

January 2020

Labor Market Analysis

Welding



California
Community
Colleges



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Summary

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for welding. Two occupations related to welding were provided by Fresno City College:

- Welders, Cutters, Solderers, and Brazers (SOC 51-4121)
- Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (SOC 51-4122)

Key findings:

- **Occupational demand** — Nearly 3,000 workers were employed in jobs related to welding in 2018 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is welders, cutters, solderers, and brazers with 2,834 workers in 2018, a projected growth rate of 6% over the next five years, and 352 annual openings.
- **Wages** — Welding, soldering, and brazing machine setters earn the highest wages, a median wage of \$21.86/hour in the subregion and \$21.01/hour in the region.
- **Employers** — Top employers in the subregion are Scelzi Enterprises, PCL Construction, and Mid Cal Labor Solutions.
- **Job titles** — The most common occupational title in job postings in the subregion is welders, cutters, and welder fitters. The most common job title is welder.
- **Skills and certifications** — The top baseline skill is physical abilities, the top specialized skill is welding, and the top software skill is Microsoft Office. The most in-demand certification is a welding certification.
- **Education** — A high school education is typically required for welders, cutters, solderers, and brazers; and welding, soldering, and brazing machine setters, operators, and tenders.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 206 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 182 trained workers in the subregion and 373 workers in the region. The Center of Excellence recommends that Fresno City College work with the Energy, Construction and Utilities Regional Director, the college's advisory board, and local industry in the expansion of programs to address the shortage of welding workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Fresno City College to provide labor market information for welding. Review of the Taxonomy of Programs (TOP) found the following program is appropriate for this analysis:

- Welding Technology-095650

The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. Analysis of the program and occupational data related to welding resulted in the identification of welding applicable occupations. The Standard Occupational Classification (SOC) System titles and codes used in this report are:

- Welders, Cutters, Solderers, and Brazers (SOC 51-4121)
- Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (SOC 51-4122)

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below. (O*NET data was not available for Welders, Cutters, Solderers, and Brazers.)

Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

Job Description: Set up, operate, or tend welding, soldering, or brazing machines or robots that weld, braze, solder, or heat treat metal products, components, or assemblies. Includes workers who operate laser cutters or laser-beam machines.

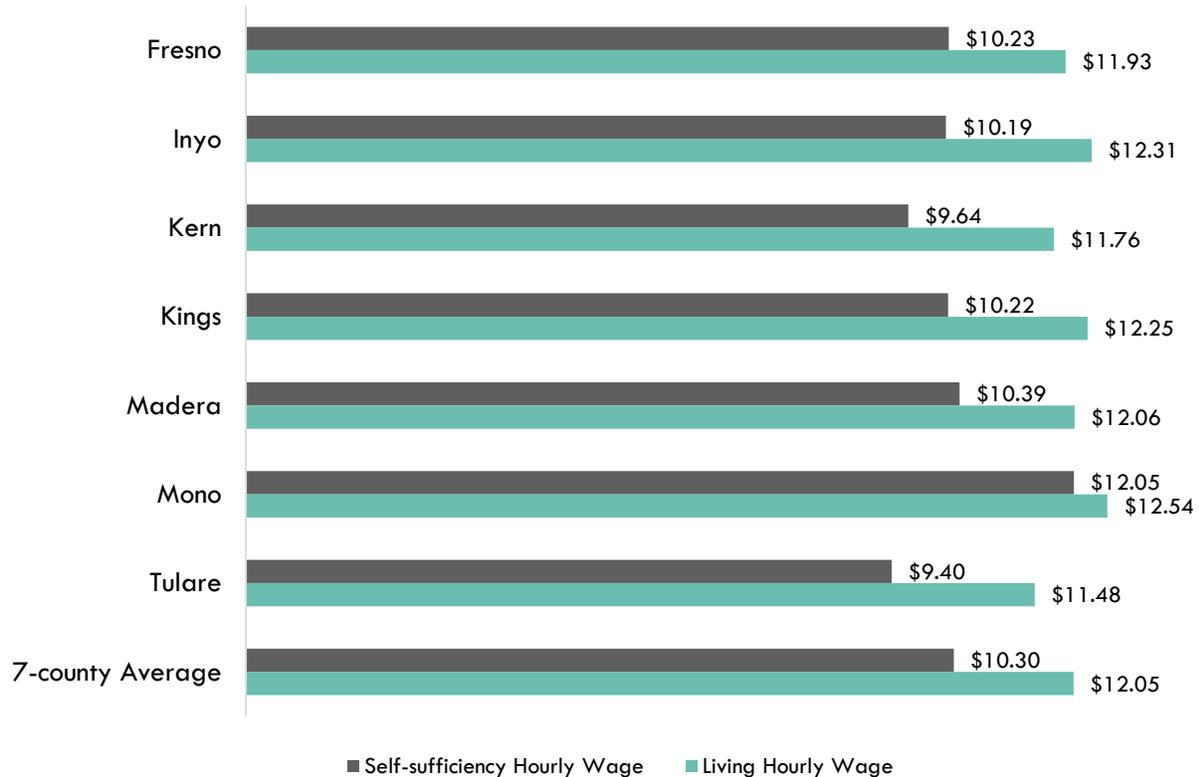
Sample Job Titles: Braze Operator, Fabricator, Finishing Technician, Fitter-Welder, Machine Operator, Mig Welder, Operator, Robot Operator, Spot Welder, Technical Associate (TA)

Knowledge: Mathematics

Skills: Operation Monitoring, Active Listening, Critical Thinking, Operation and Control, Speaking

The average self-sufficiency wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is \$10.30/hour, and the current average living wage for a single adult is \$12.05/hour. Self-sufficiency and living wage data by county and the overall seven-county average are shown in Exhibit 1. In the wages sections of this report, the 25th percentile denotes entry-level wages, and median represents experienced wages.

Exhibit 1. Self-sufficiency and living wages in the SCV/SML subregion



Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 2,923 workers in welding occupations in 2018 (Exhibit 2). The largest occupation is welders, cutters, solderers, and brazers with 2,834 workers in 2018. This occupation is projected to grow by 6% over the next five years and has the greatest number of projected annual openings, 352.

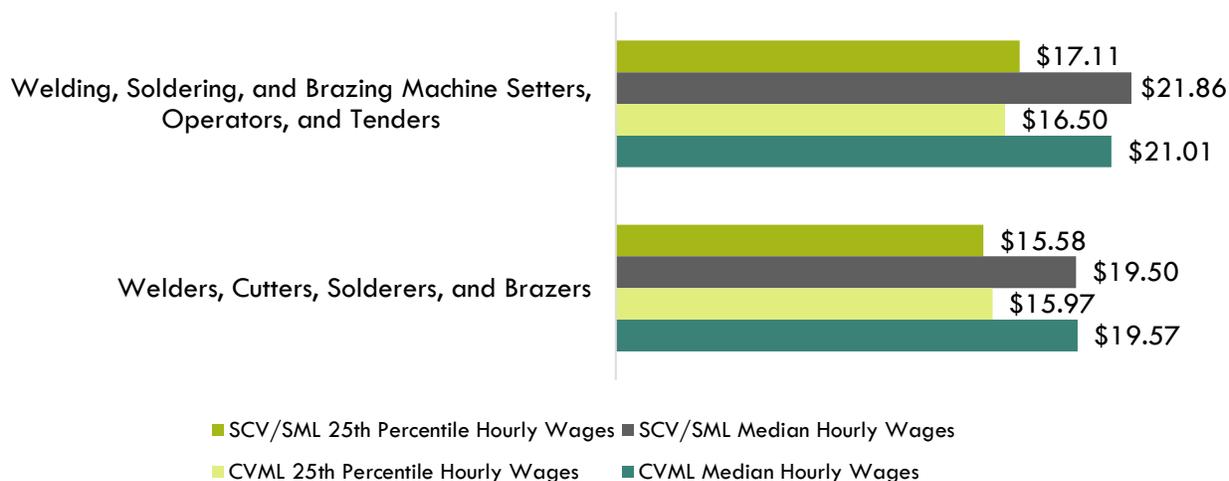
Exhibit 2. Welding employment and occupational projections in the SCV/SML subregion

Occupation	2018 Jobs	2023 Jobs	5-year Change	5-year % Change	Annual Openings
Welders, Cutters, Solderers, and Brazers	2,834	2,992	158	6%	352
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	89	89	0	0%	10
Total	2,923	3,081	158	5%	362

Wages

Exhibit 3 compares the entry-level and experienced wages of the welding occupations. Welding, soldering, and brazing machine setters have the highest earnings, a median wage of \$21.86/hour in the subregion and \$21.01/hour in the region.

Exhibit 3. Entry-level and experienced wage comparison in the SCV/SML subregion and region



Job Postings

There were 433 job postings for the two occupations in the SCV/SML subregion from January 2019 through December 2019. The top employers advertising these job postings are listed in Exhibit 4.

Exhibit 4. Top employers for welding by number of job postings

Employer	Job Postings
Scelzi Enterprises	8
PCL Construction	7
Mid Cal Labor Solutions	5
Peopleready	5
Amsted Industries	4
Krazan Associates Incorporated	4
The Kleinfelder Group, Inc	4
Aptim	3
Employnet	3
Express Incorporated	3

Job posting analysis also included the top industries hiring positions related to welding (Exhibit 5).

Exhibit 5. Top industries for welding by number of job postings

Industry	Job Postings
Foundation, Structure, and Building Exterior Contractors	178
Employment Services	18
National Security and International Affairs	10
Nonresidential Building Construction	7
Architectural, Engineering, and Related Services	6
Cement and Concrete Product Manufacturing	4
Lessors of Real Estate	3
Waste Collection	3
Business, Professional, Labor, Political, and Similar Organizations	2
Executive, Legislative, and Other General Government Support	2

Job Titles

Exhibit 6 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across two O*NET OnLine occupations. The occupational title welders, cutters, and welder fitters is listed in the most job postings, 429, followed by farm and ranch managers, four job postings.

Exhibit 6. Top occupational titles in job postings for welding

Occupational Title	Job Postings
Welders, Cutters, and Welder Fitters	429
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	4

Analysis of the 433 advertised job titles for the targeted occupations reveals the top title is welder, occurring in 332 job postings, followed by Mig welder, 40 job postings (Exhibit 7).

Exhibit 7. Top job titles by number of job postings for welding

Job Title	Job Postings
Welder	332
Mig Welder	40
Structural Welder	15
Mechanic	13
Tig Welder	7
Certified Welding Inspector	5
Certified Welding Inspector, Structural	3
Cheese Operator	3
Certified Welding Inspector, Construction	2
Welding Inspector	2

Salaries

Exhibit 8 shows the “Market Salaries” for welding occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

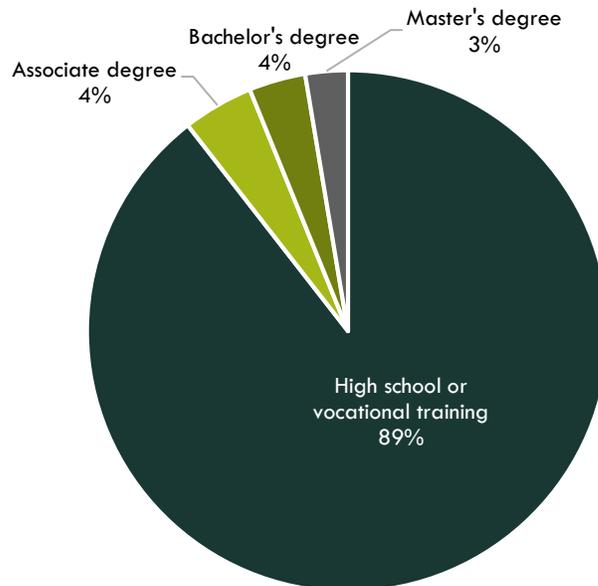
Exhibit 8. Salaries for welding

Market Salary Percentile	Salary Amount
10th Percentile	27,800
25th Percentile	30,246
50th Percentile	32,309
75th Percentile	35,971
90th Percentile	42,763

Education

Of the 433 job postings, 107 listed an education level preferred for the positions being filled. Of those, 89% requested a high school diploma or vocational training, 4% requested an associate degree, and 4% requested a bachelor’s degree (Exhibit 9).

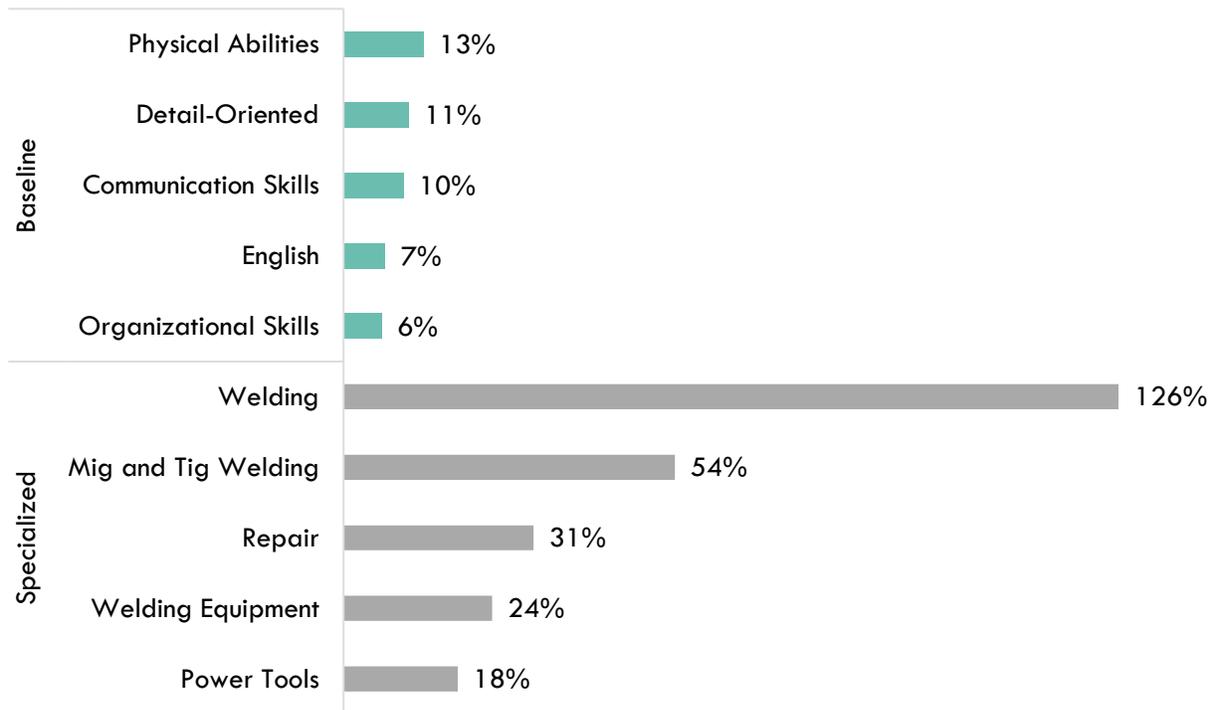
Exhibit 9. Education levels requested in job postings for welding



Baseline and Specialized Skills

Exhibit 10 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are physical abilities, 13% of job postings, detail-oriented, 11%, and communication skills, 10%. The top three specialized skills are welding, 126% of job postings, Mig and Tig welding, 54%, and repair, 31%.

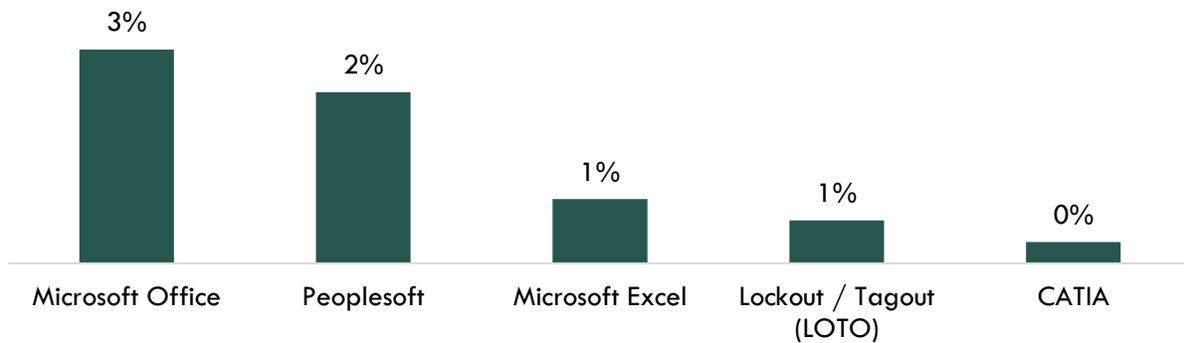
Exhibit 10. In-demand welding baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Peoplesoft rank first and second (Exhibit 11).

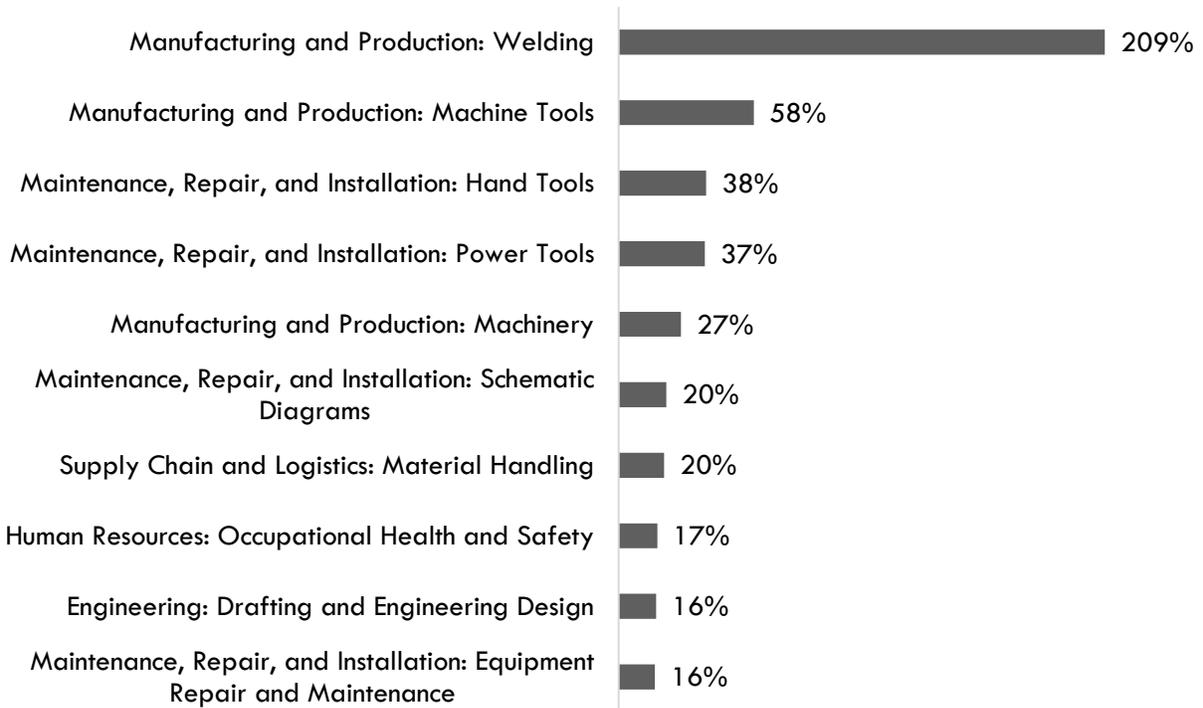
Exhibit 11. In-demand welding software skills



Skill Cluster Projections

Of the 433 job postings, 205 postings contained skill projections. An evaluation of the skill clusters that will have the greatest gains in level of importance shows that the top areas are Manufacturing and Production: Welding, 209%; Manufacturing and Production: Machine Tools, 58%; and Maintenance, Repair, and Installation: Hand Tools, 38% (Exhibit 12).

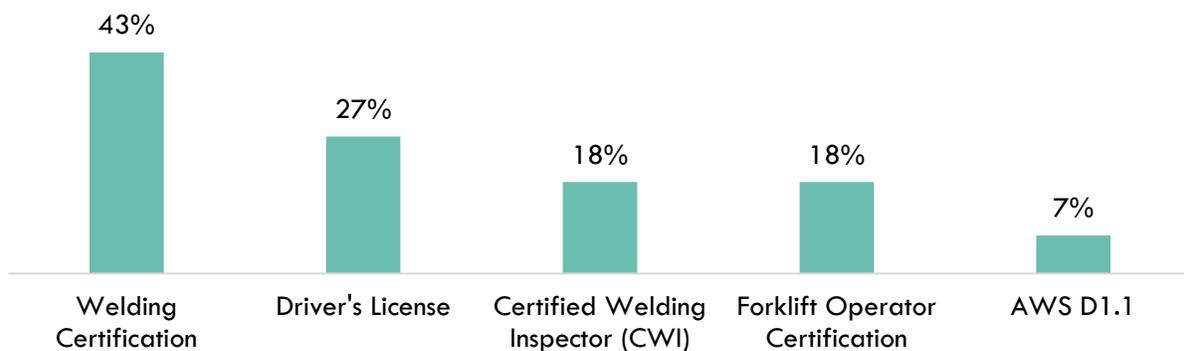
Exhibit 12. Skill cluster projections for welding



Certifications

Of the 433 job postings, 67 contained certification data. Of those, 43% indicated a need for a welding certification. The next top certifications are driver’s license and Certified Welding Inspector (Exhibit 13). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 13. Top welding certifications requested in job postings



Education, Work Experience & Training

A high school education is typically required for welders, cutters, solderers, and brazers; and welding, soldering, and brazing machine setters, operators, and tenders (Exhibit 14).

Exhibit 14. Education, work experience, training and Current Population Survey results for welding occupations¹

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	30.6%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	30.6%

Supply

Analysis of program data from the California Community Colleges Chancellor’s Office Data Mart included the TOP codes: Welding Technology-095650. Analysis of the last three years of TOP code data shows that, on average, 206 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 15).

Exhibit 15. Postsecondary supply for welding occupations in the region

TOP Title-Code	College	Certificates	Degrees	Subtotal
Welding Technology-095650	Bakersfield	80	8	88
	Cerro Coso	27	5	31
	Fresno City	11	6	17
	Merced	4	4	8
	Modesto Junior	11	3	14
	Reedley College	13	2	15
	San Joaquin Delta	5		5
	Sequoias	9	5	14
	Taft	8	2	10
	West Hills Coalinga	5		5
Total		171	35	206

Gap Analysis

There is an undersupply of 182 welding workers in the SCV/SML subregion and 373 workers in the region (Exhibit 16).

¹ “Labor Force Statistics from the Current Population Survey,” Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Exhibit 16. Welding workforce annual demand and supply in the SCV/SML subregion and region



Student Outcomes

Exhibit 17 summarizes employment and wage outcomes from the California Community College Chancellor’s Cal-PASS Plus LaunchBoard for the TOP code related to welding. Across the region, 116 students received a degree or certificate, and 14 transferred. Of the students who completed a program, 70% obtained a job closely related to their field of study, and 69% attained a living wage.

Exhibit 17. Regional metrics for the TOP code related to welding

Metric	Welding Technology:095650
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	116
Number of Students Who Transferred	14
Job Closely Related to Field of Study	70%
Median Change in Earnings	36%
Attained a Living Wage	69%
* denotes data not available.	

Conclusion

The entry-level wages of the two occupations exceed the SCV/SML subregion’s self-sufficiency and living wages for one adult. There were 433 job postings in the past 12 months for occupations related to welding in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is physical abilities, and the top specialized skill is welding.
- The top software skill is Microsoft Office.
- The top certification is a welding certification.

There is an undersupply of trained workers, a shortage of 182 in the SCV/SML subregion and 373 in the region.

Recommendation

Based on these findings, it is recommended that Fresno City College work with the Energy, Construction and Utilities Regional Director, the college’s advisory board, and local industry in the expansion of programs to address the shortage of welding in the region.

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: https://www.bls.gov/emp/tables/educational-attainment.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: 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, knowledge, work activities and interests associated with specific occupations: 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).