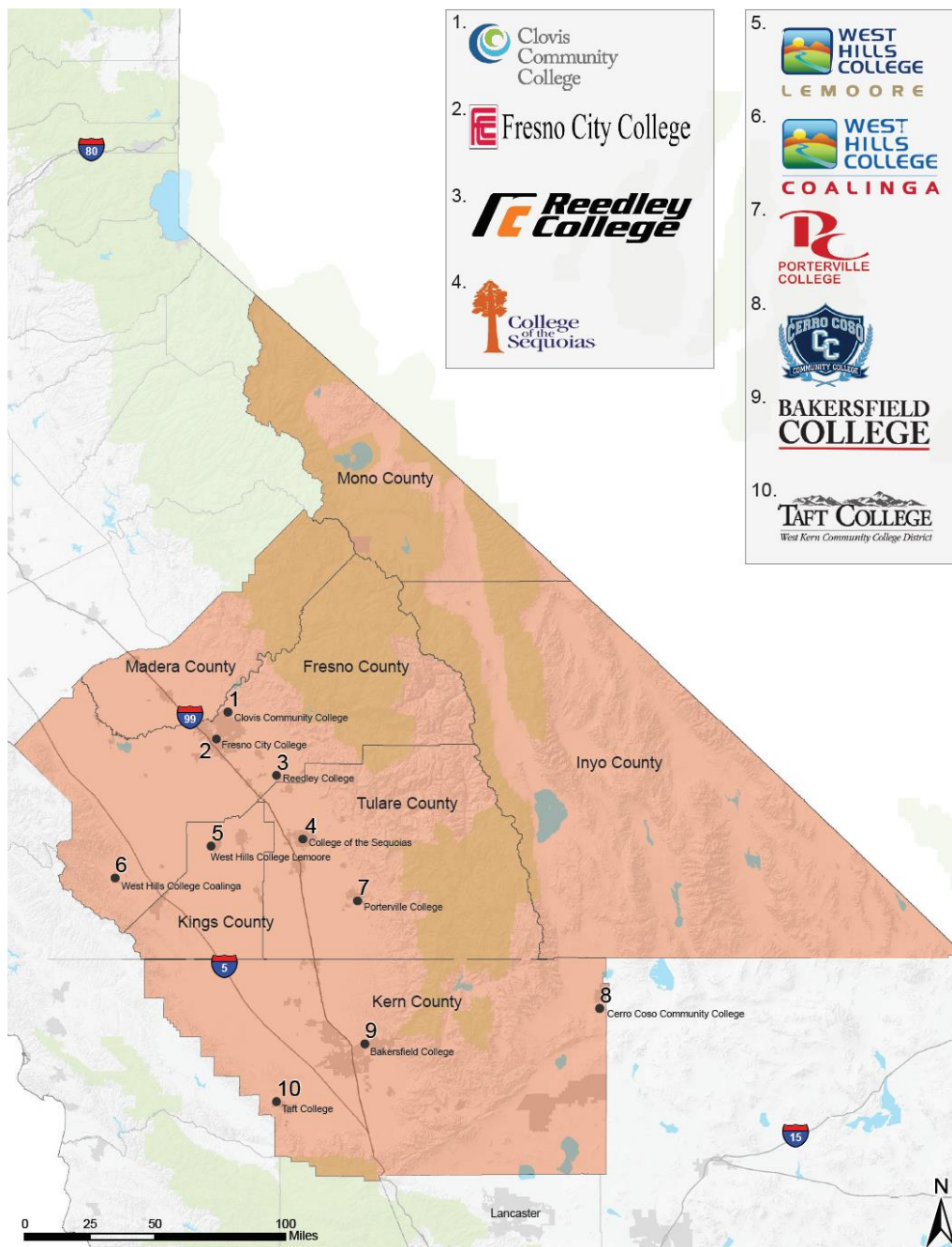


Exhibit 1: Map of community colleges in the South Central Valley/Southern Mother Lode Subregion

INTRODUCTION

The Center of Excellence has conducted a labor market analysis focusing on the South Central Valley/Southern Mother Lode Subregion. This subregion is served by 10 community colleges—Clovis Community College, Fresno City College, Reedley College, College of the Sequoias, West Hills College-Lemoore, West Hills College-Coalinga, Porterville College, Cerro Coso Community College, Bakersfield College and Taft College (Exhibit 1). The following report details current employment numbers, projected employment, job postings for in-demand occupations and the most sought-after skills by employers for each of the industries analyzed. This report is organized by eight top industries in the subregion:

- Agriculture, water and environmental technologies;
- Energy, construction and utilities;
- Global trade and logistics;
- Retail, hospitality and tourism;
- Protective services;
- Information and communication technologies (ICT)/digital media;
- Health care; and
- Manufacturing.

METHODOLOGY

Quantitative and qualitative data collection and analysis were conducted for this report. Labor market data, particularly primary and secondary data related to industry workforce demands and occupational employment, informed the report's findings. The North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) System were used to source data. Burning Glass, an online job posting aggregation tool, was employed to identify job titles with the most openings in the South Central Valley/Southern Mother Lode Subregion.¹

Job postings were selected for inclusion in the analysis based on four criteria: the five-year change from the industry staffing patterns contained 10 or more jobs; the minimum education requirement was a high school diploma or vocational training*, or associate degree; the job posting was listed within the last 12 months; and, the job posting indicated the position was physically located in one of the seven service counties of Fresno, Inyo, Kern, Kings, Madera, Mono or Tulare. The study analyzed business types within the eight industries that are projected to add jobs over the next five years.

The skills data were analyzed using two lenses to provide a more comprehensive understanding of skills desired by employers: skills were examined by industry and by groups of occupations that are associated with that specific industry, referred to in this report as occupational clusters. Plugging these occupations into Burning Glass independent of industry provides an understanding of what skill sets all businesses, regardless of sector, desire in new hires.

The criteria for the staffing patterns occupations were pre-determined by the Central Valley/Mother Lode Center of Excellence based on consortium discussions and recommendations. The occupational demand data include only those jobs directly related to the industry having 10 or more annual openings. However, a few exceptions were made in cases of emerging or complementary occupations where there were fewer than 10 jobs. The tables under the occupational demand sections have different five-year projections from

¹ Burning glass is an online job posting aggregation tool that uses intelligent "spidering" programs to search the Internet for job listings and integrates the information into a searchable database. While efforts have been made to remove duplication, it is possible that a posting removed and re-entered over the 12-month period is counted more than once.

*Selection option is high school diploma or vocational training; these two can no longer be isolated from one another.

the preceding projected employment tables because the occupational data provide projections for the entire occupation, which may span more than one industry.

Living wages were determined using the MIT Living Wage Calculator. Additional data sources employed by this study are described in Appendix A.

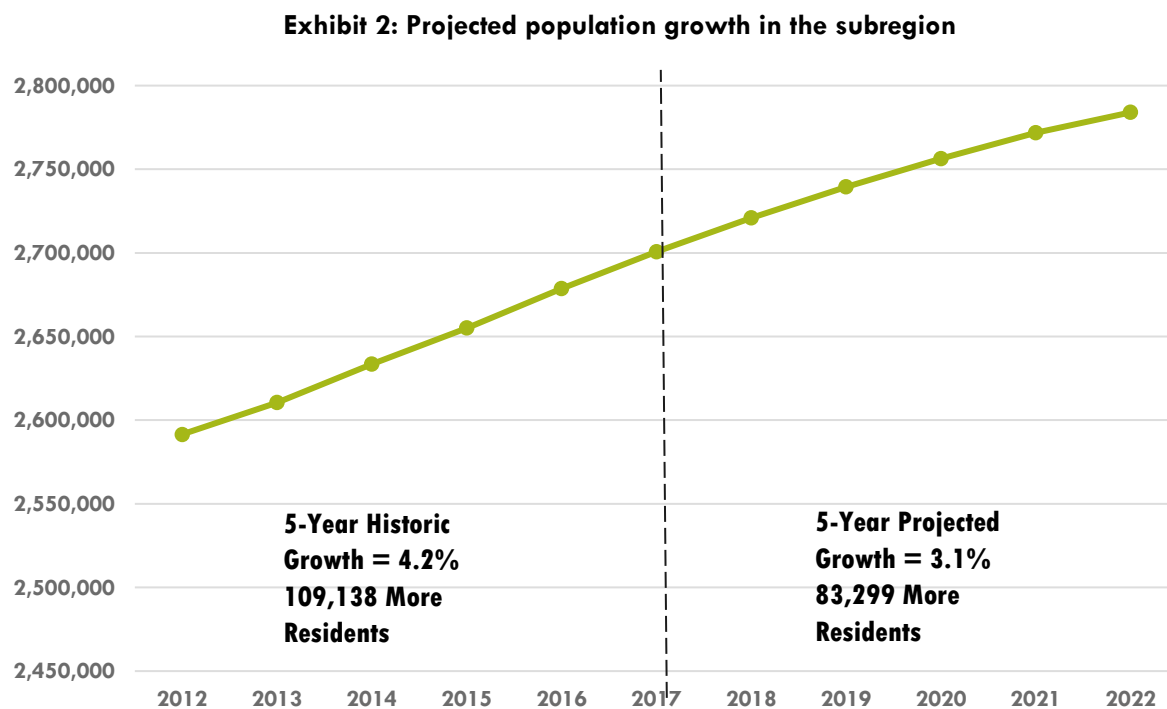
Business occupations, maintenance and multi-sector occupations are relevant to every industry; therefore, these occupations along with their wages, educational attainment and community college supply data are shown in Appendix B through Appendix E to avoid duplication and over-estimation of projected demand.

REGIONAL OVERVIEW

Population

The South Central Valley/Southern Mother Lode Subregion's population currently totals more than 2.7 million residents. By 2022, the subregion is projected to total nearly 2.8 million, having added more than 83,000 new residents (Exhibit 2). Over the last five years, the subregion grew by 4.2%, somewhat slower than the state's growth of 5%. The projected growth rate of 3.1% is slower than in the previous five years and minutely greater than the projected 3% growth rate for the state.

Each year, the subregion is expected to add from 10,000 to 20,000 new residents, with the most rapid growth occurring between 2017 and 2020.



Demographics

Exhibit 3 shows projected changes in the South Central Valley/Southern Mother Lode Subregion's demographics by 2022. Populations identifying as Hispanic are all projected to increase over the next five years. Most notably there will be growth in individuals identifying as:

- White, Hispanic, an increase of 78,353 residents, 6% growth;
- Asian, non-Hispanic, an increase of 11,433 residents, 7% growth; and
- American Indian or Alaskan Native, Hispanic, an increase of 4,628, 7% growth.

The subregion's white, non-Hispanic population is expected to decrease by 3%, a decline of nearly 24,000 by 2022.

Exhibit 3: Projected changes in race/ethnicity in the subregion

Race/Ethnicity	2017	2022	Change	% Change
White, Hispanic	1,342,872	1,421,225	78,353	6%
White, Non-Hispanic	857,912	833,931	(23,981)	(3%)
Asian, Non-Hispanic	167,060	178,493	11,433	7%
Black, Non-Hispanic	113,792	115,519	1,727	2%
American Indian or Alaskan Native, Hispanic	61,726	66,354	4,628	7%
Two or More Races, Non-Hispanic	48,341	51,540	3,199	7%
Two or More Races, Hispanic	33,584	37,262	3,678	11%
Black, Hispanic	28,628	31,070	2,442	9%
American Indian or Alaskan Native, Non-Hispanic	19,980	19,672	(308)	(2%)
Asian, Hispanic	19,297	20,821	1,524	8%
Native Hawaiian or Pacific Islander, Hispanic	3,888	4,178	290	7%
Native Hawaiian or Pacific Islander, Non-Hispanic	3,616	3,929	313	9%
TOTAL	2,700,696	2,783,995	83,299	3%

Living Wage Data

Exhibit 4 shows living wages for the subregion and by county. The average living wage for the subregion is \$11.32/hour for one adult. The highest living wage is attributed to Mono County, \$12.59/hour, while the lowest is Tulare County, \$10.67/hour.

Exhibit 4: Living wages for the South Central Valley/Southern Mother Lode Subregion by county

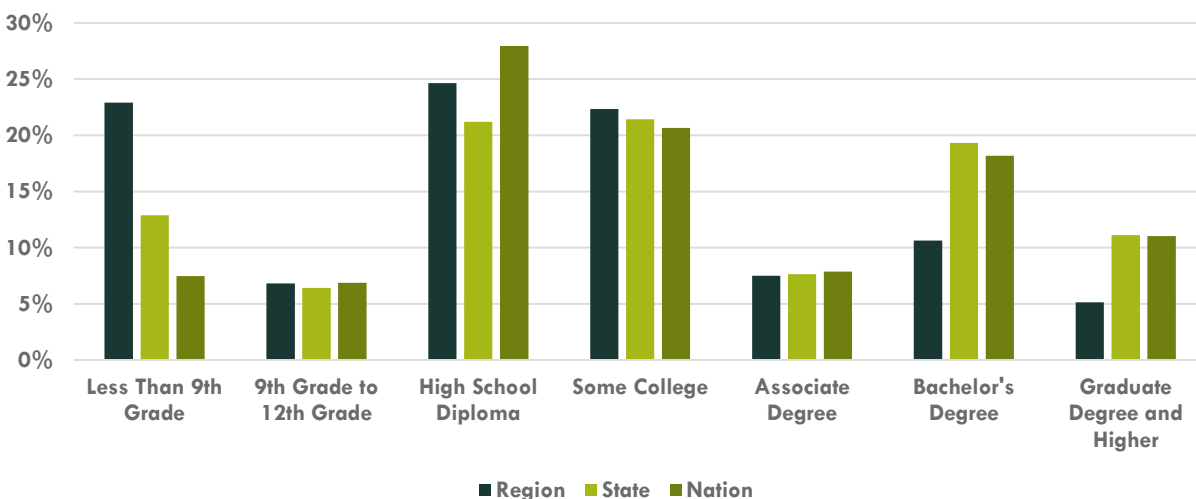
County	Living Wage for 1 Adult
Fresno	\$11.21
Inyo	\$11.68
Kern	\$10.81
Kings	\$10.85
Madera	\$11.45
Mono	\$12.59
Tulare	\$10.67
Average	\$11.32

Educational Attainment

The South Central Valley/Southern Mother Lode Subregion trails both the state and nation for bachelor's degrees and graduate degrees or higher attainment. Only 11% of the adult population holds a bachelor's degree, compared to 19% statewide and 18% nationwide (Exhibit 5)

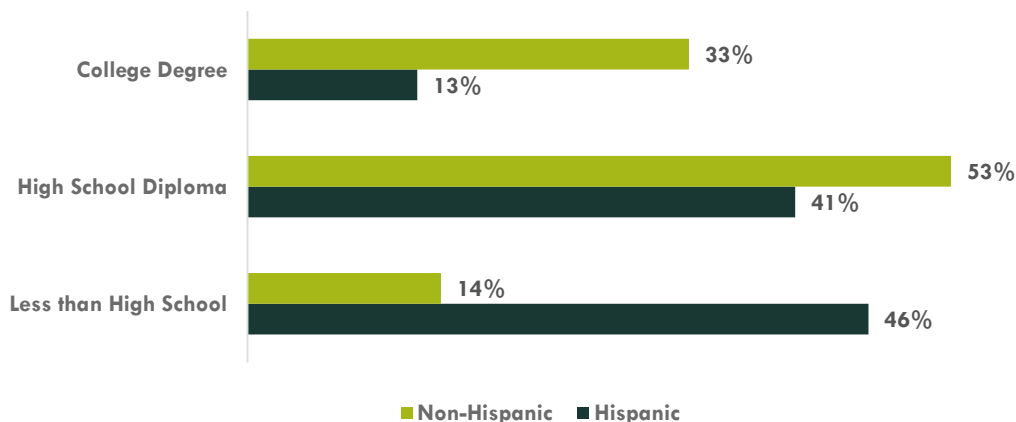
Regarding associate degree attainment, the subregion, state and nation are the same, 8%. The subregion slightly leads the state in the completion of some college or a high school diploma. In the subregion, 22% of the population has completed some college, compared to 21% of the state. Similarly, 25% of the population has obtained a high school diploma, above the state's 21% of the population.

Exhibit 5: 2017 educational attainment



Hispanic educational attainment in the South Central Valley/Southern Mother Lode Subregion is lower than non-Hispanic educational attainment. Only 13% of the Hispanic population holds a college degree (associate degree or higher) compared to 33% of the non-Hispanic population (Exhibit 6). In addition, 46% of the Hispanic population did not complete high school, compared to 14% of the non-Hispanic population.

Exhibit 6: 2017 Hispanic/non-Hispanic educational attainment



Labor Force & Employment

The size and characteristics of a subregion's labor force are important considerations in workforce planning. Labor force, employment and unemployment data are based upon "place of residence" – where people live, regardless of where they work. Individuals who have more than one job are counted only once. These data elements differ from industry employment estimates that are "place-of-work" based – where the employer/workplace is located, regardless of where the employee resides. For terms and definitions, see Appendix A.

Since 2011, the labor force in the South Central Valley/Southern Mother Lode Subregion has grown from 1,169,010 to 1,177,290 workers, an increase of more than 8,200 workers. Total employment increased by 77,090 persons (Exhibit 7).

In 2011, 186,030 individuals were unemployed. By 2016, this number had declined by nearly 69,000 to 117,120 individuals.

Because total employment increased more than the labor force, the unemployment rate decreased from nearly 16% in 2011 (compared to 11.5% statewide) to nearly 10% in 2016 (compared to 5.2% statewide).

Exhibit 7: Labor force size, employment and unemployment, 2011-2016

	2011	2016	5-Year Change
Labor Force	1,169,010	1,177,290	8,280
Employment	982,980	1,060,070	77,090
Unemployment	186,030	117,120	(68,910)
Unemployment Rate	15.9%	9.9%	-6.0%

INDUSTRY OVERVIEW

Employment Composition

According to 2016 data, the eight industries of focus for this report employ 795,173 workers in the South Central Valley/Southern Mother Lode Subregion. Exhibit 8 shows how employment is distributed among the eight major industrial groups. The largest shares of employment are attributed to agriculture, water and environmental technologies (181,068 jobs); retail, hospitality and tourism (177,729 jobs); health care (116,717 jobs); and protective services (95,571 jobs).

These are followed by global trade and logistics (87,060 jobs); energy, construction and utilities (64,056 jobs); manufacturing (61,435 jobs). ICT/digital media is the smallest industry, with only 11,537 jobs in the subregion.

The industries shown in Exhibit 8 are each discussed in detail—including current and projected employment, job postings and in-demand skills—in the following sections.

Exhibit 8: Employment by industry in the South Central Valley/Southern Mother Lode Subregion

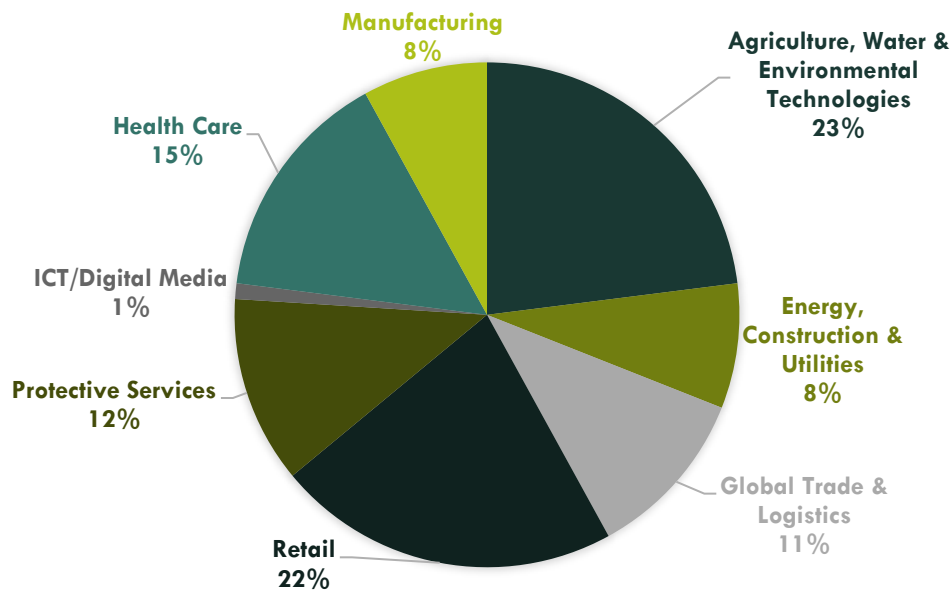


Exhibit 9 details the current and projected employment for each industry analyzed for this study. More than 57,400 new jobs are projected across the eight industries.

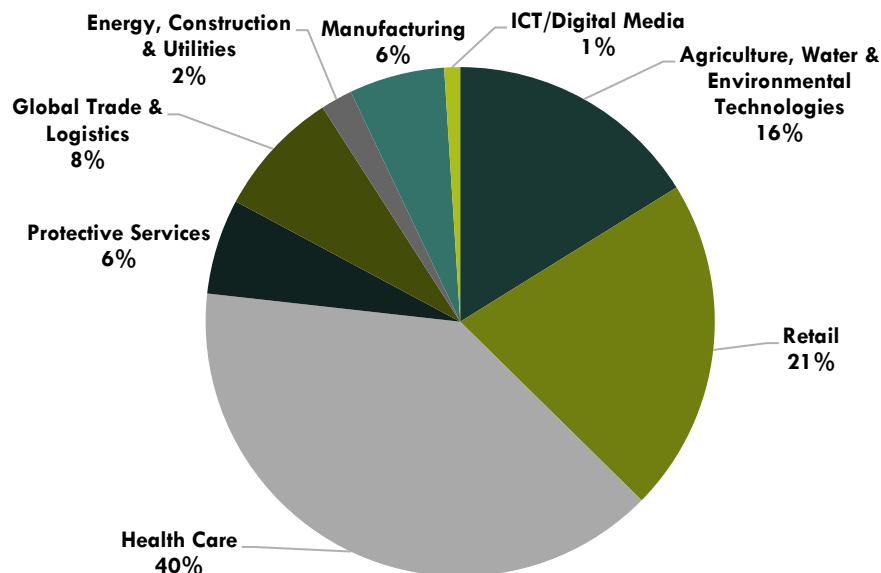
Exhibit 9: Current and projected employment by industry in the subregion

Industry	2016 Employment	Projected New Jobs by 2021
Agriculture, water & environmental technologies	181,068	9,188
Retail, hospitality & tourism	177,729	12,114
Health care	116,717	22,419
Protective services	95,571	3,540
Global trade & logistics	87,060	4,659
Energy, construction & utilities	64,056	1,222
Manufacturing	61,435	3,483
ICT/digital media	11,537	813
TOTAL	795,173	57,438

Exhibit 10 shows the industries that will produce the greatest percentage of new jobs in the next five years. Of the eight industries analyzed, the health care industry accounts for 40% of projected job growth by 2021. Other industries where substantial job growth is expected to occur are retail, hospitality and tourism; and agriculture, water and environmental technologies. The smallest amount of job growth will occur in ICT/digital media, which overall employs the fewest workers in the subregion compared to the other eight industries.

The largest job growth is projected to occur in health care, which will generate 22,419 jobs; retail, hospitality and tourism, 12,114; agriculture, water and environmental technologies, 9,188; and global trade and logistics, 4,659. Protective services will add 3,540 new jobs; manufacturing, 3,483; energy, construction and utilities, 1,222; and ICT/digital media, 813.

Exhibit 10: Percent of new jobs by industry in the subregion



AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES

Current & Projected Employment

The study analyzed business types within the agriculture, water and environmental technologies industry that are projected to add jobs over the next five years (Exhibit 11). Overall, this industry is projected to create more than 9,000 new jobs by 2021. Support activities for crop production will add more than 11,700 jobs over the next five years, an 11% growth rate, and remediation and other waste management services will add 764 new jobs, a 36% growth rate. Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance will grow by 10%, adding 257 new jobs. It should be noted that crop production (NAICS 1110) is expected to undergo a significant decline in coming years. This business type will shrink by 6% by 2021, shedding more than 3,000 jobs during that period.

Exhibit 11: Agriculture, water and environmental technologies current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Support Activities for Crop Production (1151)	109,848	121,589	11,741	11%	1,175
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance (8113)	2,502	15,368	257	10%	208
Remediation and Other Waste Management Services (5629)	2,119	2,883	764	36%	69
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	1,206	1,399	193	16%	97

Industry Staffing Patterns

The industry staffing patterns data for occupations in agriculture, water and environmental technologies that indicate an addition of 10 or more jobs in the next five years are shown in Exhibit 12. With 5,849 workers currently employed, the occupation of agricultural equipment operators is the largest in the industry and is projected to add the greatest number of jobs over five years, a total of 671 positions.

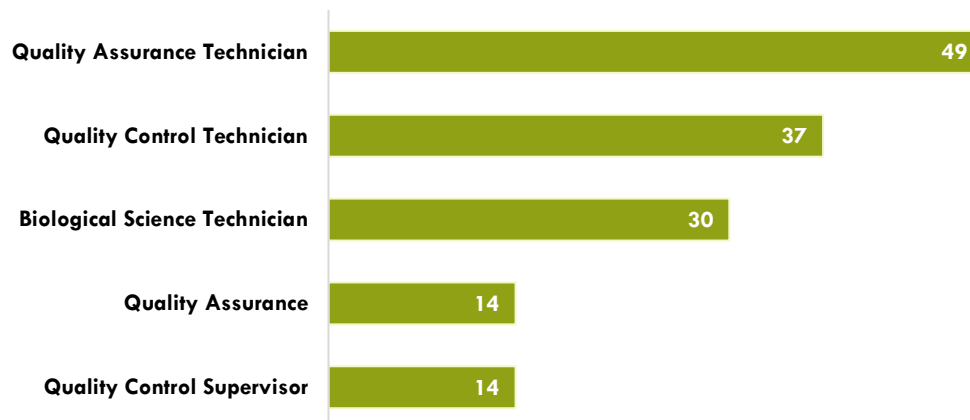
Exhibit 12: Agriculture, water and environmental technologies staffing patterns

SOC	Description	Employment 2016	2021	5-Year Change	5-Year % Change
45-2091	Agricultural Equipment Operators	5,849	6,520	671	11%
45-2041	Graders and Sorters, Agricultural Products	4,242	4,480	238	6%
53-7051	Industrial Truck and Tractor Operators	1,409	1,574	165	12%
49-3041	Farm Equipment Mechanics and Service Technicians	566	635	69	12%
37-3012	Pesticide Handlers, Sprayers and Applicators, Vegetation	308	365	57	19%
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	3,315	3,359	44	1%
51-9061	Inspectors, Testers, Sorters, Samplers and Weighers	271	313	42	15%
45-2011	Agricultural Inspectors	341	363	22	6%

Job Postings

An analysis of job posting data for the eight staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 13 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 13: Agriculture, water and environmental technologies job postings



Skills

Among the top five baseline skills for agriculture, water and environmental technologies were English, physical demand and communication skills (Exhibit 14). In analyzing the baseline skills, the job postings indicate high demand for quality assurance and control, which is not even within the top five from the industry lens. As was the case with the North Central Valley, the industry-level skills data provide a different picture with a stronger emphasis on soft skills.

Exhibit 14: Agriculture, water and environmental technologies baseline skills

Occupational Cluster		Industry: Farming, Fishing & Forestry	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Quality Assurance and Control	139	English	29
Communication Skills	111	Physical Demand	23
Physical Demand	109	Communication Skills	22
Writing	88	Spanish	19
English	81	Bilingual	17

Exhibit 15 shows specialized skills commonly listed in job ads. Other than inspection, the two tables provide different perspectives in terms of what specialized skills employers are looking for. However, they are highly complementary of each other in terms of agriculture production and processing.

Exhibit 15: Agriculture, water and environmental technologies specialized skills

Occupational Cluster		Industry: Farming, Fishing & Forestry	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Forklift Operation	162	Inspection	28
Inspection	147	Supervisory Skills	12
Packaging	68	Machinery	9
Microsoft Excel	60	Budgeting	7
Labeling	58	Employee Engagement	7

The top software skills for jobs related to agriculture, water and environmental technologies are shown in Exhibit 16. Only four are listed because this is the totality of what was listed at the industry level. As reflected in the North Central Valley, it appears that software skills are in low demand from the industry perspective. In comparing the two datasets, Microsoft Excel and Office are among those most sought by employers. Of the remaining two, Microsoft Word and word processing are relevant; whereas, SAP and CAD are different applications in that the former is for enterprise resource planning and the latter is used in (production) design.

Exhibit 16: Agriculture, water and environmental technologies specialized skills

Occupational Cluster		Industry: Farming, Fishing & Forestry	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	60	Microsoft Excel	4
Microsoft Office	42	Computer Aided Drafting/Design (CAD)	3
Microsoft Word	26	Microsoft Office	2
SAP	11	Word Processing	1

Occupational Demand Projections

Analysis of agriculture, water and environmental technologies occupations show that farmers, ranchers and other agricultural managers is, by far, the largest occupation, but it has a projected decline of 907 jobs (Exhibit 17). However, the occupation does indicate this job loss will be offset by 186 annual openings in the subregion over the next five years. The agricultural equipment operators occupation has the largest projected growth, adding 679 new jobs with 306 annual openings, followed by industrial truck and tractor operators, 419 total new jobs with 241 annual openings.

There are three agriculture-related occupations emerging within the occupation of life, physical and social science technicians: quality control analysts, precision agriculture technicians and remote sensing technicians.

Exhibit 17: Agriculture, water and environmental technologies occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Agricultural Equipment Operators	5,951	6,630	679	11%	306
Industrial Truck and Tractor Operators	6,003	6,422	419	7%	241
Farmers, Ranchers and Other Agricultural Managers	11,230	10,323	-907	-8%	186
Graders and Sorters, Agricultural Products	5,264	5,505	241	5%	139
First-Line Supervisors of Farming, Fishing and Forestry Workers	3,484	3,531	47	1%	109
Farm Equipment Mechanics and Service Technicians	1,094	1,212	118	11%	51
Compliance Officers	1,304	1,395	91	7%	37
Agricultural Inspectors	985	1,014	29	3%	32
Forest and Conservation Technicians	786	718	-68	-9%	32
Water and Wastewater Treatment Plant and System Operators	836	876	40	5%	30
First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers	1,139	1,169	30	3%	27
Pest Control Workers	755	776	21	3%	25
Pesticide Handlers, Sprayers and Applicators, Vegetation	570	637	67	12%	25
Agricultural and Food Science Technicians	576	591	15	3%	23
Animal Trainers	476	454	-22	-5%	18
Environmental Science and Protection Technicians, Including Health	327	337	10	3%	16
Veterinary Assistants and Laboratory Animal Caretakers	482	511	29	6%	16
Life, Physical and Social Science Technicians, All Other	243	261	18	7%	14
Forest and Conservation Workers	366	364	-2	-1%	10
Food Scientists and Technologists	189	200	11	6%	9

Wages

Compliance officers have the highest entry-level wages, \$21.53/hour, followed by food scientists and technologists, \$16.34/hour, and water and wastewater treatment plant and systems operators, \$15.90/hour (Exhibit 18). Eight of the 20 agriculture, water and environmental technologies occupations have entry-level wages below the subregion's average living wage for a single adult, \$11.32/hour.

Exhibit 18: Agriculture, water and environmental technologies wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Compliance Officers	\$21.53	\$32.28
Food Scientists and Technologists	\$16.34	\$27.88
Water and Wastewater Treatment Plant and System Operators	\$15.90	\$22.81
Agricultural Inspectors	\$14.13	\$20.56
Environmental Science and Protection Technicians, Including Health	\$13.98	\$20.64
Life, Physical and Social Science Technicians, All Other	\$13.88	\$23.44
Farmers, Ranchers and Other Agricultural Managers	\$13.62	\$20.32
First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers	\$13.56	\$17.96
Forest and Conservation Technicians	\$12.05	\$15.57
Agricultural and Food Science Technicians	\$11.45	\$18.21
Pest Control Workers	\$11.43	\$15.02
Farm Equipment Mechanics and Service Technicians	\$11.35	\$17.82
First-Line Supervisors of Farming, Fishing and Forestry Workers	\$10.88	\$16.19
Animal Trainers	\$10.67	\$13.02
Pesticide Handlers, Sprayers and Applicators, Vegetation	\$10.62	\$15.25
Industrial Truck and Tractor Operators	\$9.70	\$12.80
Agricultural Equipment Operators	\$9.63	\$11.41
Veterinary Assistants and Laboratory Animal Caretakers	\$9.51	\$11.96
Forest and Conservation Workers	\$9.29	\$10.06
Graders and Sorters, Agricultural Products	\$9.18	\$9.63

Education Level

The typical education level for compliance officers, agricultural inspectors, and food scientists and technologists is a bachelor's degree; these three occupations do not meet the threshold of 33.3% on the Census Bureau's Current Population Survey (CPS) to be relevant to community college education by the Centers of Excellence (Exhibit 19). Four of the occupations shown below have a typical entry-level education that is relevant to community colleges: forest and conservative technicians; environmental science and protection technicians (including health); life, physical and social science technicians (all other); and agricultural food science and technicians.

For the remaining occupations that fall below community college education levels, nearly all require work experience or typically require some on-the-job-training, which many local colleges address within their programs.

Exhibit 19: Agriculture, water and environmental technologies education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Agricultural Equipment Operators	No formal educational credential	None	Short-term	12.7%
Industrial Truck and Tractor Operators	No formal educational credential	None	Short-term	24.2%
Farmers, Ranchers and Other Agricultural Managers	High school diploma or equivalent	5 years or more	None	28.9%
Graders and Sorters, Agricultural Products	No formal educational credential	None	Short-term	11.7%
First-Line Supervisors of Farming, Fishing and Forestry Workers	High school diploma or equivalent	Less than 5 years	None	22.8%
Farm Equipment Mechanics and Service Technicians	High school diploma or equivalent	None	Long-term	37%
Compliance Officers	Bachelor's degree	None	Moderate-term	28.3%
Agricultural Inspectors	Bachelor's degree	None	Moderate-term	28.7%
Forest and Conservation Technicians	Associate degree	None	None	33.9%
Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent	None	Long-term	45.4%
First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers	High school diploma or equivalent	Less than 5 years	None	32.9%
Pest Control Workers	High school diploma or equivalent	None	Moderate-term	39%
Pesticide Handlers, Sprayers and Applicators, Vegetation	High school diploma or equivalent	None	Moderate-term	19.7%
Agricultural and Food Science Technicians	Associate degree	None	Moderate-term	36.3%
Animal Trainers	High school diploma or equivalent	None	Moderate-term	35.4%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Environmental Science and Protection Technicians, Including Health	Associate degree	None	None	33.9%
Veterinary Assistants and Laboratory Animal Caretakers	High school diploma or equivalent	None	Short-term	47.1%
Life, Physical and Social Science Technicians, All Other	Associate degree	None	None	33.9%
Forest and Conservation Workers	High school diploma or equivalent	None	Moderate-term	31.3%
Food Scientists and Technologists	Bachelor's degree	None	None	18.9%



Community College Supply

Exhibit 20 shows annual job openings and corresponding program titles with student completion data.

Exhibit 20: Agriculture, water and environmental technologies community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Agricultural Equipment Operators (45-2091)	306	No Corresponding Programs		
Industrial Truck and Tractor Operators (53-7051)	241	No Corresponding Programs		
Farmers, Ranchers and Other Agricultural Managers (11-9013)	186	Animal Science - 010200	13	5
		Dairy Science - 010230	1	2
		Plant Science - 010300	10	21
		Viticulture, Enology, and Wine Business - 010400	-	-
		Horticulture - 010900	2	4
		Nursery Technology - 010930	-	-
		Agriculture Business, Sales and Service - 011200	20	20
Graders and Sorters, Agricultural Products (45-2041)	139	No Corresponding Programs		
First-Line Supervisors of Farming, Fishing and Forestry Workers (45-1011)	109	Animal Science - 010200	13	5
		Dairy Science - 010230	1	2
		Plant Science - 010300	10	21
		Agricultural Pest Control Adviser and Operator (Licensed) - 010310	-	3
		Viticulture, Enology, and Wine Business - 010400	-	-
		Forestry - 011400	18	18
		Natural Resources - 011500	-	7
Farm Equipment Mechanics and Service Technicians (49-3041)	51	Agricultural Power Equipment Technology - 011600	2	116
Compliance Officers (13-1041)	37	No Corresponding Programs		
Agricultural Inspectors (45-2011)	32	No Corresponding Programs		
Forest and Conservation Technicians (19-4093)	32	Forestry - 011400	18	18
Water and Wastewater Treatment Plant and System Operators (51-8031)	30	Water and Wastewater Technology - 095800	-	3
	27	Horticulture - 010900	2	4

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers (37-1012)		Landscape Design and Maintenance - 010910	1	6
		Nursery Technology - 010930	-	-
		Turfgrass Technology - 010940	-	-
		Parks and Outdoor Recreation - 011510	-	4
Pest Control Workers (37-2021)	25	No Corresponding Programs		
Pesticide Handlers, Sprayers and Applicators, Vegetation (37-3012)	25	Plant Science - 010240	10	21
		Agricultural Pest Control Adviser and Operator (Licensed) - 010310	-	3
		Landscape Design and Maintenance - 010910	1	6
		Nursery Technology - 010930	-	-
		Turfgrass Technology - 010940	-	-
Agricultural and Food Science Technicians (19-4011)	23	Agriculture Technology and Sciences, General - 010100	12	16
		Viticulture, Enology, and Wine Business - 010400	-	-
		Food Processing and Related Technologies - 011300	-	-
Animal Trainers (39-2011)	18	Equine Science - 010240	-	4
Environmental Science and Protection Technicians, Including Health (19-4091)	16	Ocean Technology - 192000	-	-
Veterinary Assistants and Laboratory Animal Caretakers (31-9096)	16	No Corresponding Programs		
Life, Physical and Social Science Technicians, All Other (19-4099)	14	Biotechnology and Biomedical Technology - 043000	-	-
		Electron Microscopy - 093470	-	-
		Ocean Technology - 192000	-	-
Forest and Conservation Workers (45-4011)	10	Forestry - 011400	18	18
Food Scientists and Technologists (19-1012)	9	Agriculture Technology and Sciences, General - 010100	12	16
		Viticulture, Enology, and Wine Business - 010400	-	-
		Food Processing and Related Technologies - 011300	-	-

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

ENERGY, CONSTRUCTION & UTILITIES

Current & Projected Employment

The largest number of new jobs in the energy, construction and utilities industry in the South Central Valley/Southern Mother Lode Subregion is expected to be created by building equipment contractors, with more than 1,000 new positions, a 9% growth rate (Exhibit 21). The business types comprising utility system construction will experience robust growth of 11%, representing the addition of 637 jobs in the subregion. Oil and gas extraction will expand by 14%, adding 475 jobs, and natural gas distribution will grow by 19%, adding 551 jobs. Not shown in Exhibit 21 are several business types that are projected to contract in the subregion by 2021. Support activities for mining is expected to shed more than 700 jobs; residential building construction will eliminate 340 jobs; and building finishing contractors will be reduced by 321 jobs.

Exhibit 21: Energy, construction and utilities current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Building Equipment Contractors (2382)	11,640	12,730	1,090	9%	888
Foundation, Structure and Building Exterior Contractors (2381)	6,185	6,259	74	1%	528
Utility System Construction (2371)	5,966	6,603	637	11%	162
Oil and Gas Extraction (2111)	3,508	3,983	475	14%	65
Natural Gas Distribution (2212)	2,898	3,449	551	19%	17
Nonmetallic Mineral Mining and Quarrying (2123)	1,240	1,284	44	4%	21
Water, Sewage and Other Systems (2213)	551	613	62	11%	70

Industry Staffing Patterns

The largest occupation in the energy, construction and utilities industry is plumbers, pipefitters and steamfitters with 2,213 jobs in 2016 and the largest growth rate, 248 new jobs projected over the next five years. This is followed by electricians, adding 207 new jobs at the industry level over the next five years. See Exhibit 22.

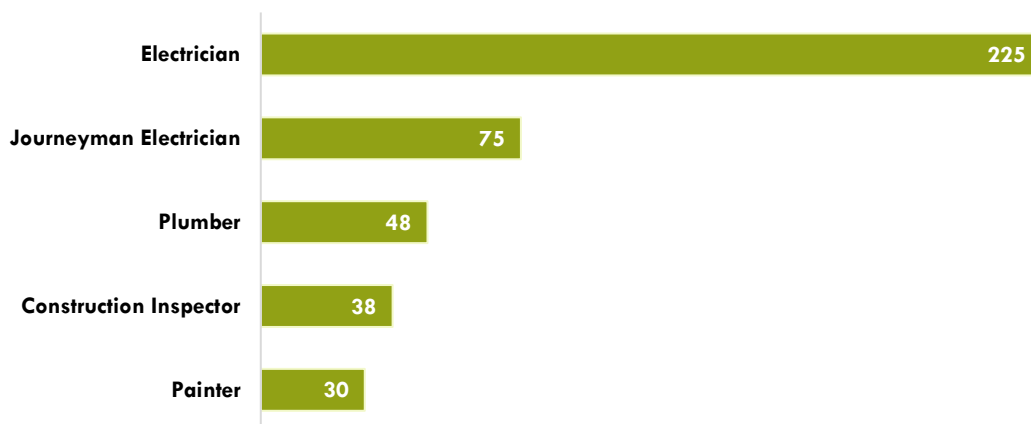
Exhibit 22: Energy, construction and utilities staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
47-2152	Plumbers, Pipefitters and Steamfitters	2,213	2,461	248	11%
47-2111	Electricians	2,608	2,815	207	8%
49-9021	Heating, Air Conditioning and Refrigeration Mechanics and Installers	1,365	1,542	177	13%
47-2073	Operating Engineers and Other Construction Equipment Operators	1,704	1,805	101	6%
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	207	251	44	21%
47-2211	Sheet Metal Workers	484	524	40	8%
13-1051	Cost Estimators	1,029	1,064	35	3%
51-8092	Gas Plant Operators	98	126	28	29%
47-2051	Cement Masons and Concrete Finishers	1,817	1,844	27	1%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	354	380	26	7%
51-8093	Petroleum Pump System Operators, Refinery Operators and Gaugers	211	237	26	12%
51-4121	Welders, Cutters, Solderers and Brazers	808	833	25	3%
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	273	294	21	8%
49-9052	Telecommunications Line Installers and Repairers	352	370	18	5%
53-7073	Wellhead Pumpers	196	214	18	9%
51-1011	First-Line Supervisors of Production and Operating Workers	218	234	16	7%
49-9099	Installation, Maintenance and Repair Workers, All Other	196	208	12	6%
17-3029	Engineering Technicians, Except Drafters, All Other	87	98	11	13%
47-2231	Solar Photovoltaic Installers	107	118	11	10%
47-5021	Earth Drillers, Except Oil and Gas	307	318	11	4%
47-2171	Reinforcing Iron and Rebar Workers	243	253	10	4%
51-8031	Water and Wastewater Treatment Plant and System Operators	137	147	10	7%

Job Postings

An analysis of job posting data for the 22 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 23 details the top five jobs requiring less than a bachelor's degree that were advertised by employers.

Exhibit 23: Energy, construction and utilities job postings



Skills

The top five baseline skills sought by employers at the occupational level are identical to those most commonly listed across the industry (Exhibit 24).

Exhibit 24: Energy, construction and utilities baseline skills

Occupational Cluster		Industry: Construction & Extraction	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	429	Troubleshooting	219
Troubleshooting	422	Physical Demand	155
Preventive Maintenance	278	Writing	153
Writing	268	Communication Skills	115
Physical Demand	261	Preventive Maintenance	89

Exhibit 25 shows specialized skills commonly listed in job ads. Repair, electrical work and inspection are highly ranked from both the industry and occupational perspectives.

Exhibit 25: Energy, construction and utilities specialized skills

Occupational Cluster		Industry: Construction & Extraction	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Repair	754	Repair	374
Scheduling	431	Electrical Work	305
Supervisory Skills	389	Hand Tools	141
Electrical Work	273	Inspection	136
Inspection	244	Wiring	115

Top software skills for jobs related to energy, construction and utilities are shown in Exhibit 26. The Microsoft Office suite dominates the list although there is a slight variation among desired software skills. SAP is a desired skill in both tables.

Exhibit 26: Energy, construction and utilities software skills

Occupational Cluster		Industry: Construction & Extraction	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	227	Microsoft Excel	89
Microsoft Office	201	Microsoft Office	78
Microsoft PowerPoint	94	Microsoft Word	43
Microsoft Word	86	Microsoft Project	18
SAP	51	SAP	15



Occupational Demand Projections

The occupation of electricians is the largest in the industry with 3,174 jobs in 2016 (Exhibit 27). This occupation has the second largest five-year change projection, 255 new jobs by 2021 with 106 annual openings.

The occupation of plumbers, pipefitters and steamfitters has the greatest change projection, 278 new jobs over five years with 96 annual openings. This is followed by heating, air conditioning and refrigeration mechanics and installers, 216 new jobs with 77 annual openings.

Operating engineers and other construction equipment operators are projected to add 155 new jobs with 78 annual openings.

Exhibit 27: Energy, construction and utilities occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Electricians	3,174	3,429	255	8%	106
Plumbers, Pipefitters and Steamfitters	2,548	2,826	278	11%	96
Operating Engineers and Other Construction Equipment Operators	2,566	2,721	155	6%	78
Heating, Air Conditioning and Refrigeration Mechanics and Installers	1,869	2,085	216	12%	77
Carpenters	5200	5037	-163	-3%	75
First-Line Supervisors of Construction Trades and Extraction Workers	3852	3889	37	1%	60
Hazardous Materials Removal Workers	477	619	142	30%	41
Painters, Construction and Maintenance	2,380	2,255	-125	-5%	38
Electrical Power-Line Installers and Repairers	690	678	-12	-2%	37
Service Unit Operators, Oil, Gas and Mining	1,059	975	-84	-8%	35
Cement Masons and Concrete Finishers	1,924	1,950	26	1%	34
Roustabouts, Oil and Gas	1,619	1,542	-77	-5%	34
Construction Managers	2,054	1,935	-119	-6%	33
Roofers	981	989	8	1%	29
Highway Maintenance Workers	497	564	67	13%	29
Septic Tank Servicers and Sewer Pipe Cleaners	228	310	82	36%	24
Pump Operators, Except Wellhead Pumps	361	372	11	3%	21
Construction and Building Inspectors	447	472	25	6%	19
Geological and Petroleum Technicians	388	402	14	4%	18
Drywall and Ceiling Tile Installers	1,248	1,205	-43	-3%	17
Wellhead Pumps	196	215	19	10%	14
Cabinetmakers and Bench Carpenters	780	772	-8	-1%	12
Tile and Marble Setters	642	609	-33	-5%	11
Earth Drillers, Except Oil and Gas	327	339	12	4%	11
Rotary Drill Operators, Oil and Gas	293	276	-17	-6%	10

Wages

The occupation of electrical power-line installers and repairers has the highest entry-level wage, followed by construction managers (Exhibit 28). Twenty-two of the 25 energy, construction and utilities occupations have entry-level wages above the subregion's average living wage for a single adult, \$11.32/hour.

Exhibit 28: Energy, construction and utilities wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Electrical Power-Line Installers and Repairers	\$26.04	\$46.62
Construction Managers	\$19.85	\$30.85
First-Line Supervisors of Construction Trades and Extraction Workers	\$18.86	\$27.53
Construction and Building Inspectors	\$18.83	\$28.91
Rotary Drill Operators, Oil and Gas	\$18.41	\$38.40
Geological and Petroleum Technicians	\$18.16	\$31.08
Electricians	\$17.35	\$27.45
Operating Engineers and Other Construction Equipment Operators	\$17.34	\$23.11
Service Unit Operators, Oil, Gas and Mining	\$16.28	\$26.41
Wellhead Pumpers	\$16.08	\$27.39
Highway Maintenance Workers	\$15.48	\$20.57
Plumbers, Pipefitters and Steamfitters	\$14.84	\$23.73
Hazardous Materials Removal Workers	\$13.89	\$22.84
Earth Drillers, Except Oil and Gas	\$13.46	\$21.51
Pump Operators, Except Wellhead Pumpers	\$13.35	\$20.35
Tile and Marble Setters	\$12.65	\$18.10
Cement Masons and Concrete Finishers	\$12.58	\$17.11
Heating, Air Conditioning and Refrigeration Mechanics and Installers	\$12.53	\$21.40
Roofers	\$12.31	\$18.86
Drywall and Ceiling Tile Installers	\$12.12	\$19.84
Septic Tank Servicers and Sewer Pipe Cleaners	\$11.90	\$17.31
Painters, Construction and Maintenance	\$11.69	\$16.40
Carpenters	\$11.18	\$17.26
Roustabouts, Oil and Gas	\$10.49	\$14.75
Cabinetmakers and Bench Carpenters	\$10.26	\$13.75

Education Level

Construction managers is the only energy, utilities and construction occupation with a typical entry-level education of a bachelor's degree that exceeds the 33.3% threshold set by the Centers of Excellence for being relevant to community college education (Exhibit 29). Heating, air conditioning and refrigeration mechanics and installers, and geological and petroleum technicians both require community college education; three other occupations require apprenticeships. Most of the remaining occupations that require less than a community college education have either on-the-job training or third-party certification requirements, which are addressed by some local community college programs.

Exhibit 29: Energy, construction and utilities education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Electricians	High school diploma or equivalent	None	Apprenticeship	47.3%
Plumbers, Pipefitters and Steamfitters	High school diploma or equivalent	None	Apprenticeship	31.4%
Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	None	Moderate-term	24.3%
Heating, Air Conditioning and Refrigeration Mechanics and Installers	Postsecondary nondegree award	None	Long-term	43.9%
Carpenters	High school diploma or equivalent	None	Apprenticeship	25.9%
First-Line Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	5 years or more	None	32.8%
Hazardous Materials Removal Workers	High school diploma or equivalent	None	Moderate-term	27.5%
Painters, Construction and Maintenance	No formal educational credential	None	Moderate-term	20.5%
Electrical Power-Line Installers and Repairers	High school diploma or equivalent	None	Long-term	49.8%
Service Unit Operators, Oil, Gas and Mining	No formal educational credential	None	Moderate-term	28.8%
Cement Masons and Concrete Finishers	No formal educational credential	None	Moderate-term	15.2%
Roustabouts, Oil and Gas	No formal educational credential	None	Moderate-term	28.8%
Construction Managers	Bachelor's degree	None	Moderate-term	32.8%
Roofers	No formal educational credential	None	Moderate-term	13.7%
Highway Maintenance Workers	High school diploma or equivalent	None	Moderate-term	27.1%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Septic Tank Servicers and Sewer Pipe Cleaners	No formal educational credential	None	Moderate-term	28%
Pump Operators, Except Wellhead Pumpers	High school diploma or equivalent	None	Moderate-term	30.3%
Construction and Building Inspectors	High school diploma or equivalent	5 years or more	Moderate-term	44.5%
Geological and Petroleum Technicians	Associate degree	None	Moderate-term	38.1%
Drywall and Ceiling Tile Installers	No formal educational credential	None	Moderate-term	15.4%
Wellhead Pumpers	High school diploma or equivalent	Less than 5 years	Moderate-term	30.3%
Cabinetmakers and Bench Carpenters	High school diploma or equivalent	None	Moderate-term	25.7%
Tile and Marble Setters	No formal educational credential	None	Long-term	18.8%
Earth Drillers, Except Oil and Gas	High school diploma or equivalent	None	Moderate-term	22.8%
Rotary Drill Operators, Oil and Gas	No formal educational credential	None	Moderate-term	28.8%

Community College Supply

Exhibit 30 shows annual job openings and corresponding program titles with student completion data.

Exhibit 30: Energy, construction and utilities community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Electricians (47-2111)	106	Electrical - 095220	-	30
Plumbers, Pipefitters and Steamfitters (47-2152)	96	Plumbing, Pipefitting and Steamfitting - 095230	-	4
Operating Engineers and Other Construction Equipment Operators (47-2073)	78	Heavy Equipment Operation - 094730	-	6
Heating, Air Conditioning and Refrigeration Mechanics and Installers (49-9021)	77	Environmental Control Technology - 094600	3	45
		Energy Systems Technology - 094610	82	254
Carpenters (47-2031)	75	Construction Crafts Technology - 095200	3	5
		Carpentry - 095210	-	-
First-Line Supervisors of Construction Trades and Extraction Workers (47-1011)	60	Construction Crafts Technology - 095200	3	5
		Carpentry - 095210	-	-
		Electrical - 095220	-	30
		Glazing - 095240	-	-
		Masonry, Tile, Cement, Lath and Plaster - 095260	-	-
		Painting, Decorating and Flooring - 095270	-	-
		Drywall and Insulation - 095280	-	-
		Roofing - 095290	-	-
		Civil and Construction Management Technology - 095700	29	-
		Public Works - 210210	-	-
Hazardous Materials Removal Workers (47-4041)	41	Environment Technology - 030300	-	-
Painters, Construction and Maintenance (47-2141)	38	Painting, Decorating and Flooring - 095270	-	-
Electrical Power-Line Installers and Repairers (49-9051)	37	Electrical Systems and Power Transmission - 093440	-	-
Service Unit Operators, Oil, Gas and Mining (47-5013)	35	No Corresponding Programs		

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Cement Masons and Concrete Finishers (47-2051)	34	No Corresponding Programs		
Roustabouts, Oil and Gas (47-5071)	34			
Construction Managers (11-9021)	33	Civil and Construction Management Technology - 095700	29	-
Roofers (47-2181)	29	Roofing - 095290	-	-
Highway Maintenance Workers (47-4051)	29	Heavy Equipment Operation - 094730	-	6
		Public Works - 210210	-	-
Septic Tank Servicers and Sewer Pipe Cleaners (47-4071)	24	Plumbing, Pipefitting and Steamfitting - 095230	-	4
Pump Operators, Except Wellhead Pumps (53-7072)	21	No Corresponding Programs		
Construction and Building Inspectors (47-4011)	19	Construction Inspection - 095720	1	1
Geological and Petroleum Technicians (19-4041)	18	Petroleum Technology - 095430	-	-
Drywall and Ceiling Tile Installers (47-2081)	17	Drywall and Insulation - 095280	-	-
Wellhead Pumps (53-7073)	14	No Corresponding Programs		
Cabinetmakers and Bench Carpenters (51-7011)	12	Mill and Cabinet Work - 095250	0	3
Tile and Marble Setters (47-2044)	11	Masonry, Tile, Cement, Lath and Plaster - 095260	-	-
Earth Drillers, Except Oil and Gas (47-5021)	11	Heavy Equipment Operation - 094730	-	6
Rotary Drill Operators, Oil and Gas (47-5012)	10	No Corresponding Programs		

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

GLOBAL TRADE & LOGISTICS

Current & Projected Employment

Global trade and logistics will generate more than 4,600 new jobs in the South Central Valley/Southern Mother Lode Subregion by 2021. Based on projections, general freight trucking will create 1,026 new jobs, with a growth rate of 10%, and grocery and related product merchant wholesalers will generate 615 new positions, a growth rate of 9% (Exhibit 31).

The business type comprising agencies, brokerages and other insurance will add 284 jobs, representing 5% growth.

Warehousing and storage is expected to expand 4% by 2021, adding 208 jobs. Specialized freight trucking (7% growth) will increase by 332 jobs, and machinery, equipment and supplies merchant wholesalers (also 7% growth) will expand by 348 positions.

It should be noted that the depository credit intermediation business type (NAICS 5221) falls within this industry grouping. However, this business type is not shown because it is projected to decline 12% over the next five years, eliminating 680 jobs in the subregion.

Exhibit 31: Global trade and logistics current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
General Freight Trucking (4841)	10,133	11,159	1,026	10%	653
Grocery and Related Product Merchant Wholesalers (4244)	6,481	7,096	615	9%	252
Agencies, Brokerages and Other Insurance Related Activities (5242)	5,883	6,167	284	5%	747
Warehousing and Storage (4931)	5,526	5,734	208	4%	116
Specialized Freight Trucking (4842)	5,013	5,345	332	7%	311
Machinery, Equipment and Supplies Merchant Wholesalers (4238)	4,751	5,099	348	7%	346
Insurance Carriers (5241)	4,424	4,467	43	1%	149
Lessors of Real Estate (5311)	3,596	3,681	85	2%	526
Activities Related to Real Estate (5313)	3,534	3,755	221	6%	488
Miscellaneous Nondurable Goods Merchant Wholesalers (4249)	3,042	3,124	82	3%	235

Industry Staffing Patterns

With 11,720 current jobs and more than 1,000 new jobs, heavy and tractor-trailer truck drivers is the largest occupation with the highest projected growth in the industry as well as the subregion (Exhibit 32). The next largest occupation in the industry is sales representatives, wholesale and manufacturing (except technical and scientific), with 342 projected new jobs (Exhibit 32).

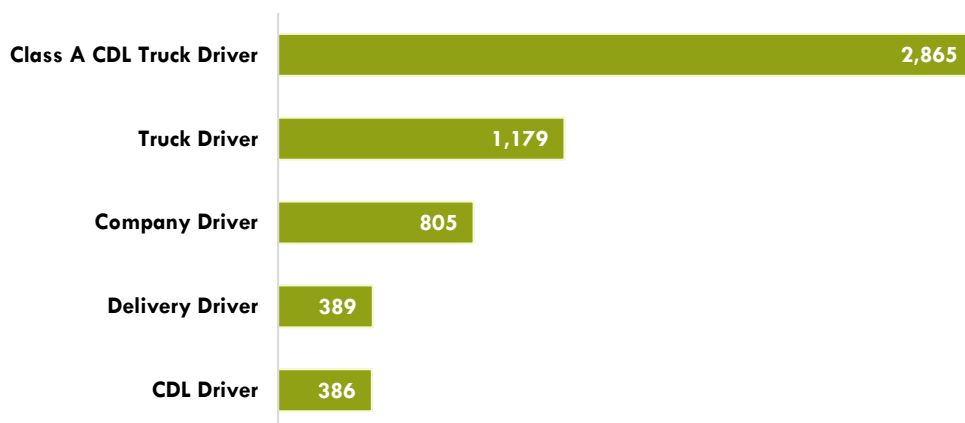
Exhibit 32: Global trade and logistics staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
53-3032	Heavy and Tractor-Trailer Truck Drivers	11,720	12,809	1089	9%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	4,022	4,364	342	9%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	795	882	87	11%
53-7051	Industrial Truck and Tractor Operators	1,715	1,796	81	5%
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	558	613	55	10%
53-1021	First-Line Supervisors of Helpers, Laborers and Material Movers, Hand	630	668	38	6%
11-3071	Transportation, Storage and Distribution Managers	357	386	29	8%
43-5011	Cargo and Freight Agents	165	188	23	14%
13-1022	Wholesale and Retail Buyers, Except Farm Products	227	245	18	8%
43-5061	Production, Planning and Expediting Clerks	217	235	18	8%
51-1011	First-Line Supervisors of Production and Operating Workers	144	158	14	10%
13-1081	Logisticians	106	118	12	11%

Job Postings

An analysis of job posting data for the 12 staffing pattern occupations in global trade and logistics shows the positions employers most sought to fill in the last 12 months. Exhibit 33 details the top five jobs requiring less than a bachelor's degree that were advertised by employers.

Exhibit 33: Global trade and logistics job postings



Skills

Communication skills, organizational skills and physical demand are the most commonly listed baseline skills from the two perspectives (Exhibit 34).

Exhibit 34: Global trade and logistics baseline skills

Occupational Cluster		Industry: Transportation & Warehousing	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	1582	Physical Demand	859
Writing	710	Communication Skills	534
Organizational Skills	668	English	395
Physical Demand	599	Organizational Skills	357
Building Effective Relationships	570	Preventive Maintenance	278

Customer service is the only specialized skill shared between the occupational and industry perspectives (Exhibit 35). The remaining skills from the occupational perspective are business related; whereas, from the industry perspective, the remaining top skills are hard skills, i.e., forklift operation and repair.

Exhibit 35: Global trade and logistics specialized skills

Occupational Cluster		Industry: Transportation & Warehousing	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Sales	2098	Forklift Operation	791
Customer Service	895	Repair	690
Microsoft Office	613	Inspection	588
Microsoft Excel	574	Customer Service	392
Scheduling	568	Machinery	310

Top software skills for jobs related to global trade and logistics are shown in Exhibit 36. Four of the five top skills shared between the two perspectives are in the Microsoft Office suite of tools.

Exhibit 36: Global trade and logistics software skills

Occupational Cluster		Industry: Transportation & Warehousing	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Office	613	Microsoft Office	95
Microsoft Excel	574	Microsoft Excel	74
Microsoft PowerPoint	282	Microsoft Word	37
Microsoft Word	252	SAP	30
Salesforce	145	Microsoft PowerPoint	24

Occupational Demand Projections

Heavy and tractor-trailer drivers is the largest occupation across all sectors as well as the subregion with 17,141 jobs in 2016 (Exhibit 37). It also has the greatest five-year growth projection of 1,395 new jobs with 592 annual openings, followed by sales representatives, wholesale and manufacturing (except technical and scientific products), 502 new jobs with 251 annual openings. The next few occupations are significantly smaller across all three metrics, but do indicate sizeable growth and moderate annual openings in the next five years.

Exhibit 37: Global trade and logistics occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Heavy and Tractor-Trailer Truck Drivers	17,141	18,536	1,395	8%	592
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	6,829	7,331	502	7%	251
First-Line Supervisors of Helpers, Laborers and Material Movers, Hand	1,594	1,722	128	8%	80
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	1,246	1,367	121	10%	67
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	1,462	1,567	105	7%	53
Wholesale and Retail Buyers, Except Farm Products	707	738	31	4%	30
Transportation, Storage and Distribution Managers	873	914	41	5%	28
Commercial Pilots	258	314	56	22%	18
Logisticians	666	687	21	3%	14
Cargo and Freight Agents	182	206	24	13%	11

Wages

The wages for the global trade and logistics occupations are all above the average living wage for a single adult in the subregion, \$11.32/hour (Exhibit 38).

Exhibit 38: Global trade and logistics wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Transportation, Storage and Distribution Managers	\$24.77	\$37.09
Logisticians	\$23.50	\$38.05
Commercial Pilots	\$22.71	\$39.40
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	\$19.80	\$34.88
Wholesale and Retail Buyers, Except Farm Products	\$16.36	\$22.58
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	\$15.66	\$25.70
First-Line Supervisors of Helpers, Laborers and Material Movers, Hand	\$14.81	\$22.62
Cargo and Freight Agents	\$13.56	\$20.33
Heavy and Tractor-Trailer Truck Drivers	\$13.10	\$18.86
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	\$12.65	\$25.90



Education Level

Exhibit 39 shows education levels required for occupations that fall within the global trade and logistics industry. Sales representatives, wholesale and manufacturing, technical and scientific products as well as wholesale retail buyers (except farm products) indicate a bachelor's degree, but have 32% and 37% CPS results, making them relevant to community colleges.

Heavy and tractor-trailer truck drivers typically require community college education, whereas, the remaining occupations require only a high school diploma. However, the commercial pilots occupation requires special training and third-party certification. Supervisorial positions are viewed as relevant to community colleges because of the need for management skills.

Exhibit 39: Global trade and logistics education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Heavy and Tractor-Trailer Truck Drivers	Postsecondary nondegree award	None	Short-term	28.3%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	None	Moderate-term	31.6%
First-Line Supervisors of Helpers, Laborers and Material Movers, Hand	High school diploma or equivalent	Less than 5 years	None	39.5%
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	High school diploma or equivalent	Less than 5 years	None	39.5%
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Bachelor's degree	None	Moderate-term	31.6%
Wholesale and Retail Buyers, Except Farm Products	Bachelor's degree	None	Long-term	36.7%
Transportation, Storage and Distribution Managers	High school diploma or equivalent	5 years or more	None	34.5%
Commercial Pilots	High school diploma or equivalent	None	Moderate-term	20.5%
Logisticians	Bachelor's degree	None	None	38.8%
Cargo and Freight Agents	High school diploma or equivalent	None	Short-term	46%

Community College Supply

Exhibit 40 shows annual job openings and corresponding program titles with student completion data.

Exhibit 40: Global trade and logistics community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Heavy and Tractor-Trailer Truck Drivers (53-3032)	592	Truck and Bus Driving - 094750	-	-
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products (41-4012)	251	International Business and Trade - 050800	-	-
		Marketing and Distribution - 050900	7	2
		Display - 050960	-	-
First-Line Supervisors of Helpers, Laborers and Material Movers, Hand (53-1021)	80	No Corresponding Programs		
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators (53-1031)	67	Logistics and Materials Transportation - 051000	-	14
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (41-4011)	53	International Business and Trade - 050800	-	-
		Sales and Salesmanship - 050940	-	-
Wholesale and Retail Buyers, Except Farm Products (13-1022)	30	International Business and Trade - 050800	-	-
		Marketing and Distribution - 050900	7	2
		Purchasing - 050920	-	-
Transportation, Storage and Distribution Managers (11-3071)	28	Logistics and Materials Transportation - 051000	-	14
		Aviation and Airport Management and Services - 302000	-	-
		Aviation and Airport Management - 302010	-	-
Commercial Pilots (53-2012)	18	Piloting - 302020	-	-
Logisticians (13-1081)	14	Logistics and Materials Transportation - 051000	-	14
Cargo and Freight Agents (43-5011)	11	Logistics and Materials Transportation - 051000	-	14

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

RETAIL, HOSPITALITY AND TOURISM

Employment analysis for the retail, hospitality and tourism industry shows restaurants and other eating places are projected to experience significant expansion by 2021, with a growth rate of 10%, which translates to the addition of nearly 6,000 jobs (Exhibit 41).

Other business types adding employment will be grocery stores, 1,683 new jobs, and automobile dealers, 791 new jobs.

Department stores represent the third largest business type within the retail industry and in 2016 employed more than 11,500 workers in the South Central Valley/Southern Mother Lode Subregion. However, this business type, which is not shown in the table below, is projected to decline by 14% over the next five years, shedding more than 1,600 jobs.

Exhibit 41: Retail, hospitality and tourism current and projected employment

Description	2016 Jobs	2021 Jobs	5-Yr Change	5-Yr % Change	# of Firms
Restaurants and Other Eating Places (7225)	61,172	67,119	5,947	10%	3,253
Grocery Stores (4451)	18,368	20,051	1,683	9%	791
Automobile Dealers (4411)	7,668	8,387	719	9%	234
Traveler Accommodation (7211)	7,323	7,531	208	3%	356
Building Material and Supplies Dealers (4441)	6,932	7,304	372	5%	334
Health and Personal Care Stores (4461)	6,700	7,058	358	5%	614
Clothing Stores (4481)	6,422	7,312	890	14%	446
Gasoline Stations (4471)	5,440	5,794	354	7%	584
Other Amusement and Recreation Industries (7139)	5,440	5,861	421	8%	259
Automotive Parts, Accessories, and Tire Stores (4413)	4,673	5,093	420	9%	491

Industry Staffing Patterns

The staffing patterns data for the retail, hospitality and tourism industry are shown in Exhibit 42. Cooks (restaurant) has the largest five-year industry-level job change, 655 new jobs, followed by first-line supervisors of food preparation and serving workers, 582 new jobs by 2021.

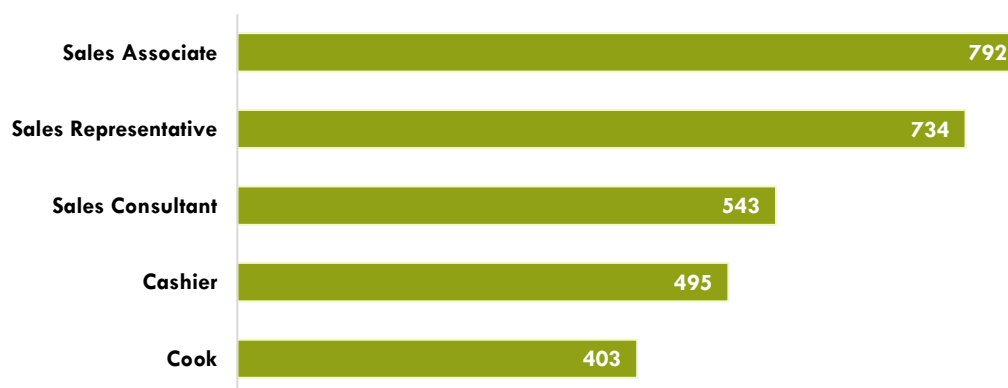
Exhibit 42: Retail, hospitality and tourism staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2,016	2,021		
35-2014	Cooks, Restaurant	5,161	5,816	655	13%
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	4,359	4,941	582	13%
41-1011	First-Line Supervisors of Retail Sales Workers	7,642	7,832	190	2%
41-2022	Parts Salespersons	1,634	1,765	131	8%
43-4051	Customer Service Representatives	1,422	1,536	114	8%
11-9051	Food Service Managers	2,029	2,142	113	6%
39-9031	Fitness Trainers and Aerobics Instructors	761	854	93	12%
51-3021	Butchers and Meat Cutters	777	854	77	10%
51-3011	Bakers	689	760	71	10%
41-3099	Sales Representatives, Services, All Other	796	860	64	8%
29-2052	Pharmacy Technicians	1,455	1,511	56	4%
35-2012	Cooks, Institution and Cafeteria	184	231	47	26%
39-7011	Tour Guides and Escorts	96	111	15	16%
27-2042	Musicians and Singers	347	358	11	3%

Job Postings

An analysis of job posting data for the 14 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 43 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 43: Retail, hospitality and tourism job postings



Skills

Skills data for retail, hospitality and tourism were analyzed by dominant occupations and then by each of the following three industry-related areas: arts, design, entertainment, sports and media; food preparation and serving related; and sales and related. The comparison of these four perspectives reveals that communication skills, writing, organization skills and physical demand are the most highly sought baseline skills (Exhibit 44).

Exhibit 44: Retail baseline skills

Occupational Cluster		Industry: Arts, Design, Entertainment, Sports & Media	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	2214	Communication Skills	519
Physical Demand	1122	Writing	467
Problem Solving	1117	Physical Demand	400
Writing	1072	Organizational Skills	306
Organizational Skills	1060	Building Effective Relationships	243

Industry: Food Preparation & Serving Related		Industry: Sales & Related	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	797	Communication Skills	3648
Physical Demand	716	Writing	2047
Organizational Skills	465	Organizational Skills	1665
English	296	Physical Demand	1592
Work Area Maintenance	244	Problem Solving	1193

Exhibit 45 shows specialized skills commonly listed in job ads and the related industries. Customer service and retail setting are present in three of the four tables. Store management, scheduling, sales and merchandising are also highly desired skills.

Exhibit 45: Retail specialized skills

Occupational Cluster		Industry: Arts, Design, Entertainment, Sports & Media	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Customer Service	2564	Merchandising	661
Retail Setting	1681	Retail Setting	376
Store Management	1330	Customer Service	280
Scheduling	1329	Sales	182
Sales	1217	Scheduling	139

Industry: Food Preparation & Serving Related		Industry: Sales & Related	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Cleaning	742	Sales	5995
Cooking	559	Customer Service	3684
Customer Service	477	Retail Setting	2998
Food Preparation	434	Store Management	1731
Food Service Experience	408	Merchandising	1587

Top software skills for jobs related to retail are shown in Exhibit 46. Microsoft Office tools were the most in demand across all perspectives except for arts, design, entertainment, sports and media where the Adobe product line was most prevalent.

Exhibit 46: Retail software skills

Occupational Cluster		Industry: Arts, Design, Entertainment, Sports & Media	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	530	Microsoft Office	123
Microsoft Office	483	Microsoft Excel	102
Microsoft Word	329	Adobe Photoshop	58
Microsoft PowerPoint	130	Adobe Acrobat	55
Microsoft Outlook	110	Adobe Illustrator	43

Industry: Food Preparation & Serving Related		Industry: Sales & Related	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Office	109	Microsoft Office	896
Microsoft Excel	78	Microsoft Excel	781
Microsoft Word	58	Microsoft Word	382
Microsoft PowerPoint	55	Microsoft PowerPoint	288
Microsoft Outlook	8	Palm OS	199

Occupational Demand Projections

The occupation of first-line supervisors of retail sales workers is the largest in the sector with 9,045 jobs (Exhibit 47). This occupation has the third greatest five-year change, 601 projected new jobs by 2021 with 379 annual openings. First-line supervisors of food preparation and serving workers has the largest five-year change projection, 678 new jobs with 307 annual openings. Cooks (restaurant) is projected to add 667 new jobs with 288 annual openings.

Exhibit 47: Retail, hospitality and tourism occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
First-Line Supervisors of Retail Sales Workers	9,045	9,646	601	7%	379
First-Line Supervisors of Food Preparation and Serving Workers	5,282	5,960	678	13%	307
Cooks, Restaurant	5,407	6,074	667	12%	288
Sales Representatives, Services, All Other	4,271	4,637	366	9%	169
Hairdressers, Hairstylists and Cosmetologists	3,705	3,978	273	7%	156
Cooks, Institution and Cafeteria	1,865	2,136	271	15%	109
Parts Salespersons	2,224	2,410	186	8%	90
Food Service Managers	2,277	2,409	132	6%	76
Self-Enrichment Education Teachers	1,589	1,789	200	13%	73
First-Line Supervisors of Personal Service Workers	792	960	168	21%	55
Bakers	1,425	1,528	103	7%	55
Fitness Trainers and Aerobics Instructors	1,099	1,232	133	12%	49
Butchers and Meat Cutters	1,078	1,199	121	11%	47
Musicians and Singers	758	811	53	7%	34
Interpreters and Translators	617	709	92	15%	29
Manicurists and Pedicurists	850	945	95	11%	26
Demonstrators and Product Promoters	478	495	17	4%	19
Merchandise Displayers and Window Trimmers	496	519	23	5%	17
Advertising Sales Agents	553	537	-16	-3%	17
Barbers	429	458	29	7%	15
Interior Designers	337	349	12	4%	12
Tour Guides and Escorts	184	202	18	10%	11
Skincare Specialists	293	330	37	13%	10

Wages

The highest hourly wages are earned by interpreters and translators, and interior designers. These are followed by fitness trainers and aerobics instructors, and advertising sales agents (Exhibit 48). More than half of these occupations have entry-level wages below the \$11.32/hour average living wage for one adult in the subregion.

Exhibit 48: Retail, hospitality and tourism wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Interpreters and Translators	\$14.86	\$21.73
Interior Designers	\$14.86	\$19.05
Fitness Trainers and Aerobics Instructors	\$14.64	\$22.04
Advertising Sales Agents	\$14.22	\$26.34
Sales Representatives, Services, All Other	\$13.00	\$21.08
Musicians and Singers	\$12.12	\$19.53
Tour Guides and Escorts	\$12.08	\$14.89
Food Service Managers	\$11.89	\$16.68
Self-Enrichment Education Teachers	\$11.65	\$16.31
Demonstrators and Product Promoters	\$11.36	\$13.58
First-Line Supervisors of Personal Service Workers	\$11.19	\$15.55
First-Line Supervisors of Retail Sales Workers	\$11.15	\$16.88
Hairdressers, Hairstylists and Cosmetologists	\$10.52	\$11.83
Skincare Specialists	\$10.51	\$13.72
Butchers and Meat Cutters	\$9.95	\$13.82
First-Line Supervisors of Food Preparation and Serving Workers	\$9.88	\$14.66
Cooks, Institution and Cafeteria	\$9.73	\$13.29
Parts Salespersons	\$9.28	\$12.77
Bakers	\$9.27	\$10.70
Cooks, Restaurant	\$9.26	\$11.59
Barbers	\$9.22	\$10.16
Merchandise Displayers and Window Trimmers	\$9.17	\$12.06
Manicurists and Pedicurists	\$8.27	\$9.14

Education Level

Exhibit 49 shows education levels required for occupations that fall within the retail, hospitality and tourism industry. One of the occupations that typically requires a bachelor's degree, but meets the CPS 33.3% requirement for being relevant to community college education is interpreters and translators. Four of the occupations have community college-level educational requirements; 10 occupations requiring less than a community college education are community college relevant because they require specialized or managerial training needs.

Exhibit 49: Retail, hospitality and tourism education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	Less than 5 years	None	38.1%
First-Line Supervisors of Food Preparation and Serving Workers	High school diploma or equivalent	Less than 5 years	None	37.9%
Cooks, Restaurant	No formal educational credential	Less than 5 years	Moderate-term	23.4%
Sales Representatives, Services, All Other	High school diploma or equivalent	None	Moderate-term	34.3%
Hairdressers, Hairstylists and Cosmetologists	Postsecondary nondegree award	None	None	41.6%
Cooks, Institution and Cafeteria	No formal educational credential	None	Short-term	23.4%
Parts Salespersons	No formal educational credential	None	Moderate-term	36.6%
Food Service Managers	High school diploma or equivalent	Less than 5 years	None	37.7%
Self-Enrichment Education Teachers	High school diploma or equivalent	Less than 5 years	None	26.7%
First-Line Supervisors of Personal Service Workers	High school diploma or equivalent	Less than 5 years	None	37.6%
Bakers	No formal educational credential	None	Long-term	27.8%
Fitness Trainers and Aerobics Instructors	High school diploma or equivalent	None	Short-term	34.1%
Butchers and Meat Cutters	No formal educational credential	None	Long-term	20.5%
Musicians and Singers	No formal educational credential	None	Long-term	27.4%
Interpreters and Translators	Bachelor's degree	None	Short-term	36%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Manicurists and Pedicurists	Postsecondary nondegree award	None	None	30.2%
Demonstrators and Product Promoters	High school diploma or equivalent	None	Short-term	36.4%
Merchandise Displayers and Window Trimmers	High school diploma or equivalent	None	Moderate-term	30.3%
Advertising Sales Agents	High school diploma or equivalent	None	Moderate-term	30.1%
Barbers	Postsecondary nondegree award	None	None	34%
Interior Designers	Bachelor's degree	None	None	30.3%
Tour Guides and Escorts	High school diploma or equivalent	None	Moderate-term	36.9%
Skincare Specialists	Postsecondary nondegree award	None	None	30.2%

Community College Supply

Exhibit 50 shows annual job openings and corresponding program titles with student completion data.

Exhibit 50: Retail, hospitality and tourism community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
First-Line Supervisors of Retail Sales Workers (41-1011)	379	Retail Store Operations and Management - 050650	1	19
		Sales and Salesmanship - 050940	-	-
		Display - 050960	-	-
First-Line Supervisors of Food Preparation and Serving Workers (35-1012)	307	Nutrition, Foods, and Culinary Arts - 130600	1	0
		Dietetic Services and Management - 130620	1	9
		Culinary Arts - 130630	182	154
		Hospitality - 130700	-	-
		Restaurant and Food Services and Management - 130710	3	53
Cooks, Restaurant (35-2014)	288	Culinary Arts - 130630	182	154
Sales Representatives, Services, All Other (41-3099)	169	Sales and Salesmanship - 050940	-	-
Hairdressers, Hairstylists and Cosmetologists (39-5012)	156	Cosmetology and Barbering - 300700	-	771

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Cooks, Institution and Cafeteria (35-2012)	109	Dietetic Services and Management - 130620	1	9
		Culinary Arts - 130630	182	154
Parts Salespersons (41-2022)	90	Sales and Salesmanship - 050940	-	-
Food Service Managers (11-9051)	76	Dietetic Services and Management - 130620	1	9
		Hospitality - 130700	-	-
		Restaurant and Food Services and Management - 130710	3	53
		Lodging Management - 130720	-	-
Self-Enrichment Education Teachers (25-3021)	73	No Corresponding Programs		
First-Line Supervisors of Personal Service Workers (39-1021)	55	No Corresponding Programs		
Bakers (51-3011)	55	No Corresponding Programs		
Fitness Trainers and Aerobics Instructors (39-9031)	49	Physical Education - 083500	-	-
		Physical Fitness and Body Movement - 083510	-	-
		Fitness Trainer - 083520	-	13
		Intercollegiate Athletics - 083550	-	-
		Health Education - 083800	-	-
		Athletic Training and Sports Medicine - 122800	10	-
Butchers and Meat Cutters (51-3021)	47	No Corresponding Programs		
Musicians and Singers (27-2042)	34	Music - 100400	-	-
Interpreters and Translators (27-3091)	29	Sign Language - 085000	-	-
		Sign Language Interpreting - 085010	-	4
		Foreign Languages, General - 110100	-	-
		French - 110200	-	-
		German - 110300	-	-
		Italian - 110400	-	-
		Spanish - 110500	-	-
		Russian - 110600	-	-
		Chinese - 110700	-	-
		Japanese - 110800	-	-
		Latin - 110900	-	-

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
		Greek - 111000	-	-
		Hebrew and Semitic - 111100	-	-
		Arabic - 111200	-	-
		African Languages (Non-Semitic) - 111600	-	-
		Asian, South Asian and Pacific Islands (Chinese and Japanese excluded)	-	-
		Filipino (Tagalog) - 111710	-	-
		Vietnamese - 111720	-	-
		Korean - 111730	-	-
		Portuguese - 111900	-	-
		Other Foreign Languages - 119900	-	-
		Linguistics - 150110	-	-
		Classics - 150400	-	-
		Legal and Community Interpretation - 214000	-	-
Manicurists and Pedicurists (39-5092)	26	Cosmetology and Barbering - 300700	-	771
Demonstrators and Product Promoters (41-9011)	19	No Corresponding Programs		
Merchandise Displayers and Window Trimmers (27-1026)	17	Display - 050960	-	-
		Fashion Merchandising - 130320	3	2
Advertising Sales Agents (41-3011)	17	Advertising - 050910	-	-
		Sales and Salesmanship - 050940	-	-
Barbers (39-5011)	15	No Corresponding Programs		
Interior Designers (27-1025)	12	Interior Design and Merchandising - 130200	-	-
Tour Guides and Escorts (39-7011)	11	Travel Services and Tourism - 300900	-	-
Skincare Specialists (39-5094)	10	Cosmetology and Barbering - 300700	-	771

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

PROTECTIVE SERVICES

Current & Projected Employment

The business type comprising state government (excluding education and hospitals) is projected to rapidly expand, adding nearly 3,400 jobs by 2021, a 15% growth rate (Exhibit 51). Local government (excluding education and hospitals) will add nearly 1,500 jobs, a 3% growth rate. The federal government (civilian) business type will shrink by more than 1,000 jobs, a 5% decline in employment over the next five years.

Exhibit 51: Protective services current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Local Government, Excluding Education and Hospitals (9039)	45,880	47,342	1,462	3%	574
State Government, Excluding Education and Hospitals (9029)	22,624	26,018	3,394	15%	693

Industry Staffing Patterns

Occupations with the greatest projected job increase for the protective service industry include correctional officers and jailers, police and sheriff's patrol officers, and first-line supervisors of correctional officers (Exhibit 52). Compliance officers have traditionally fallen within the subregion's agriculture industry. Therefore, data relating to overall demand of this occupation is housed under that industry in this report.

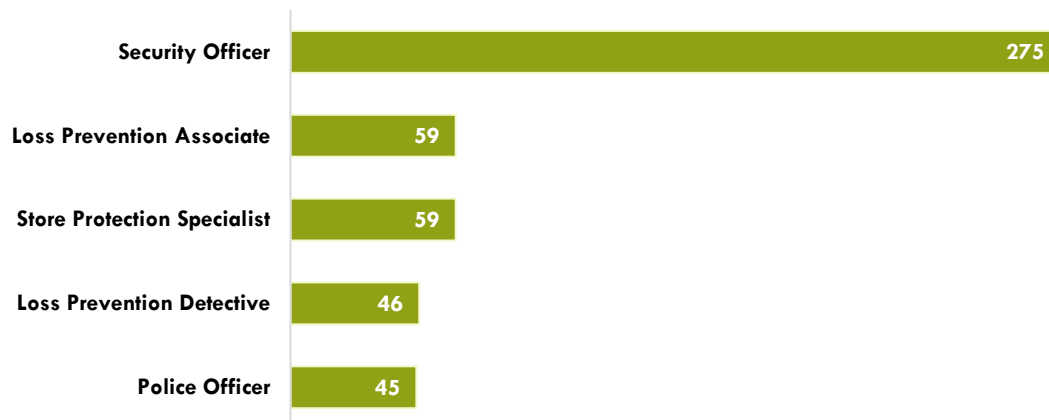
Exhibit 52: Protective services staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
33-3012	Correctional Officers and Jailers	9,127	9,936	809	9%
33-3051	Police and Sheriff's Patrol Officers	4,336	4,572	236	5%
33-1011	First-Line Supervisors of Correctional Officers	1,185	1,283	98	8%
33-2011	Firefighters	2,288	2,386	98	4%
33-3021	Detectives and Criminal Investigators	861	903	42	5%
13-1041	Compliance Officers	795	834	39	5%
33-1012	First-Line Supervisors of Police and Detectives	507	539	32	6%
19-4092	Forensic Science Technicians	134	155	21	16%
29-2041	Emergency Medical Technicians and Paramedics	309	325	16	5%
33-9099	Protective Service Workers, All Other	379	395	16	4%
33-1021	First-Line Supervisors of Fire Fighting and Prevention Workers	216	229	13	6%
33-9092	Lifeguards, Ski Patrol and Other Recreational Protective Service Workers	282	295	13	5%
23-2011	Paralegals and Legal Assistants	298	310	12	4%
33-3031	Fish and Game Wardens	74	85	11	15%
43-6012	Legal Secretaries	188	198	10	5%

Job Postings

An analysis of job posting data for the 15 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 53 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 53: Protective services job postings



Skills

The following tables show the most commonly requested baseline, specialized and software skills sought by protective services employers in the subregion. Communication skills, writing, physical demand and building effective relationships are the most commonly listed baseline skills from both perspectives (Exhibit 54).

Exhibit 54: Protective services baseline skills

Occupational Cluster		Industry: Protective Services	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	240	Writing	465
Writing	228	Communication Skills	430
Physical Demand	152	Physical Demand	372
Mathematics	119	English	228
Building Effective Relationships	104	Building Effective Relationships	219

Exhibit 55 shows specialized skills commonly listed in job ads. Loss prevention, asset protection, surveillance and supervisory skills are those most highly ranked across the industry and among the staffing pattern occupations.

Exhibit 55: Protective services specialized skills

Occupational Cluster		Industry: Protective Services	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Loss Prevention	267	Loss Prevention	282
Surveillance	229	Surveillance	256
Asset Protection	225	Asset Protection	245
Retail Setting	149	Prevention of Criminal Activity	156
Supervisory Skills	146	Supervisory Skills	153

Top software skills for jobs related to protective services are shown in Exhibit 56. The four top skills shared by the tables are Microsoft Office, Excel, Word and PowerPoint.

Exhibit 56: Protective services software skills

Occupational Cluster		Industry: Protective Services	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	52	Notepad	140
Microsoft Office	42	Microsoft Excel	50
Microsoft Word	33	Microsoft Office	49
Microsoft PowerPoint	23	Microsoft Word	38
Microsoft Access	20	Microsoft PowerPoint	22

Occupational Demand Projections

Corrections officers and jailers is the largest occupation in the industry, with 9,710 workers employed in 2016 (Exhibit 57). This occupation is also adding the greatest number of new jobs, 894 with 464 annual openings.

This is followed by police and sheriff's patrol officers, 261 new jobs by 2021 with 211 annual openings; and emergency medical technicians, 211 new jobs with 66 annual openings. The occupations of firefighters has nearly one-third more annual openings than EMTs, 94 compared to 66.

Exhibit 57: Protective services occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Correctional Officers and Jailers	9,710	10,604	894	9%	464
Police and Sheriff's Patrol Officers	4,505	4,766	261	6%	211
Firefighters	2,341	2,450	109	5%	94
Emergency Medical Technicians and Paramedics	1,319	1,530	211	16%	66
First-Line Supervisors of Correctional Officers	1,239	1,340	101	8%	59
Protective Service Workers, All Other	1,336	1,422	86	6%	37
Detectives and Criminal Investigators	871	912	41	5%	31
First-Line Supervisors of Police and Detectives	511	544	33	6%	26
Police, Fire and Ambulance Dispatchers	610	623	13	2%	19
Lifeguards, Ski Patrol and Other Recreational Protective Service Workers	553	595	42	8%	17
First-Line Supervisors of Fire Fighting and Prevention Workers	217	231	14	6%	14
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	232	273	41	18%	13
Private Detectives and Investigators	337	341	4	1%	12
First-Line Supervisors of Protective Service Workers, All Other	312	330	18	6%	12
Forensic Science Technicians	143	166	23	16%	11

Wages

The three highest hourly wages in the protective services industry are earned by first-line supervisor occupations (Exhibit 58).

Three occupations have entry-level wages below the average living wage for a single adult in the subregion: emergency medical technicians and paramedics; ambulance drivers and attendants, except emergency medical technicians; and lifeguards, ski patrol and other recreational protective service workers.

Exhibit 58: Protective services wages

Occupation	Pct. 10 Hourly Earnings	Median Hourly Earnings
First-Line Supervisors of Correctional Officers	\$38.88	\$52.07
First-Line Supervisors of Police and Detectives	\$35.83	\$64.20
First-Line Supervisors of Fire Fighting and Prevention Workers	\$33.25	\$49.08
Detectives and Criminal Investigators	\$31.09	\$49.92
Correctional Officers and Jailers	\$25.80	\$39.98
Police and Sheriff's Patrol Officers	\$22.96	\$32.66
Forensic Science Technicians	\$18.55	\$27.37
Private Detectives and Investigators	\$18.15	\$30.96
Firefighters	\$17.44	\$28.94
First-Line Supervisors of Protective Service Workers, All Other	\$16.38	\$25.38
Police, Fire and Ambulance Dispatchers	\$15.23	\$22.34
Emergency Medical Technicians and Paramedics	\$11.20	\$15.73
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	\$9.76	\$11.92
Protective Service Workers, All Other	\$9.65	\$13.32
Lifeguards, Ski Patrol and Other Recreational Protective Service Workers	\$9.50	\$11.11

Education Level

Exhibit 59 shows education levels required for occupations that fall within the protective services industry. Only three of the occupations typically require a community college education; however, all but two require formal (academy) training certifications.

Exhibit 59: Protective services education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Correctional Officers and Jailers	High school diploma or equivalent	None	Moderate-term	52.4%
Police and Sheriff's Patrol Officers	High school diploma or equivalent	None	Moderate-term	51.6%
Firefighters	Postsecondary nondegree award	None	Long-term	63.6%
Emergency Medical Technicians and Paramedics	Postsecondary nondegree award	None	None	68.3%
First-Line Supervisors of Correctional Officers	High school diploma or equivalent	Less than 5 years	Moderate-term	46.3%
Protective Service Workers, All Other	High school diploma or equivalent	None	Short-term	36.4%
Detectives and Criminal Investigators	High school diploma or equivalent	Less than 5 years	Moderate-term	35.2%
First-Line Supervisors of Police and Detectives	High school diploma or equivalent	Less than 5 years	Moderate-term	43.4%
Police, Fire and Ambulance Dispatchers	High school diploma or equivalent	None	Moderate-term	47.6%
Lifeguards, Ski Patrol and Other Recreational Protective Service Workers	No formal educational credential	None	Short-term	36.4%
First-Line Supervisors of Fire Fighting and Prevention Workers	Postsecondary nondegree award	Less than 5 years	Moderate-term	59.2%
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	High school diploma or equivalent	None	Moderate-term	38.2%
Private Detectives and Investigators	High school diploma or equivalent	Less than 5 years	Moderate-term	32.1%
First-Line Supervisors of Protective Service Workers, All Other	High school diploma or equivalent	Less than 5 years	None	43.1%
Forensic Science Technicians	Bachelor's degree	None	Moderate-term	33.9%

Community College Supply

Exhibit 60 shows annual job openings and corresponding program titles with student completion data.

Exhibit 60: Protective services community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Correctional Officers and Jailers (33-3012)	464	Corrections - 210510	139	6
		Probation and Parole - 210520	-	-
Police and Sheriff's Patrol Officers (33-3051)	211	Administration of Justice - 210500	624	85
		Police Academy - 210550	-	113
Firefighters (33-2011)	94	Fire Technology - 213300	40	21
		Wildland Fire Technology - 213310	1	3
		Fire Academy - 213350	-	86
Emergency Medical Technicians and Paramedics (29-2041)	66	Emergency Medical Services - 125000	-	158
		Paramedic - 125100	1	4
First-Line Supervisors of Correctional Officers (33-1011)	59	Corrections - 210510	139	6
		Probation and Parole - 210520	-	-
Protective Service Workers, All Other (33-9099)	37	No Corresponding Programs		
Detectives and Criminal Investigators (33-3021)	31	Administration of Justice - 210500	624	85
		Police Academy - 210550	-	113
First-Line Supervisors of Police and Detectives (33-1012)	26	Corrections - 210510	139	6
Police, Fire and Ambulance Dispatchers (43-5031)	19	No Corresponding Programs		
Lifeguards, Ski Patrol and Other Recreational Protective Service Workers (33-9092)	17	No Corresponding Programs		
First-Line Supervisors of Fire Fighting and Prevention Workers (33-1021)	14	Fire Technology - 213300	40	21
Ambulance Drivers and Attendants, Except Emergency Medical Technicians (53-3011)	13	No Corresponding Programs		
Private Detectives and Investigators (33-9021)	12	Administration of Justice - 210500	624	85

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
		Police Academy - 210550	-	113
First-Line Supervisors of Protective Service Workers, All Other (33-1099)	12	No Corresponding Programs		
Forensic Science Technicians (19-4092)	11	Forensics, Evidence and Investigation - 210540	34	4

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



ICT/DIGITAL MEDIA

Current & Projected Employment

Within the ICT/digital media industry, wired telecommunications is projected to produce the greatest number of new jobs in the next five years, resulting in nearly 900 new positions by 2021, a 35% growth rate (Exhibit 61). Radio and television broadcasting will expand by 8%, creating 135 new jobs. Specialized design services will undergo strong growth, 12%, adding 92 new jobs.

Several ICT/digital media business types will contract in the South Central Valley/Southern Mother Lode Subregion by 2021. Newspaper, periodical, book and directory publishers will decline by 18%, shedding more than 200 jobs. Cable and other subscription programming will be reduced by 24%, a loss of 118 jobs. And wireless telecommunications carriers (except satellite) will shrink by 40%, eliminating 97 positions.

Exhibit 61: ICT/digital media current and projected employment

Description	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Wired Telecommunications Carriers (5171)	2,524	3,416	892	35%	76
Computer Systems Design and Related Services (5415)	2,523	2,530	7	0%	248
Radio and Television Broadcasting (5151)	1,794	1,929	135	8%	57
Motion Picture and Video Industries (5121)	998	1,067	69	7%	44
Specialized Design Services (5414)	782	874	92	12%	56
Data Processing, Hosting and Related Services (5182)	418	428	10	2%	12
Software Publishers (5112)	348	441	93	27%	13

Industry Staffing Patterns

Telecommunications equipment installers and repairers, except line installers is the largest occupation with the greatest number of job gains projected at the industry level in the next five years (Exhibit 62).

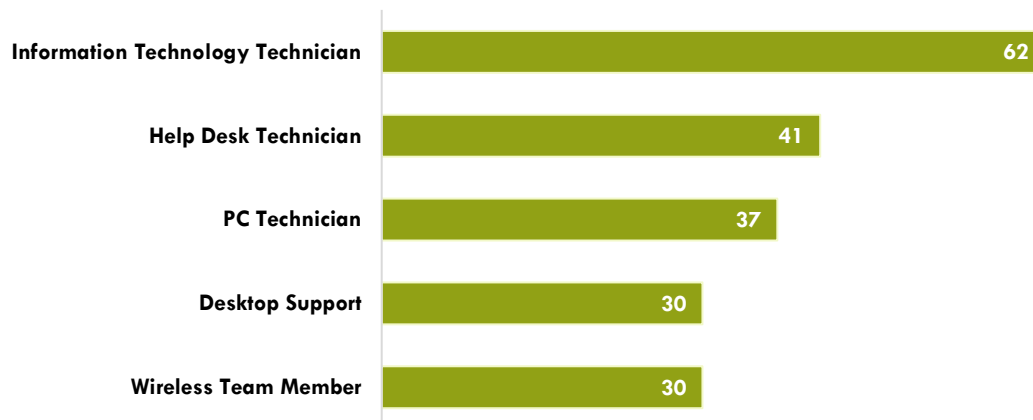
Exhibit 62: ICT/digital media staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	963	1,191	228	24%
49-9052	Telecommunications Line Installers and Repairers	425	502	77	18%
15-1151	Computer User Support Specialists	317	345	28	9%
15-1152	Computer Network Support Specialists	119	139	20	17%
15-1142	Network and Computer Systems Administrators	176	193	17	10%
27-1024	Graphic Designers	369	384	15	4%
15-1143	Computer Network Architects	99	110	11	11%

Job Postings

An analysis of job posting data for the seven staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 63 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 63: ICT/digital media job postings



Skills

The top baseline skills from the occupational and industry perspectives are identical with troubleshooting, communication and writing skills as the top three (Exhibit 64).

Exhibit 64: ICT/digital media baseline skills

Occupational Cluster		Industry: Computer & Mathematical	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Troubleshooting	545	Communication Skills	1038
Communication Skills	338	Troubleshooting	886
Writing	249	Writing	806
Problem Solving	220	Planning	666
Planning	171	Problem Solving	595

Exhibit 65 shows specialized skills commonly listed in job ads. Technical support, system administration and customer service are highly ranked.

Exhibit 65: ICT/digital media specialized skills

Occupational Cluster		Industry: Computer & Mathematical	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Technical Support	349	Technical Support	559
System Administration	292	SQL	518
Hardware and Software Installation	226	Microsoft Office	500
Repair	225	Customer Service	433
Customer Service	205	System Administration	429

Top software skills for jobs related to ICT/digital media are shown in Exhibit 66. The top three requested skills that are shared between the two tables are Microsoft Office, Windows and SQL.

Exhibit 66: ICT/digital media specialized skills

Occupational Cluster		Industry: Computer & Mathematical	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Office	193	SQL	518
Microsoft Windows	186	Microsoft Office	500
Microsoft Operating Systems	107	Microsoft Excel	357
Windows Server	106	Microsoft Windows	262
SQL	101	Oracle	240

Occupational Demand Projections

Computer user support specialists is the largest occupation and has the greatest projected five-year gain, 221 new jobs by 2021 with 75 annual openings (Exhibit 67). Telecommunications equipment installers and repairers (except line installers) has the next highest gain projection, 268 new jobs with 69 annual openings, followed by network and system administrators, 95 new jobs with 36 annual openings.

Exhibit 67: ICT/digital media occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Computer User Support Specialists	2,229	2,450	221	10%	75
Telecommunications Equipment Installers and Repairers, Except Line Installers	1,463	1,731	268	18%	69
Network and Computer Systems Administrators	1,247	1,342	95	8%	36
Graphic Designers	1,036	1,063	27	3%	32
Computer Network Support Specialists	560	623	63	11%	20
Computer Occupations, All Other	1,024	1,047	23	2%	19
Audio and Video Equipment Technicians	408	453	45	11%	17
Computer, Automated Teller and Office Machine Repairers	432	441	9	2%	15
Web Developers	416	457	41	10%	14
Computer Network Architects	356	387	31	9%	11

Wages

The highest occupational hourly wages are earned by computer network architects, computer occupations (all other) and network and computer systems administrators (Exhibit 68). All the listed occupations have wages above the subregion's average living wage for a single adult except audio and video equipment technicians.

Exhibit 68: ICT/digital media wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Computer Network Architects	\$29.46	\$49.79
Computer Occupations, All Other	\$25.03	\$38.67
Network and Computer Systems Administrators	\$22.32	\$36.15
Computer Network Support Specialists	\$16.92	\$30.45
Telecommunications Equipment Installers and Repairers, Except Line Installers	\$15.80	\$26.27
Web Developers	\$15.48	\$22.64
Computer User Support Specialists	\$14.14	\$22.61
Graphic Designers	\$13.28	\$19.96
Computer, Automated Teller, and Office Machine Repairers	\$13.18	\$17.55
Audio and Video Equipment Technicians	\$10.17	\$17.62

Education Level

Exhibit 69 shows education levels required for occupations that fall within the ICT/digital media industry. Network and computer systems administrators, graphic designers and computer occupations (all other) and computer network architects have a typical entry-level education of a bachelor's degree. Three of the occupations below meet the 33.3% threshold on the CPS for being community college relevant. All the remaining ICT/digital media occupations have typical education levels at the community college level.

Exhibit 69: ICT/digital media education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Computer User Support Specialists	Some college, no degree	None	None	45.2%
Telecommunications Equipment Installers and Repairers, Except Line Installers	Postsecondary nondegree award	None	Moderate-term	52.8%
Network and Computer Systems Administrators	Bachelor's degree	None	None	39.5%
Graphic Designers	Bachelor's degree	None	None	30.3%
Computer Network Support Specialists	Associate degree	None	None	45.2%
Computer Occupations, All Other	Bachelor's degree	None	None	36.9%
Audio and Video Equipment Technicians	Postsecondary nondegree award	None	Short-term	44.6%
Computer, Automated Teller and Office Machine Repairers	Some college, no degree	None	Short-term	53.1%
Web Developers	Associate degree	None	None	27.2%
Computer Network Architects	Bachelor's degree	5 years or more	None	37.0%

Community College Supply

Exhibit 70 shows annual job openings and corresponding program titles with student completion data.

Exhibit 70: ICT/digital media community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Computer User Support Specialists (15-1151)	75	Computer Information Systems - 070200	32	55
		Computer Support - 070820	22	-
Telecommunications Equipment Installers and Repairers, Except Line Installers (49-2022)	69	Telecommunications Technology - 093430	-	17
Network and Computer Systems Administrators (15-1142)	36	Computer Infrastructure and Support - 070800	-	11
Graphic Designers (27-1024)	32	Digital Media - 061400	-	2
		Computer Graphics and Digital Imagery - 061460	-	-
		Applied Design - 100900	-	-
		Commercial Art - 101300	-	-
		Graphic Art and Design - 103000	21	18
Computer Network Support Specialists (15-1152)	20	Computer Science (Transfer) - 070600	12	-
		Computer Systems Analysis - 070730	-	-
		Computer Infrastructure and Support - 070800	-	11
		Computer Networking - 070810	50	56
		Computer Support - 070820	22	-
Computer Occupations, All Other (15-1199)	19	Electronic Game Design - 061420	-	-
		Information Technology, General - 070100	30	12
		Computer Information Systems - 070200	32	55
		Computer Science (Transfer) - 070600	12	-
		Other Information Technology - 079900	-	-
		Geographic Information Systems - 220610	-	-
Audio and Video Equipment Technicians (27-4011)	17	Commercial Music - 100500	3	3

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Computer, Automated Teller and Office Machine Repairers (49-2011)	15	Computer Electronics - 093410	-	5
Web Developers (15-1134)	14	Website Design and Development - 061430	7	22
		Computer Science (Transfer) - 070600	12	-
		Computer Software Development - 070700	-	-
		Computer Programming - 070710	1	0
		World Wide Web Administration - 070900	1	1
		E-Commerce (Technology Emphasis) - 070910	-	-
Computer Network Architects (15-1143)	11	Computer Systems Analysis - 070730	-	-
		Computer Infrastructure and Support - 070800	-	11
		Computer Networking - 070810	50	56

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

HEALTH CARE

Current & Projected Employment

Of all the industries analyzed, the health care industry is expected to offer the most employment opportunities in the South Central Valley/Southern Mother Lode Subregion over the next five years. Overall, more than 22,400 new jobs are anticipated. Individual and family services will create the greatest number of new jobs, 10,019 by 2021, with a growth rate of 32% (Exhibit 71).

Another job generator will be general medical and surgical hospitals, which will expand by 11%, a gain of nearly 3,000 jobs.

Outpatient care centers will undergo rapid growth. This industry type also has a 36% growth rate and will add nearly 2,400 positions in the subregion by 2021.

Offices of physicians will increase by 11%, adding 1,758 jobs, and nursing care facilities (skilled nursing facilities) will grow by the same rate, adding 859 positions.

Also noteworthy are offices of other health practitioners, which will add more than 1,200 jobs, a 25% growth rate, and continuing care retirement communities and assisted living facilities for the elderly, which will add more than 1,000 jobs, representing 23% growth.

Exhibit 71: Health care current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Individual and Family Services (6241)	30,878	40,897	10,019	32%	23,146
General Medical and Surgical Hospitals (6221)	25,920	28,866	2,946	11%	57
Offices of Physicians (6211)	16,258	18,016	1,758	11%	1,746
Nursing Care Facilities (Skilled Nursing Facilities) (6231)	7,682	8,541	859	11%	96
Outpatient Care Centers (6214)	6,569	8,966	2,397	36%	234
Offices of Dentists (6212)	5,856	6,296	440	8%	821
Offices of Other Health Practitioners (6213)	4,872	6,108	1,236	25%	561
Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly (6233)	4,328	5,344	1,016	23%	189
Home Health Care Services (6216)	3,195	4,078	883	28%	108

Industry Staffing Patterns

The occupation of registered nurses is the largest in the health care industry, with 12,843 jobs (Exhibit 72). This occupation also has the greatest projected five-year change in the industry, 2,161 new jobs. Home health aides has the next greatest growth projection, 1,333 new jobs. The nursing assistants occupation had 6,044 jobs in 2016 and more than 1,100 new jobs projected by 2021.

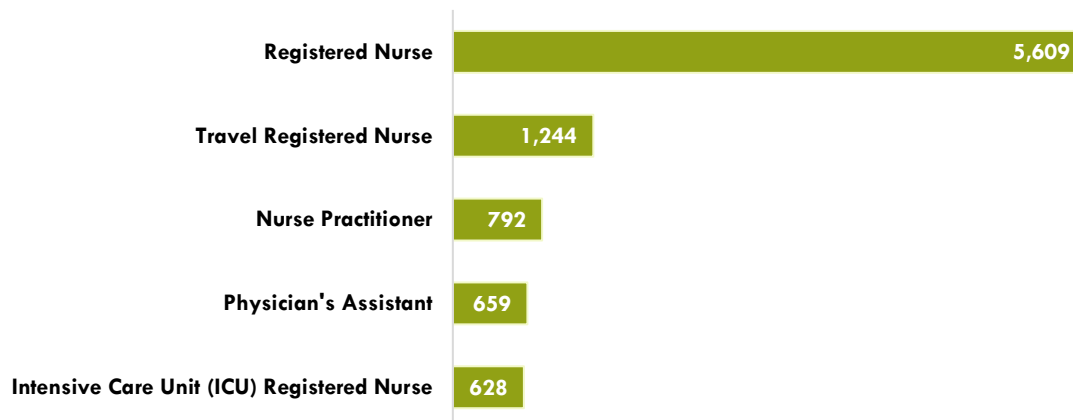
Exhibit 72: Health care staffing patterns

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
29-1141	Registered Nurses	12,843	15,004	2,161	17%
31-1011	Home Health Aides	2,081	3,414	1,333	64%
31-1014	Nursing Assistants	6,044	7,176	1,132	19%
31-9092	Medical Assistants	5,017	5,725	708	14%
29-2061	Licensed Practical and Licensed Vocational Nurses	3,275	3,798	523	16%
43-6013	Medical Secretaries	3,346	3,817	471	14%
31-9091	Dental Assistants	2,576	2,778	202	8%
29-2041	Emergency Medical Technicians and Paramedics	926	1,109	183	20%
29-2071	Medical Records and Health Information Technicians	899	1,022	123	14%
29-2012	Medical and Clinical Laboratory Technicians	702	821	119	17%
29-2034	Radiologic Technologists	818	933	115	14%
31-9097	Phlebotomists	759	869	110	14%
29-2021	Dental Hygienists	866	955	89	10%
29-2055	Surgical Technologists	507	595	88	17%
29-2011	Medical and Clinical Laboratory Technologists	464	551	87	19%
29-1126	Respiratory Therapists	676	758	82	12%
31-2022	Physical Therapist Aides	379	447	68	18%
31-9099	Healthcare Support Workers, All Other	480	545	65	14%
29-2081	Opticians, Dispensing	211	274	63	30%
29-2057	Ophthalmic Medical Technicians	473	535	62	13%
31-2021	Physical Therapist Assistants	173	234	61	35%
29-2052	Pharmacy Technicians	420	479	59	14%
29-2032	Diagnostic Medical Sonographers	259	315	56	22%
29-2053	Psychiatric Technicians	461	506	45	10%
31-9093	Medical Equipment Preparers	284	326	42	15%
29-2031	Cardiovascular Technologists and Technicians	177	215	38	21%
53-3011	Ambulance Drivers and Attendants, Except Emergency Medical Technicians	173	205	32	18%
31-2011	Occupational Therapy Assistants	72	101	29	40%
29-9099	Healthcare Practitioners and Technical Workers, All Other	155	183	28	18%
31-1015	Orderlies	203	231	28	14%
31-1013	Psychiatric Aides	95	118	23	24%
29-2051	Dietetic Technicians	168	190	22	13%
29-2035	Magnetic Resonance Imaging Technologists	116	134	18	16%
31-9011	Massage Therapists	82	98	16	20%

Job Postings

An analysis of job posting data for the 34 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 73 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 73: Health care job postings



Skills

The following tables show the most commonly requested baseline, specialized and software skills sought by health care employers in job postings in the subregion. The two tables contain the same top five skills with communication skills and English in top spots (Exhibit 74).

Exhibit 74: Health care baseline skills

Occupational Cluster		Industry: Health Care	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	1 595	Communication Skills	2100
English	982	English	1294
Computer Skills	925	Team Work/Collaboration	1181
Planning	904	Planning	1163
Team Work/Collaboration	819	Computer Skills	1145

Exhibit 75 shows specialized skills commonly listed by health care employers. The industry-level software skills data mirrors that in the occupational analysis table. Patient care is the most highly ranked skill overall.

Exhibit 75: Health care specialized skills

Occupational Cluster		Industry: Health Care	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Patient Care	2653	Patient Care	3317
Advanced Cardiac Life Support (ACLS)	1498	Treatment Planning	1909
Cardiopulmonary Resuscitation (CPR)	1345	Cardiopulmonary Resuscitation (CPR)	1811
Treatment Planning	1082	Advanced Cardiac Life Support (ACLS)	1625
Acute Care	1035	Acute Care	1235

Top software skills for jobs related to health care are shown in Exhibit 76. The top three requested skills are Microsoft Excel, Word and Office.

Exhibit 76: Health care software skills

Occupational Cluster		Industry: Health Care	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	298	Microsoft Excel	378
Microsoft Word	279	Microsoft Word	357
Microsoft Office	212	Microsoft Office	282
Microsoft Windows	106	Microsoft SharePoint	250
ICD-10	90	Microsoft Windows	156

Occupational Demand Projections

The three largest health care occupations are: registered nurses with 17,233 jobs and 2,517 new jobs projected by 2021; nursing assistants, with 7,105 jobs and 1,222 new jobs; and home health aides, 2,186 jobs and 1,349 new jobs (Exhibit 77).

Exhibit 77: Health care occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Registered Nurses	17,233	19,750	2,517	15%	953
Nursing Assistants	7,105	8,327	1,222	17%	425
Home Health Aides	2,186	3,535	1,349	62%	343
Medical Assistants	5,536	6,287	751	14%	277
Licensed Practical and Licensed Vocational Nurses	4,193	4,752	559	13%	242
Medical Secretaries	3,986	4,489	503	13%	147
Dental Assistants	2,769	2,982	213	8%	115
Pharmacy Technicians	2,279	2,491	212	9%	67
Medical Records and Health Information Technicians	1,239	1,382	143	12%	59
Medical and Clinical Laboratory Technicians	866	997	131	15%	49
Radiologic Technologists	1,053	1,178	125	12%	47
Phlebotomists	887	1,010	123	14%	45
Respiratory Therapists	866	963	97	11%	42
Medical and Clinical Laboratory Technologists	659	762	103	16%	38
Healthcare Support Workers, All Other	862	947	85	10%	36
Dental Hygienists	901	994	93	10%	35
Opticians, Dispensing	377	486	109	29%	34
Physical Therapist Aides	441	512	71	16%	28
Psychiatric Technicians	1,411	1,394	-17	-1%	27
Surgical Technologists	613	710	97	16%	26
Massage Therapists	738	834	96	13%	25
Physical Therapist Assistants	208	273	65	31%	20
Diagnostic Medical Sonographers	305	367	62	20%	19
Ophthalmic Medical Technicians	493	557	64	13%	18
Medical Equipment Preparers	364	413	49	13%	18
Psychiatric Aides	191	251	60	31%	17
Pharmacy Aides	575	590	15	3%	16
Cardiovascular Technologists and Technicians	236	281	45	19%	14
Orderlies	254	288	34	13%	13
Veterinary Technologists and Technicians	367	412	45	12%	13
Healthcare Practitioners and Technical Workers, All Other	274	305	31	11%	12
Occupational Therapy Assistants	85	117	32	38%	9
Medical Transcriptionists	286	296	10	3%	9

Wages

The highest occupational hourly wages are earned by registered nurses, dental hygienists and medical and clinical laboratory technologists (Exhibit 78). However, 10 of the health care occupations have entry-level wages that fall below the subregion's average living wage for one adult, \$11.32/hour.

Exhibit 78: Health care wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Registered Nurses	\$30.68	\$40.85
Dental Hygienists	\$29.39	\$41.48
Medical and Clinical Laboratory Technologists	\$29.17	\$42.53
Diagnostic Medical Sonographers	\$26.20	\$41.64
Respiratory Therapists	\$25.26	\$35.99
Physical Therapist Assistants	\$22.14	\$32.68
Radiologic Technologists	\$21.91	\$34.59
Psychiatric Technicians	\$21.07	\$27.82
Surgical Technologists	\$20.21	\$27.05
Licensed Practical and Licensed Vocational Nurses	\$18.98	\$24.24
Occupational Therapy Assistants	\$17.85	\$26.96
Cardiovascular Technologists and Technicians	\$16.83	\$28.39
Healthcare Practitioners and Technical Workers, All Other	\$16.27	\$26.16
Medical and Clinical Laboratory Technicians	\$14.93	\$21.62
Medical Equipment Preparers	\$13.78	\$18.15
Opticians, Dispensing	\$13.41	\$19.24
Healthcare Support Workers, All Other	\$13.40	\$19.59
Medical Transcriptionists	\$12.51	\$18.77
Pharmacy Technicians	\$12.33	\$17.26
Medical Records and Health Information Technicians	\$11.73	\$17.96
Phlebotomists	\$11.55	\$16.17
Orderlies	\$11.45	\$15.68
Ophthalmic Medical Technicians	\$11.44	\$16.73
Veterinary Technologists and Technicians	\$10.57	\$13.88
Dental Assistants	\$10.55	\$15.24
Medical Secretaries	\$10.55	\$15.54
Medical Assistants	\$10.38	\$14.27
Massage Therapists	\$10.36	\$13.45
Psychiatric Aides	\$9.91	\$12.15
Physical Therapist Aides	\$9.89	\$12.71
Pharmacy Aides	\$9.78	\$13.24
Nursing Assistants	\$9.55	\$12.14
Home Health Aides	\$9.21	\$10.43

Education Level

Exhibit 79 shows education levels required for occupations that fall within the health care industry. Although registered nurses at the national level have a typical education level of a bachelor's degree, California only requires an associate degree. Nearly two-thirds of the health care occupations typically require community college education. Most of the remaining occupations that indicate no formal educational credential or a high school diploma/equivalent do require some formal training and an accompanying third-party certification.

Exhibit 79: Health care education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Registered Nurses	Bachelor's degree	None	None	42.1%
Nursing Assistants	Postsecondary nondegree award	None	None	41.7%
Home Health Aides	No formal educational credential	None	Short-term	41.7%
Medical Assistants	Postsecondary nondegree award	None	None	65%
Licensed Practical and Licensed Vocational Nurses	Postsecondary nondegree award	None	None	74.1%
Medical Secretaries	High school diploma or equivalent	None	Moderate-term	47.5%
Dental Assistants	Postsecondary nondegree award	None	None	58.3%
Pharmacy Technicians	High school diploma or equivalent	None	Moderate-term	56.4%
Medical Records and Health Information Technicians	Postsecondary nondegree award	None	None	54.9%
Medical and Clinical Laboratory Technicians	Associate degree	None	None	36.2%
Radiologic Technologists	Associate degree	None	None	66.1%
Phlebotomists	Postsecondary nondegree award	None	None	61.1%
Respiratory Therapists	Associate degree	None	None	69.9%
Medical and Clinical Laboratory Technologists	Bachelor's degree	None	None	36.2%
Healthcare Support Workers, All Other	High school diploma or equivalent	None	None	38.1%
Dental Hygienists	Associate degree	None	None	60.8%
Opticians, Dispensing	High school diploma or equivalent	None	Long-term	56.1%
Physical Therapist Aides	High school diploma or equivalent	None	Short-term	70.9%
Psychiatric Technicians	Postsecondary nondegree award	Less than 5 years	Short-term	56.4%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Surgical Technologists	Postsecondary nondegree award	None	None	56.4%
Massage Therapists	Postsecondary nondegree award	None	None	54%
Physical Therapist Assistants	Associate degree	None	None	70.9%
Diagnostic Medical Sonographers	Associate degree	None	None	66.1%
Ophthalmic Medical Technicians	Postsecondary nondegree award	None	None	56.4%
Medical Equipment Preparers	High school diploma or equivalent	None	Moderate-term	38.1%
Psychiatric Aides	High school diploma or equivalent	None	Short-term	41.7%
Pharmacy Aides	High school diploma or equivalent	None	Short-term	50.3%
Cardiovascular Technologists and Technicians	Associate degree	None	None	66.1%
Orderlies	High school diploma or equivalent	None	Short-term	41.7%
Veterinary Technologists and Technicians	Associate degree	None	None	56.4%
Healthcare Practitioners and Technical Workers, All Other	Postsecondary nondegree award	None	None	27.3%
Occupational Therapy Assistants	Associate degree	None	None	85.6%
Medical Transcriptionists	Postsecondary nondegree award	None	None	60.9%

Community College Supply

Exhibit 80 shows annual job openings and corresponding program titles with student completion data.

Exhibit 80: Health care community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Registered Nurses (29-1141)	953	Nursing - 123000	-	-
		Registered Nursing - 123010	628	7
Nursing Assistants (31-1014)	425	Health Occupations, General - 120100	42	-
		School Health Clerk - 122400	-	-
		Nursing - 123000	-	-
		Certified Nurse Assistant - 123030	-	191
Home Health Aides (31-1011)	343	Health Occupations, General - 120100	42	-
		Nursing - 123000	-	-
		Home Health Aide - 123080	-	-
		Gerontology - 130900	-	-
Medical Assistants (31-9092)	277	Medical Assisting - 120800	716	1,827
		Clinical Medical Assisting - 120810	15	10
Licensed Practical and Licensed Vocational Nurses (29-2061)	242	Nursing - 123000	-	-
		Licensed Vocational Nursing - 123020	50	221
Medical Secretaries (43-6013)	147	Medical Office Technology - 051420	36	95
		Administrative Medical Assisting - 120820	-	7
Dental Assistants (31-9091)	115	Dental Occupations - 124000	-	-
		Dental Assistant - 124010	49	384
Pharmacy Technicians (29-2052)	67	Pharmacy Technology - 122100	223	228
Medical Records and Health Information Technicians (29-2071)	59	Health Information Technology - 122300	7	-
		Health Information Coding - 122310	20	120
Medical and Clinical Laboratory Technicians (29-2012)	49	Biotechnology and Biomedical Technology - 043000	-	-
		Laboratory Science Technology - 095500	-	-
		Medical Laboratory Technology - 120500	-	-
Radiologic Technologists (29-2034)	47	Radiologic Technology - 122500	48	14
Phlebotomists (31-9097)	45	Phlebotomy - 120510	-	14

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Respiratory Therapists (29-1126)	42	Respiratory Care/Therapy - 121000	176	-
Medical and Clinical Laboratory Technologists (29-2011)	38	Electron Microscopy - 093470	-	-
Healthcare Support Workers, All Other (31-9099)	36	Health Facility Unit Coordinator - 120830	-	-
		Speech/Language Pathology and Audiology - 122000	-	-
Dental Hygienists (29-2021)	35	Dental Occupations - 124000	-	-
		Dental Hygienist - 124020	98	18
Opticians, Dispensing (29-2081)	34	No Corresponding Programs		
Physical Therapist Aides (31-2022)	28	No Corresponding Programs		
Psychiatric Technicians (29-2053)	27	Psychiatric Technician - 123900	39	105
Surgical Technologists (29-2055)	26	Surgical Technician - 121700	25	0
Massage Therapists (31-9011)	25	Massage Therapy - 126200	7	119
Physical Therapist Assistants (31-2021)	20	Physical Therapist Assistant - 122200	22	-
Diagnostic Medical Sonographers (29-2032)	19	Diagnostic Medical Sonography - 122700	9	-
Ophthalmic Medical Technicians (29-2057)	18	Optical Technology - 121900	-	-
Medical Equipment Preparers (31-9093)	18	Hospital Central Service Technician - 120900	-	-
Psychiatric Aides (31-1013)	17	Psychiatric Technician - 123900	39	105
Pharmacy Aides (31-9095)	16	No Corresponding Programs		
Cardiovascular Technologists and Technicians (29-2031)	14	Cardiovascular Technician - 121300	-	3
		Electrocardiography - 121500	-	-
Orderlies (31-1015)	13	No Corresponding Programs		
Veterinary Technologists and Technicians (29-2056)	13	Veterinary Technician (Licensed) - 010210	38	1
Healthcare Practitioners and Technical Workers, All Other (29-9099)	12	No Corresponding Programs		
Occupational Therapy Assistants (31-2011)	9	Occupational Therapy Technology - 121800	-	-
Medical Transcriptionists (31-9094)	9	Medical Office Technology - 051420	36	95

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
		Administrative Medical Assisting - 120820	-	7
		Health Information Coding - 122310	20	120
Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC				



MANUFACTURING

Current & Projected Employment

With the manufacturing industry projected to generate approximately 3,483 new jobs by 2021, animal slaughtering will account for a significant portion of the industry's job creation, growing by 13%, adding 1,000 jobs (Exhibit 81).

The business type comprising other food manufacturing is projected to add 738 jobs, growing by 12%.

Additional business types that will each create more than 200 new jobs over the next five years in the subregion include: converted paper product manufacturing (283 new jobs) and beverage manufacturing (246 new jobs).

Business types that are expected to contract in the South Central Valley/Southern Mother Lode Subregion include communications equipment manufacturing (the loss of 401 jobs), printing and related support activities (the loss of 194 jobs), bakeries and tortilla manufacturers (the loss of 109 jobs), and fruit and vegetable preserving and specialty food manufacturing (the loss of 101 jobs).

Exhibit 81: Manufacturing current and projected employment

Description (NAICS)	2016 Jobs	2021 Jobs	5-Year Change	5-Year % Change	# of Firms
Animal Slaughtering and Processing (3116)	7,753	8,753	1,000	13%	60
Other Food Manufacturing (3119)	5,964	6,702	738	12%	34
Dairy Product Manufacturing (3115)	5,434	5,622	188	3%	32
Beverage Manufacturing (3121)	2,373	2,619	246	10%	83
Plastics Product Manufacturing (3261)	2,267	2,309	42	2%	42
Converted Paper Product Manufacturing (3222)	2,164	2,447	283	13%	26
Other General Purpose Machinery Manufacturing (3339)	1,647	1,684	37	2%	42
Architectural and Structural Metals Manufacturing (3323)	1,620	1,716	96	6%	57
Agriculture, Construction and Mining Machinery Manufacturing (3331)	1,363	1,483	120	9%	54
Other Wood Product Manufacturing (3219)	1,253	1,296	43	3%	40
Petroleum and Coal Products Manufacturing (3241)	1,050	1,142	92	9%	30
Animal Food Manufacturing (3111)	971	1,045	74	8%	34
Glass and Glass Product Manufacturing (3272)	872	992	120	14%	7

Industry Staffing Patterns

The industrial machinery mechanics occupation has the strongest industry-level growth projection, 192 new jobs by 2021 (Exhibit 82). This is followed by packaging and filling machine operators and tenders, and team assemblers.

Exhibit 82: Manufacturing staffing patterns

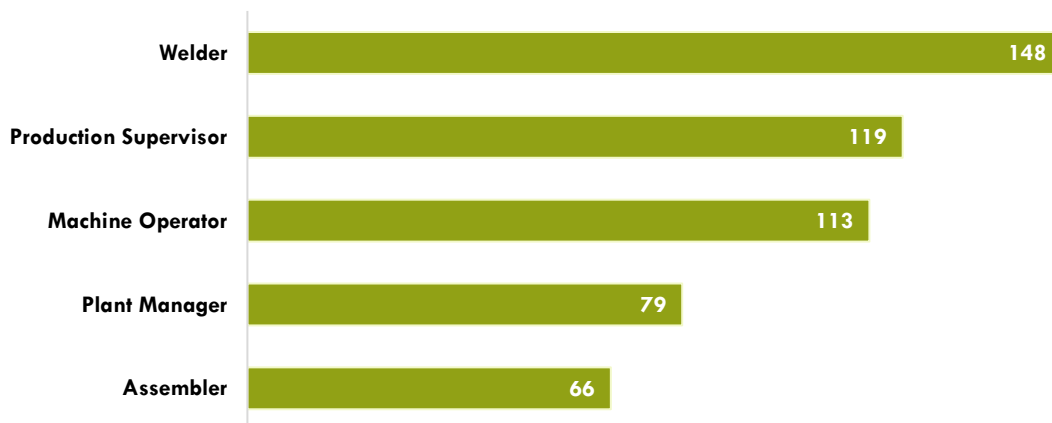
SOC	Description	Employment 2016	2021	5-Year Change	5-Year % Change
49-9041	Industrial Machinery Mechanics	1,283	1,475	192	15%
51-9111	Packaging and Filling Machine Operators and Tenders	2,680	2,857	177	7%
51-2092	Team Assemblers	1,980	2,127	147	7%
51-1011	First-Line Supervisors of Production and Operating Workers	2,067	2,190	123	6%
51-3092	Food Batchmakers	1,604	1,706	102	6%
51-9061	Inspectors, Testers, Sorters, Samplers and Weighers	1,693	1,783	90	5%
49-9071	Maintenance and Repair Workers, General	1,097	1,173	76	7%
51-4121	Welders, Cutters, Solderers and Brazers	1,124	1,197	73	6%
51-9023	Mixing and Blending Machine Setters, Operators and Tenders	509	562	53	10%
51-9196	Paper Goods Machine Setters, Operators and Tenders	420	473	53	13%
51-4041	Machinists	958	1,008	50	5%
51-3099	Food Processing Workers, All Other	537	584	47	9%
49-9043	Maintenance Workers, Machinery	457	502	45	10%
51-3093	Food Cooking Machine Operators and Tenders	459	503	44	10%
11-3051	Industrial Production Managers	696	737	41	6%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	225	261	36	16%
51-9199	Production Workers, All Other	407	441	34	8%
51-9012	Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders	728	760	32	4%
51-9121	Coating, Painting and Spraying Machine Setters, Operators and Tenders	203	228	25	12%
51-3021	Butchers and Meat Cutters	176	200	24	14%
51-9011	Chemical Equipment Operators and Tenders	208	232	24	12%
43-5061	Production, Planning and Expediting Clerks	507	530	23	5%
17-3023	Electrical and Electronics Engineering Technicians	190	212	22	12%
49-1011	First-Line Supervisors of Mechanics, Installers and Repairers	303	323	20	7%
51-2099	Assemblers and Fabricators, All Other	292	311	19	7%

SOC	Description	Employment		5-Year Change	5-Year % Change
		2016	2021		
51-8093	Petroleum Pump System Operators, Refinery Operators and Gaugers	140	153	13	9%
51-9192	Cleaning, Washing and Metal Pickling Equipment Operators and Tenders	278	291	13	5%
51-2041	Structural Metal Fabricators and Fitters	227	239	12	5%
51-9041	Extruding, Forming, Pressing and Compacting Machine Setters, Operators and Tenders	197	209	12	6%
19-1012	Food Scientists and Technologists	121	132	11	9%
51-2022	Electrical and Electronic Equipment Assemblers	252	263	11	4%
51-4081	Multiple Machine Tool Setters, Operators and Tenders, Metal and Plastic	104	115	11	11%
51-8091	Chemical Plant and System Operators	107	118	11	10%
51-9021	Crushing, Grinding and Polishing Machine Setters, Operators and Tenders	178	189	11	6%
19-4011	Agricultural and Food Science Technicians	247	257	10	4%
19-4031	Chemical Technicians	97	107	10	10%
47-2111	Electricians	175	185	10	6%
47-2211	Sheet Metal Workers	118	128	10	8%
51-3091	Food and Tobacco Roasting, Baking and Drying Machine Operators and Tenders	453	463	10	2%
51-9141	Semiconductor Processors	36	46	10	28%

Job Postings

An analysis of job posting data for the 41 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 83 details the top five jobs requiring less than a bachelor's degree advertised by employers.

Exhibit 83: Manufacturing job postings



Skills

Physical demand, communication skills and writing are the most commonly listed baseline skills from both perspectives (Exhibit 84). The remaining two of the top five occupational baseline skills include troubleshooting and preventive maintenance. From the industry perspective, English and quality assurance and control are more highly ranked.

Exhibit 84: Manufacturing baseline skills

Occupational Cluster		Industry: Production	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	1008	Communication Skills	474
Troubleshooting	931	Physical Demand	413
Physical Demand	780	English	274
Preventive Maintenance	653	Writing	244
Writing	570	Quality Assurance and Control	229

Repair, inspection, scheduling and supervisory skills are the most commonly listed skills sought by employers in the subregion (Exhibit 85).

Exhibit 85: Manufacturing specialized skills

Occupational Cluster		Industry: Production	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Repair	1710	Inspection	409
Scheduling	697	Repair	329
Inspection	667	Scheduling	308
Machinery	514	Welding	250
Supervisory Skills	512	Supervisory Skills	237

The top five software skills for jobs related to manufacturing are shown in Exhibit 86. The top four skills listed in each table are identical. Once again, the Microsoft Office suite of tools dominates.

Exhibit 86: Manufacturing software skills

Occupational Cluster		Industry: Production	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	374	Microsoft Excel	152
Microsoft Office	369	Microsoft Office	140
Microsoft Word	181	Microsoft Word	73
Microsoft PowerPoint	142	Microsoft PowerPoint	61
SAP	94	Enterprise Resource Planning (ERP)	17

Occupational Demand Projections

Packaging and filling machine operators and tenders is the largest occupation with the greatest projected gain, 434 new jobs by 2021 with 251 annual opening (Exhibit 87). This is followed by industrial machinery mechanics, 404 new jobs with 158 annual openings, and team assemblers ,265 new jobs and 123 annual openings.

Exhibit 87: Manufacturing occupational projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Packaging and Filling Machine Operators and Tenders	4292	4726	434	10%	251
Industrial Machinery Mechanics	2691	3095	404	15%	158
Team Assemblers	3,013	3,278	265	9%	123
Inspectors, Testers, Sorters, Samplers and Weighers	3,031	3,225	194	6%	119
First-Line Supervisors of Mechanics, Installers and Repairers	2845	3073	228	8%	106
First-Line Supervisors of Production and Operating Workers	3365	3588	223	7%	101
Production, Planning and Expediting Clerks	1529	1631	102	7%	64
Food Batchmakers	1754	1866	112	6%	62
Production Workers, All Other	1382	1482	100	7%	52
Industrial Production Managers	1024	1090	66	6%	44
Assemblers and Fabricators, All Other	1,027	1,123	96	9%	44
Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders	944	997	53	6%	42
Maintenance Workers, Machinery	938	1032	94	10%	35
Food Processing Workers, All Other	644	718	74	11%	29
Mixing and Blending Machine Setters, Operators and Tenders	632	699	67	11%	28
Petroleum Pump System Operators, Refinery Operators and Gaugers	399	439	40	10%	24
Cleaning, Washing and Metal Pickling Equipment Operators and Tenders	501	546	45	9%	23
Food Cooking Machine Operators and Tenders	488	536	48	10%	21
Paper Goods Machine Setters, Operators and Tenders	492	551	59	12%	20
Food and Tobacco Roasting, Baking and Drying Machine Operators and Tenders	617	650	33	5%	20
Power Plant Operators	446	390	-56	-13%	19
Computer-Controlled Machine Tool Operators, Metal and Plastic	239	277	38	16%	16
Chemical Equipment Operators and Tenders	269	294	25	9%	14
Extruding, Forming, Pressing and Compacting Machine Setters, Operators and Tenders	220	232	12	5%	11
Molders, Shapers and Casters, Except Metal and Plastic	235	237	2	1%	11

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Gas Plant Operators	102	130	28	27%	10
Tailors, Dressmakers and Custom Sewers	247	249	2	1%	10
Coating, Painting and Spraying Machine Setters, Operators and Tenders	248	274	26	10%	10
Printing Press Operators	520	497	-23	-4%	10



Wages

The highest occupational hourly wages are earned by industrial production managers and first-line supervisors of mechanics, installers and repairers (Exhibit 88). More than 40 percent of the occupations, however, have entry-level wages below the subregion's average living wage for a single adult.

Exhibit 88: Manufacturing wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Gas Plant Operators	\$25.86	\$34.31
Industrial Production Managers	\$24.52	\$41.87
Power Plant Operators	\$22.56	\$33.77
First-Line Supervisors of Mechanics, Installers and Repairers	\$19.89	\$33.32
Petroleum Pump System Operators, Refinery Operators and Gaugers	\$18.38	\$32.91
Industrial Machinery Mechanics	\$16.00	\$23.65
First-Line Supervisors of Production and Operating Workers	\$14.95	\$25.21
Production, Planning and Expediting Clerks	\$13.41	\$23.50
Computer-Controlled Machine Tool Operators, Metal and Plastic	\$12.90	\$19.09
Maintenance Workers, Machinery	\$12.43	\$18.29
Molders, Shapers and Casters, Except Metal and Plastic	\$11.80	\$14.62
Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders	\$11.68	\$18.65
Tailors, Dressmakers and Custom Sewers	\$11.03	\$13.16
Printing Press Operators	\$10.93	\$16.28
Chemical Equipment Operators and Tenders	\$10.91	\$15.79
Mixing and Blending Machine Setters, Operators and Tenders	\$10.86	\$15.67
Coating, Painting, and Spraying Machine Setters, Operators and Tenders	\$10.65	\$14.59
Paper Goods Machine Setters, Operators and Tenders	\$10.13	\$14.69
Inspectors, Testers, Sorters, Samplers and Weighers	\$9.95	\$16.23
Team Assemblers	\$9.88	\$13.11
Food Cooking Machine Operators and Tenders	\$9.85	\$13.38
Production Workers, All Other	\$9.81	\$11.89
Extruding, Forming, Pressing and Compacting Machine Setters, Operators and Tenders	\$9.78	\$13.69
Cleaning, Washing and Metal Pickling Equipment Operators and Tenders	\$9.59	\$12.56
Assemblers and Fabricators, All Other	\$9.55	\$12.27
Food Batchmakers	\$9.54	\$15.77
Food and Tobacco Roasting, Baking and Drying Machine Operators and Tenders	\$9.44	\$11.63
Packaging and Filling Machine Operators and Tenders	\$9.35	\$12.27
Food Processing Workers, All Other	\$9.31	\$10.70

Education Level

Exhibit 89 shows education levels required for occupations that fall within the manufacturing industry. The typical entry-level education for industrial production managers is a bachelor's degree and falls only minutely short of meeting the 33.3 % CPS threshold to be relevant to community colleges. The remaining occupations typically require less than a community college education. However, nearly three-quarters of the occupations have moderate- to long-term on-the-job training requirements or upskilling needs that are addressed by many local community college programs.

Exhibit 89: Manufacturing education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Packaging and Filling Machine Operators and Tenders	High school diploma or equivalent	None	Moderate-term	18.6%
Industrial Machinery Mechanics	High school diploma or equivalent	None	Long-term	41.7%
Team Assemblers	High school diploma or equivalent	None	Moderate-term	29.2%
Inspectors, Testers, Sorters, Samplers and Weighers	High school diploma or equivalent	None	Moderate-term	37.7%
First-Line Supervisors of Mechanics, Installers and Repairers	High school diploma or equivalent	Less than 5 years	None	42.9%
First-Line Supervisors of Production and Operating Workers	High school diploma or equivalent	Less than 5 years	None	35.3%
Production, Planning and Expediting Clerks	High school diploma or equivalent	None	Moderate-term	40.1%
Food Batchmakers	High school diploma or equivalent	None	Moderate-term	27%
Production Workers, All Other	High school diploma or equivalent	None	Moderate-term	26.7%
Industrial Production Managers	Bachelor's degree	5 years or more	None	32.7%
Assemblers and Fabricators, All Other	High school diploma or equivalent	None	Moderate-term	29.2%
Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders	High school diploma or equivalent	None	Moderate-term	40.7%
Maintenance Workers, Machinery	High school diploma or equivalent	None	Moderate-term	34.5%
Food Processing Workers, All Other	No formal educational credential	None	Moderate-term	18.7%
Mixing and Blending Machine Setters, Operators and Tenders	High school diploma or equivalent	None	Moderate-term	26.8%
Petroleum Pump System Operators, Refinery Operators and Gaugers	High school diploma or equivalent	None	Long-term	44%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Cleaning, Washing and Metal Pickling Equipment Operators and Tenders	No formal educational credential	None	Moderate-term	26.7%
Food Cooking Machine Operators and Tenders	High school diploma or equivalent	None	Moderate-term	22%
Paper Goods Machine Setters, Operators and Tenders	High school diploma or equivalent	None	Moderate-term	30.4%
Food and Tobacco Roasting, Baking and Drying Machine Operators and Tenders	No formal educational credential	None	Moderate-term	31.4%
Power Plant Operators	High school diploma or equivalent	None	Long-term	50.5%
Computer-Controlled Machine Tool Operators, Metal and Plastic	High school diploma or equivalent	None	Moderate-term	43.6%
Chemical Equipment Operators and Tenders	High school diploma or equivalent	None	Moderate-term	40.7%
Extruding, Forming, Pressing and Compacting Machine Setters, Operators and Tenders	High school diploma or equivalent	None	Moderate-term	27.9%
Molders, Shapers and Casters, Except Metal and Plastic	High school diploma or equivalent	None	Long-term	24.4%
Gas Plant Operators	High school diploma or equivalent	None	Long-term	44%
Tailors, Dressmakers and Custom Sewers	No formal educational credential	None	Moderate-term	24.2%
Coating, Painting and Spraying Machine Setters, Operators and Tenders	High school diploma or equivalent	None	Moderate-term	27.1%
Printing Press Operators	High school diploma or equivalent	None	Moderate-term	32.6%

Community College Supply

Exhibit 90 shows annual job openings and corresponding program titles with student completion data.

Exhibit 90: Manufacturing community college supply

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Packaging and Filling Machine Operators and Tenders (51-9111)	251	No Corresponding Programs		
Industrial Machinery Mechanics (49-9041)	158	No Corresponding Programs		
Team Assemblers (51-2092)	123	No Corresponding Programs		
Inspectors, Testers, Sorters, Samplers and Weighers (51-9061)	119	Biotechnology and Biomedical Technology - 043000	-	-
		Laboratory Science Technology - 095500	-	-
		Manufacturing and Industrial Technology - 095600	3	38
		Industrial Quality Control - 095680	-	-
First-Line Supervisors of Mechanics, Installers and Repairers (49-1011)	106	Electrical Systems and Power Transmission - 093440	-	-
		Recreational Vehicle Service - 094850	-	-
First-Line Supervisors of Production and Operating Workers (51-1011)	101	No Corresponding Programs		
Production, Planning and Expediting Clerks (43-5061)	64	Logistics and Materials Transportation - 051000	-	14
Food Batchmakers (51-3092)	62	No Corresponding Programs		
Production Workers, All Other (51-9199)	52	No Corresponding Programs		
Industrial Production Managers (11-3051)	44	Business and Commerce, General - 050100	78	29
		Business Administration - 050500	512	62
		Business Management - 050600	26	29
Assemblers and Fabricators, All Other (51-2099)	44	No Corresponding Programs		
Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders (51-9012)	42	No Corresponding Programs		

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Maintenance Workers, Machinery (49-9043)	35	No Corresponding Programs		
Food Processing Workers, All Other (51-3099)	29	No Corresponding Programs		
Mixing and Blending Machine Setters, Operators and Tenders (51-9023)	28	No Corresponding Programs		
Petroleum Pump System Operators, Refinery Operators and Gaugers (51-8093)	24	Petroleum Technology - 095430	-	-
Cleaning, Washing and Metal Pickling Equipment Operators and Tenders (51-9192)	23	No Corresponding Programs		
Food Cooking Machine Operators and Tenders (51-3093)	21	No Corresponding Programs		
Paper Goods Machine Setters, Operators and Tenders (51-9196)	20	No Corresponding Programs		
Food and Tobacco Roasting, Baking and Drying Machine Operators and Tenders (51-3091)	20	No Corresponding Programs		
Power Plant Operators (51-8013)	19	No Corresponding Programs		
Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011)	16	Manufacturing and Industrial Technology - 095600	3	38
		Machining and Machine Tools - 095630	1	63
Chemical Equipment Operators and Tenders (51-9011)	14	Chemical Technology - 095400	-	-
Extruding, Forming, Pressing and Compacting Machine Setters, Operators and Tenders (51-9041)	11	No Corresponding Programs		
Molders, Shapers and Casters, Except Metal and Plastic (51-9195)	11	No Corresponding Programs		
Gas Plant Operators (51-8092)	10	No Corresponding Programs		
Tailors, Dressmakers and Custom Sewers (51-6052)	10	Fashion Production - 130330	-	-

Occupation	Annual Openings (2016-21)	Program - TOP6	Total Annual Avg Degrees (2013-16)	Total Annual Avg Certificates (2013-16)
Coating, Painting and Spraying Machine Setters, Operators and Tenders (51-9121)	10	No Corresponding Programs		
Printing Press Operators (51-5112)	10	Printing and Lithography - 093600	2	1

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



CONCLUSION & RECOMMENDATIONS

The South Central Valley/Southern Mother Lode Subregion's population currently totals more than 2.7 million residents and is projected to add more than 83,000 new residents by 2022.

This study focused on eight industries: agriculture, water and environmental technologies; energy, construction and utilities; global trade and logistics; retail, hospitality and tourism; protective services; ICT/digital media; health care; and manufacturing.

Collectively, these industries employ approximately 795,173 workers and are projected to offer more than 57,438 new jobs by 2021 in the subregion.

The largest shares of employment are attributed to agriculture, water and environmental technologies (181,068 jobs); retail, hospitality and tourism (177,729 jobs); and health care (116,717 jobs).

Of the eight industries analyzed, the health care industry accounts for 40% of projected job growth by 2021 in the subregion. Community colleges are strongly encouraged to take into consideration the rapid expansion that the health care industry will undergo over the next five years. Other industries where substantial job growth is expected to occur are retail, hospitality and tourism; and agriculture, water and environmental technologies.

Health care is expected to generate 22,419 jobs, followed by retail and hospitality, 12,114 jobs. Agriculture, water and environmental technologies is projected to create 9,188 new positions by 2021.

Across all industries, software skills most highly in demand revolve around Microsoft Office, with employers frequently seeking workers who are skilled in Word, Excel and PowerPoint.

Key findings and recommendations:

- **AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES**—In the subregion, the industry business type known as support activities for crop production will add the greatest share of new positions—more than 11,700 jobs over the next five years. Community colleges may want to devote attention toward preparing students to enter jobs in this area since crop production is expected to shed 3,000 jobs during the same timeframe. In the last 12 months, the most job postings related to this industry were for quality assurance technicians.
- **ENERGY, CONSTRUCTION & UTILITIES**—While activities for mining, residential building construction and building finishing contractors are expected to shed jobs over the next five years, there will be substantial growth in several areas by 2021: utility system construction, 637 new jobs; oil and gas extraction, 475 new jobs; and natural gas distribution, 551 new jobs. Top job postings seem to revolve around the skilled trades, such as plumbers and electricians. Construction inspectors were also sought by employers in the subregion.
- **GLOBAL TRADE & LOGISTICS**—With more than 4,600 new jobs in the subregion expected in the next five years, community colleges may want to assess whether a sufficient number of students are entering career pipelines related to this industry. Top job postings appear to center on truck drivers and other types of specialty drivers. Business types projected to undergo the most growth include grocery and related product merchant wholesalers (615 new positions); machinery, equipment and supplies merchant wholesalers (348 new positions); and specialized freight trucking (332 new positions).

- **RETAIL, HOSPITALITY & TOURISM**—Restaurants and other eating places are projected to create 6,000 jobs by 2021, and grocery stores are expected to generate 1,683 new jobs, followed by automobile dealers, 719 new jobs. Top job postings in the subregion are related to sales: sales associate, sales representative and sales consultant.
- **PROTECTIVE SERVICES**—Two business types related to protective services are expected to expand over the next five years: state government (excluding education and hospitals) is projected to add nearly 3,400 jobs, and local government (excluding education and hospitals) will add nearly 1,500 jobs. In the last 12 months, job postings for security officers far exceeded other top job postings related to protective services.
- **ICT/DIGITAL MEDIA**—While ICT/digital media is by far the smallest industry regarding overall employment in the subregion, it should be noted that the wired telecommunications business type is projected to increase rapidly in the next five years, resulting in nearly 900 new positions, a 35% growth rate. Community colleges may want to evaluate current programs to see if student completions are meeting demand and if curriculum revision or updating is needed to meet employer needs.
- **HEALTH CARE**—The significant growth projected for the health care industry in the subregion warrants attention, with more than 22,400 new jobs projected by 2021. Business types generating the most new jobs include: individual and family services, 10,019 new jobs; general medical and surgical hospitals, nearly 3,000 new jobs; and outpatient care centers, nearly 2,400 new jobs. In the last 12 months, there were 5,609 job postings for registered nurses, and 1,244 job postings for travel registered nurses, indicating that these are in-demand occupations.
- **MANUFACTURING**—Several manufacturing business types are expected to undergo contraction in the next five years; however, the largest job generators will be animal slaughtering, adding 1,000 jobs, and other food manufacturing, 738 new jobs. Top job postings in the subregion sought welders, production supervisors and machine operators in the last 12 months.

APPENDIX A: METHODOLOGY & DATA SOURCES

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com .
Living Wage	A living wage calculator that estimates the cost of living in a specific community or region: livingwage.mit.edu .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: www.bls.gov/emp/ep_education_tech.htm .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division, labormarketinfo.edd.ca.gov
Job Posting and Skills Data	Burning Glass, http://www.burning-glass.com/
Additional Education Requirements/Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledges, work activities and interests associated with specific occupations: www.onetonline.org

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.

Wages Family Compositions: The living wage calculator estimates the living wage needed to support families. For single adult families, the adult is assumed to be employed full time. For two adult families where both adults are in the labor force, both adults are assumed to be employed full time. For two adult families where one adult is not in the labor force, one of the adults is assumed to be employed full time while the other non-wage-earning adult provides full-time child care for the family's children. Full-time work is assumed to be year-round, 40 hours per week for 52 weeks, per adult. Families with one child are assumed to have a 'young child' (4 years old). Families with two children are assumed to have a 'young child' and a 'child' (9 years old). Families with three children are assumed to have a 'young child,' a 'child,' and a 'teenager' (15 years old).

APPENDIX B: MAINTENANCE OCCUPATIONAL DATA

Exhibit 1B: Maintenance occupational demand projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Maintenance and Repair Workers, General	8984	9690	706	8%	389
Bus and Truck Mechanics and Diesel Engine Specialists	1909	2106	197	10%	75
Mobile Heavy Equipment Mechanics, Except Engines	1,428	1,480	52	4%	46
Aircraft Mechanics and Service Technicians	1,263	1,209	-54	-4%	33
Installation, Maintenance and Repair Workers, All Other	1287	1342	55	4%	31
Control and Valve Installers and Repairers, Except Mechanical Door	274	322	48	18%	22
Electrical and Electronics Repairers, Commercial and Industrial Equipment	439	457	18	4%	11
Medical Equipment Repairers	210	241	31	15%	10
Security and Fire Alarm Systems Installers	242	249	7	3%	9
Structural Metal Fabricators and Fitters	315	331	16	5%	9

Exhibit 2B: Maintenance occupational wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Aircraft Mechanics and Service Technicians	\$19.96	\$28.90
Electrical and Electronics Repairers, Commercial and Industrial Equipment	\$18.53	\$26.80
Mobile Heavy Equipment Mechanics, Except Engines	\$16.62	\$24.64
Security and Fire Alarm Systems Installers	\$14.26	\$21.29
Bus and Truck Mechanics and Diesel Engine Specialists	\$13.99	\$22.28
Medical Equipment Repairers	\$13.90	\$20.71
Control and Valve Installers and Repairers, Except Mechanical Door	\$12.70	\$19.96
Structural Metal Fabricators and Fitters	\$11.33	\$16.78
Maintenance and Repair Workers, General	\$10.71	\$18.26
Installation, Maintenance and Repair Workers, All Other	\$10.67	\$16.19

Exhibit 3B: Maintenance education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Maintenance and Repair Workers, General	High school diploma or equivalent	None	Long-term	38.2%
Bus and Truck Mechanics and Diesel Engine Specialists	High school diploma or equivalent	None	Long-term	34.8%
Mobile Heavy Equipment Mechanics, Except Engines	High school diploma or equivalent	None	Long-term	37%
Aircraft Mechanics and Service Technicians	Postsecondary nondegree award	None	None	60%
Installation, Maintenance and Repair Workers, All Other	High school diploma or equivalent	None	Moderate-term	35%
Control and Valve Installers and Repairers, Except Mechanical Door	High school diploma or equivalent	None	Moderate-term	49.1%
Electrical and Electronics Repairers, Commercial and Industrial Equipment	Postsecondary nondegree award	None	Long-term	56.8%
Medical Equipment Repairers	Associate degree	None	Moderate-term	54.4%
Security and Fire Alarm Systems Installers	High school diploma or equivalent	None	Moderate-term	47.2%
Structural Metal Fabricators and Fitters	High school diploma or equivalent	None	Moderate-term	34.7%

APPENDIX C: MULTI-SECTOR OCCUPATIONAL DATA

Exhibit 1C: Multi-sector occupational demand projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Welders, Cutters, Solderers and Brazers	3015	3150	135	4%	119
Machinists	1495	1602	107	7%	68
Telecommunications Line Installers and Repairers	845	942	97	11%	36
Electrical and Electronics Engineering Technicians	1,008	1,041	33	3%	32
Sheet Metal Workers	689	742	53	8%	27
Engineering Technicians, Except Drafters, All Other	654	672	18	3%	20
Crane and Tower Operators	495	507	12	2%	20
Chemical Technicians	304	325	21	7%	14

Exhibit 2C: Multi-sector occupational wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Electrical and Electronics Engineering Technicians	\$24.74	\$35.49
Engineering Technicians, Except Drafters, All Other	\$22.76	\$34.74
Crane and Tower Operators	\$19.34	\$27.26
Telecommunications Line Installers and Repairers	\$18.18	\$30.04
Sheet Metal Workers	\$13.47	\$21.85
Welders, Cutters, Solderers and Brazers	\$12.73	\$22.16
Machinists	\$11.90	\$18.49
Chemical Technicians	\$11.36	\$16.52

Exhibit 3C: Multi-sector education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Welders, Cutters, Solderers and Brazers	High school diploma or equivalent	None	Moderate- term	28.2%
Machinists	High school diploma or equivalent	None	Long-term	38.8%
Telecommunications Line Installers and Repairers	High school diploma or equivalent	None	Long-term	47.2%
Electrical and Electronics Engineering Technicians	Associate degree	None	None	55.1%
Sheet Metal Workers	High school diploma or equivalent	None	Apprenticeship	34.4%
Engineering Technicians, Except Drafters, All Other	Associate degree	None	None	55.1%
Crane and Tower Operators	High school diploma or equivalent	Less than 5 years	Moderate- term	26.6%
Chemical Technicians	Associate degree	None	Moderate- term	35.8%

APPENDIX D: BUSINESS OCCUPATIONAL DATA

Exhibit 1D: Business occupational demand projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Customer Service Representatives	9,066	10,432	1366	15%	519
Secretaries and Administrative Assistants, Except Legal, Medical and Executive	13,193	14,187	994	8%	346
First-Line Supervisors of Office and Administrative Support Workers	8,106	8,838	732	9%	276
Office and Administrative Support Workers, All Other	4,038	4,253	215	5%	155
Billing and Posting Clerks	3085	3424	339	11%	137
Bookkeeping, Accounting and Auditing Clerks	10932	10963	31	0%	128
Business Operations Specialists, All Other	5234	5539	305	6%	126
Insurance Sales Agents	2,498	2,625	127	5%	101
Tellers	2,372	2,040	-332	-14%	84
Insurance Claims and Policy Processing Clerks	2,461	2,484	23	1%	72
Tax Examiners and Collectors, and Revenue Agents	1480	1450	-30	-2%	64
Administrative Services Managers	1742	1873	131	8%	60
Payroll and Timekeeping Clerks	1843	1888	45	2%	60
Cost Estimators	1520	1585	65	4%	58
Executive Secretaries and Executive Administrative Assistants	3,171	3,263	92	3%	54
Eligibility Interviewers, Government Programs	2,661	2,750	89	3%	48
Purchasing Agents, Except Wholesale, Retail and Farm Products	1204	1257	53	4%	45
Claims Adjusters, Examiners and Investigators	1508	1523	15	1%	45
First-Line Supervisors of Non-Retail Sales Workers	1924	2004	80	4%	41
First-Line Supervisors of Housekeeping and Janitorial Workers	1270	1364	94	7%	40
Interviewers, Except Eligibility and Loan	896	982	86	10%	40
Bill and Account Collectors	1,355	1,367	12	1%	37
Property, Real Estate and Community Association Managers	1460	1503	43	3%	37
Loan Officers	1232	1184	-48	-4%	24
Data Entry Keyers	1261	1286	25	2%	22
Real Estate Sales Agents	1803	1767	-36	-2%	20
Tax Preparers	642	653	11	2%	20
Human Resources Assistants, Except Payroll and Timekeeping	842	887	45	5%	19
Procurement Clerks	477	483	6	1%	18
Legal Secretaries	1092	1115	23	2%	18
Court, Municipal and License Clerks	576	633	57	10%	16

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Compensation, Benefits and Job Analysis Specialists	320	343	23	7%	13
Loan Interviewers and Clerks	624	623	-1	0%	12
Appraisers and Assessors of Real Estate	410	413	3	1%	10

Exhibit 2D: Business and financial operations top job postings

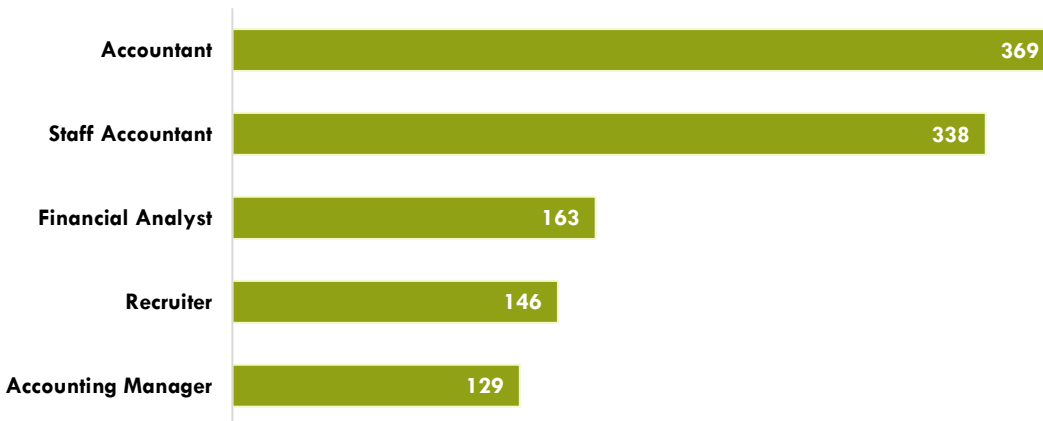


Exhibit 3D: Office and administrative top job postings

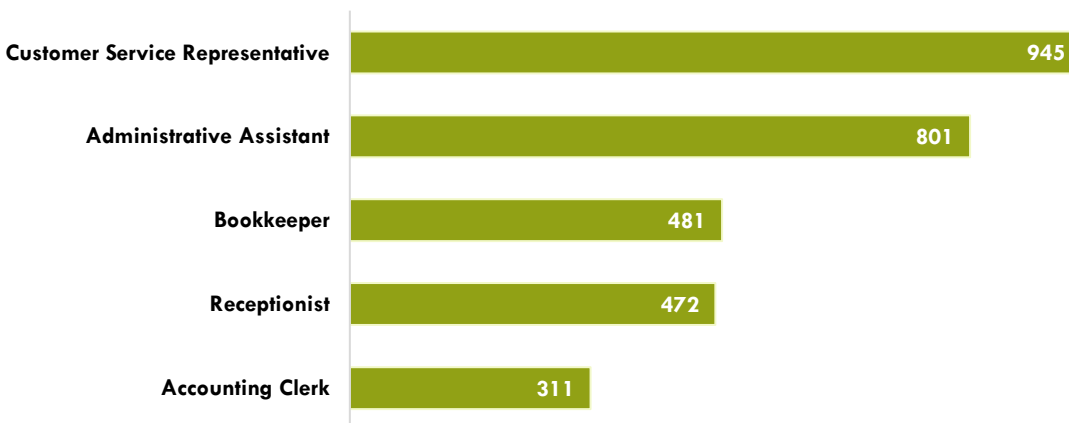


Exhibit 4D: Business top baseline skills

Business & Financial		Office Administration & Support	
Baseline Skills	Job Postings	Baseline Skills	Job Postings
Communication Skills	1,369	Communication Skills	3,371
Writing	946	Detail-Oriented	2,276
Organizational Skills	865	Writing	2,019
Planning	641	Organizational Skills	1,999
Detail-Oriented	568	Typing	1,854

Exhibit 5D: Business top specialized skills

Business & Financial		Office Administration & Support	
Specialized Skills	Job Postings	Specialized Skills	Job Postings
Accounting	1,319	Customer Service	3,110
Microsoft Excel	1,186	Microsoft Excel	2,972
Microsoft Office	784	Data Entry	2,142
Budgeting	726	Accounting	2,034
Financial Analysis	501	Administrative Support	1,998

Exhibit 6D: Business top software skills

Business & Financial		Office Administration & Support	
Software Skills	Job Postings	Software Skills	Job Postings
Microsoft Excel	1,186	Microsoft Excel	2,972
Microsoft Office	784	Microsoft Office	1,686
Microsoft Word	440	Microsoft Word	1,446
Microsoft PowerPoint	337	Microsoft PowerPoint	546
Microsoft Outlook	138	Word Processing	461

Exhibit 7D: Business occupational wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Administrative Services Managers	\$21.50	\$37.24
Compensation, Benefits and Job Analysis Specialists	\$19.99	\$29.00
Appraisers and Assessors of Real Estate	\$19.41	\$27.57
Claims Adjusters, Examiners and Investigators	\$18.18	\$30.12
Loan Officers	\$18.04	\$33.28
Business Operations Specialists, All Other	\$16.56	\$31.03
Executive Secretaries and Executive Administrative Assistants	\$16.38	\$23.90
Purchasing Agents, Except Wholesale, Retail and Farm Products	\$16.32	\$28.58
First-Line Supervisors of Non-Retail Sales Workers	\$15.56	\$23.59
First-Line Supervisors of Office and Administrative Support Workers	\$15.46	\$23.93
Cost Estimators	\$15.12	\$28.17
Court, Municipal and License Clerks	\$15.04	\$20.13
Eligibility Interviewers, Government Programs	\$14.92	\$21.72
Legal Secretaries	\$14.73	\$20.90
Real Estate Sales Agents	\$14.53	\$21.00
Insurance Sales Agents	\$14.49	\$22.11
Property, Real Estate and Community Association Managers	\$14.34	\$25.16
Tax Examiners and Collectors, and Revenue Agents	\$14.13	\$21.60
Procurement Clerks	\$13.22	\$18.22
Human Resources Assistants, Except Payroll and Timekeeping	\$12.65	\$18.40
Tax Preparers	\$12.41	\$20.34
First-Line Supervisors of Housekeeping and Janitorial Workers	\$12.08	\$17.43
Bill and Account Collectors	\$11.97	\$16.51
Bookkeeping, Accounting and Auditing Clerks	\$11.92	\$17.93
Insurance Claims and Policy Processing Clerks	\$11.67	\$17.23
Billing and Posting Clerks	\$11.58	\$16.41
Loan Interviewers and Clerks	\$11.47	\$17.99
Payroll and Timekeeping Clerks	\$11.42	\$18.51
Data Entry Keyers	\$10.97	\$14.96
Customer Service Representatives	\$10.79	\$15.98
Interviewers, Except Eligibility and Loan	\$10.70	\$16.50
Secretaries and Administrative Assistants, Except Legal, Medical and Executive	\$10.42	\$16.24
Tellers	\$9.82	\$12.40
Office and Administrative Support Workers, All Other	\$9.43	\$13.19

Exhibit 8D: Business education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Customer Service Representatives	High school diploma or equivalent	None	Short-term	43.7%
Secretaries and Administrative Assistants, Except Legal, Medical and Executive	High school diploma or equivalent	None	Short-term	47.5%
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	Less than 5 years	None	40.8%
Office and Administrative Support Workers, All Other	High school diploma or equivalent	None	Short-term	42.7%
Billing and Posting Clerks	High school diploma or equivalent	None	Moderate-term	49.6%
Bookkeeping, Accounting and Auditing Clerks	Some college, no degree	None	Moderate-term	48.8%
Business Operations Specialists, All Other	Bachelor's degree	None	None	27.9%
Insurance Sales Agents	High school diploma or equivalent	None	Moderate-term	35.6%
Tellers	High school diploma or equivalent	None	Short-term	44.5%
Insurance Claims and Policy Processing Clerks	High school diploma or equivalent	None	Moderate-term	46.5%
Tax Examiners and Collectors, and Revenue Agents	Bachelor's degree	None	Moderate-term	35%
Administrative Services Managers	Bachelor's degree	Less than 5 years	None	42%
Payroll and Timekeeping Clerks	High school diploma or equivalent	None	Moderate-term	51.3%
Cost Estimators	Bachelor's degree	None	None	40.8%
Executive Secretaries and Executive Administrative Assistants	High school diploma or equivalent	Less than 5 years	None	47.5%
Eligibility Interviewers, Government Programs	High school diploma or equivalent	None	Moderate-term	38.4%
Purchasing Agents, Except Wholesale, Retail and Farm Products	Bachelor's degree	None	Long-term	36.5%
Claims Adjusters, Examiners and Investigators	High school diploma or equivalent	None	Long-term	34.6%
First-Line Supervisors of Non-Retail Sales Workers	High school diploma or equivalent	Less than 5 years	None	32.2%
First-Line Supervisors of Housekeeping and Janitorial Workers	High school diploma or equivalent	Less than 5 years	None	35.2%
Interviewers, Except Eligibility and Loan	High school diploma or equivalent	None	Short-term	49.5%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Bill and Account Collectors	High school diploma or equivalent	None	Moderate-term	50.2%
Property, Real Estate and Community Association Managers	High school diploma or equivalent	Less than 5 years	None	36.7%
Loan Officers	Bachelor's degree	None	Moderate-term	33.8%
Data Entry Keyers	High school diploma or equivalent	None	Moderate-term	46.3%
Real Estate Sales Agents	High school diploma or equivalent	None	Moderate-term	37.9%
Tax Preparers	High school diploma or equivalent	None	Moderate-term	33.8%
Human Resources Assistants, Except Payroll and Timekeeping	Associate degree	None	None	46.7%
Procurement Clerks	High school diploma or equivalent	None	Moderate-term	45.3%
Legal Secretaries	High school diploma or equivalent	None	Moderate-term	47.5%
Court, Municipal and License Clerks	High school diploma or equivalent	None	Moderate-term	47.5%
Compensation, Benefits and Job Analysis Specialists	Bachelor's degree	Less than 5 years	None	33%
Loan Interviewers and Clerks	High school diploma or equivalent	None	Short-term	45.7%
Appraisers and Assessors of Real Estate	Bachelor's degree	None	Long-term	34.7%

APPENDIX E: ALL OTHER OCCUPATIONAL DATA

Exhibit 1E: All other occupational demand projections

Occupation	2016	2021	5-Yr Change	5-Yr % Change	Annual Openings
Teacher Assistants	11845	12972	1127	10%	527
Childcare Workers	10797	10417	-380	-4%	349
Automotive Service Technicians and Mechanics	5,288	5,586	298	6%	210
Bus Drivers, School or Special Client	2,912	3,311	399	14%	122
Preschool Teachers, Except Special Education	2661	2836	175	7%	120
Kindergarten Teachers, Except Special Education	1708	1850	142	8%	81
Dispatchers, Except Police, Fire and Ambulance	1464	1592	128	9%	64
Library Technicians	825	873	48	6%	51
Weighers, Measurers, Checkers and Samplers, Recordkeeping	1196	1251	55	5%	47
Paralegals and Legal Assistants	1247	1328	81	6%	45
Training and Development Specialists	842	949	107	13%	44
Automotive Body and Related Repairers	1,023	1,072	49	5%	35
Bus Drivers, Transit and Intercity	879	949	70	8%	26
Education Administrators, Preschool and Childcare Center/Program	628	651	23	4%	25
Photographers	583	596	13	2%	22
Library Assistants, Clerical	406	445	39	10%	21
Home Appliance Repairers	368	417	49	13%	21
Civil Engineering Technicians	447	489	42	9%	20
Career/Technical Education Teachers, Secondary School	293	335	42	14%	16
Electrical and Electronic Equipment Assemblers	392	419	27	7%	15
Special Education Teachers, Preschool	218	262	44	20%	14
Funeral Attendants	291	311	20	7%	11
Painters, Transportation Equipment	340	358	18	5%	10

Exhibit 2E: All other occupational wages

Occupation	Pct. 10 Hourly Wages	Median Hourly Wages
Kindergarten Teachers, Except Special Education	\$21.25	\$31.49
Career/Technical Education Teachers, Secondary School	\$21.25	\$33.96
Civil Engineering Technicians	\$20.15	\$28.99
Special Education Teachers, Preschool	\$18.46	\$32.47
Paralegals and Legal Assistants	\$14.80	\$22.19
Painters, Transportation Equipment	\$14.45	\$20.51
Training and Development Specialists	\$14.36	\$24.74
Education Administrators, Preschool and Childcare Center/Program	\$13.20	\$18.19
Library Technicians	\$12.99	\$16.53
Bus Drivers, Transit and Intercity	\$12.07	\$18.18
Home Appliance Repairers	\$12.03	\$18.04
Photographers	\$11.88	\$14.97
Dispatchers, Except Police, Fire and Ambulance	\$11.69	\$17.64
Bus Drivers, School or Special Client	\$11.30	\$16.49
Automotive Service Technicians and Mechanics	\$10.88	\$16.71
Automotive Body and Related Repairers	\$10.32	\$16.61
Preschool Teachers, Except Special Education	\$10.15	\$13.92
Electrical and Electronic Equipment Assemblers	\$10.09	\$14.60
Funeral Attendants	\$9.79	\$11.81
Teacher Assistants	\$9.70	\$12.77
Weighers, Measurers, Checkers and Samplers, Recordkeeping	\$9.42	\$12.00
Library Assistants, Clerical	\$9.30	\$12.78
Childcare Workers	\$7.77	\$8.84

Exhibit 3E: All other education levels

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Teacher Assistants	Some college, no degree	None	None	43.7%
Childcare Workers	High school diploma or equivalent	None	Short-term	36.7%
Automotive Service Technicians and Mechanics	Postsecondary nondegree award	None	Short-term	33.4%
Bus Drivers, School or Special Client	High school diploma or equivalent	None	Short-term	36.1%
Preschool Teachers, Except Special Education	Associate degree	None	None	37.8%
Kindergarten Teachers, Except Special Education	Bachelor's degree	None	Internship/residency	37.8%
Dispatchers, Except Police, Fire and Ambulance	High school diploma or equivalent	None	Moderate-term	47.6%
Library Technicians	Postsecondary nondegree award	None	None	26.1%
Weighers, Measurers, Checkers and Samplers, Recordkeeping	High school diploma or equivalent	None	Short-term	33.9%
Paralegals and Legal Assistants	Associate degree	None	None	42.6%
Training and Development Specialists	Bachelor's degree	Less than 5 years	None	33.7%
Automotive Body and Related Repairers	High school diploma or equivalent	None	Long-term	26.1%
Bus Drivers, Transit and Intercity	High school diploma or equivalent	None	Moderate-term	36.1%
Education Administrators, Preschool and Childcare Center/Program	Bachelor's degree	Less than 5 years	None	13%
Photographers	High school diploma or equivalent	None	Long-term	33%
Library Assistants, Clerical	High school diploma or equivalent	None	Short-term	37.6%
Home Appliance Repairers	High school diploma or equivalent	None	Moderate-term	37.6%
Civil Engineering Technicians	Associate degree	None	None	55.1%
Career/Technical Education Teachers, Secondary School	Bachelor's degree	Less than 5 years	Internship/residency	4.8%
Electrical and Electronic Equipment Assemblers	High school diploma or equivalent	None	Moderate-term	30.1%
Special Education Teachers, Preschool	Bachelor's degree	None	Internship/residency	9.7%
Funeral Attendants	High school diploma or equivalent	None	Short-term	51.9%

Occupation	Typical Entry-Level Education	Work Experience Required	Typical On-The-Job Training	CPS
Painters, Transportation Equipment	High school diploma or equivalent	None	Moderate- term	27.1%