March 2021

Labor Market Analysis

Welding

POWERED BY

California Community Colleges

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Prepared by the Central Valley/Mother Lode Center of Excellence

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> **COVID-19 Statement:** This report includes employment projection data by Emsi. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

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 identified for Merced College:

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

Key findings:
- **Occupational demand —** More than 2,080 workers were employed in jobs related to welding in 2019 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is welders, cutters, solderers, and brazers with 1,996 workers in 2019, a projected growth rate of 3% over the next five years, and 205 annual openings.
- **Wages —** Welders, cutters, solderers, and brazers earn the highest entry-level wage, $17.51/hour in the subregion and $16.26 in the region.
- **Employers —** Employers with the most job postings in the subregion are Barrett Business Services, Jr Simplot, and Schuff Steel.
- **Occupational 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 work area maintenance, the top specialized skill is welding, and the top software skill is Amazon Web Services. The most in-demand certification is a driver's license.
- **Education —** A high school diploma is the typical entry-level education required for the two occupations.
- **Supply —** Analysis of postsecondary completions in the region shows that on average 278 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 157 trained workers in the subregion and 218 workers in the region. The Center of Excellence recommends that Merced College work with the Advanced Manufacturing 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 Merced College to provide labor market information for welding. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the North Central Valley/Northern Mother Lode (NCV/NML) subregion is $10.27/hour.[1] Analysis of the program and occupational data related to welding resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

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

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.

Welders, Cutters, Solderers, and Brazers
Job Description: Use hand-welding, flame-cutting, hand-soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.
Knowledge: Production and Processing
Skills: No skills met the minimum score.

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

Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 2,081 workers in welding occupations in 2019 (Exhibit 1). The largest occupation is welders, cutters, solderers, and brazers with 1,996 workers in 2019. This occupation is projected to grow by 3% over the next five years and has the greatest number of projected annual openings, 205.

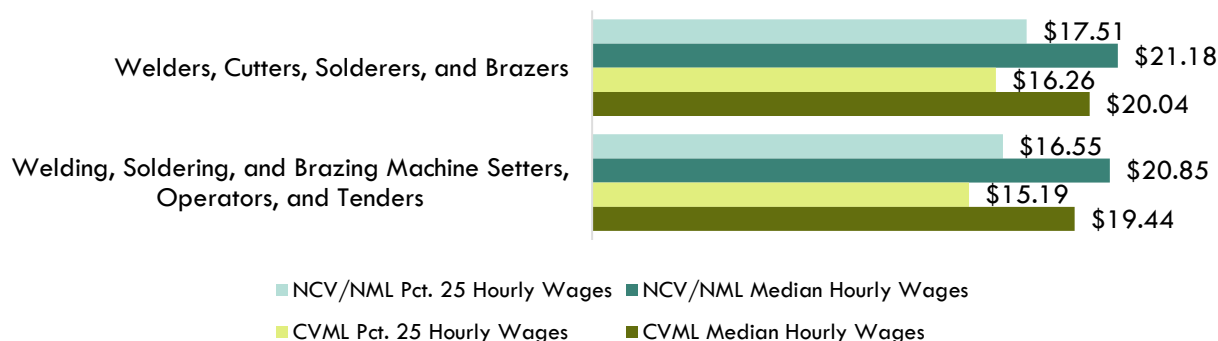**Exhibit 1. Welding employment and occupational projections in the NCV/NML subregion**

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Welders, Cutters, Solderers, and Brazers	1,996	2,057	61	3%	205
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	85	85	(0)	(1%)	8
TOTAL	**2,081**	**2,141**	**61**	**3%**	**213**

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[1] The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

Wages

Exhibit 2 compares the entry-level and experienced wages of the welding occupations. Welders, cutters, solderers, and brazers earn the highest entry-level wage, $17.51/hour in the subregion and $16.26 in the region.

Exhibit 2. Entry-level and experienced wage comparison in the NCV/NML subregion and region

Occupation	NCV/NML Pct. 25	NCV/NML Median	CVML Pct. 25	CVML Median
Welders, Cutters, Solderers, and Brazers	$17.51	$21.18	$16.26	$20.04
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	$16.55	$20.85	$15.19	$19.44

- NCV/NML Pct. 25 Hourly Wages
- NCV/NML Median Hourly Wages
- CVML Pct. 25 Hourly Wages
- CVML Median Hourly Wages

Job Postings

There were 93 job postings for the two occupations in the NCV/NML subregion from September 2020 to February 2021.[2] The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of welding by number of job postings

Employer	Job Postings	% Job Postings
Barrett Business Services	3	8%
Jr Simplot	3	8%
Schuff Steel	3	8%
Barrett Business Services Modesto	2	5%
Hcl Machine Works	2	5%
Schuff Steel Company	2	5%
The News Tribune Com	2	5%
Acm	1	3%
Amazon	1	3%
Avitek	1	3%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across two O*NET OnLine occupations. The occupational title welders, cutters, and welder fitters is listed in 90 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include welder in 16 job postings, fabrication welder in 11 job postings, and welder/fabricator in 11 job postings.

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[2] Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Exhibit 4. Top occupational titles in job postings for welding

Occupational Title	Job Postings	% of Job Postings
Welders, Cutters, and Welder Fitters	90	97%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	3	3%

Salaries

No data was available on "Market Salaries" for welding occupations. Market Salaries 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.

Education

Of the 93 job postings, 41 listed an education level preferred for the positions being filled. Of those, 98% requested high school or vocational training, 12% requested an associate degree, and 2% requested a bachelor's degree (Exhibit 5). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.
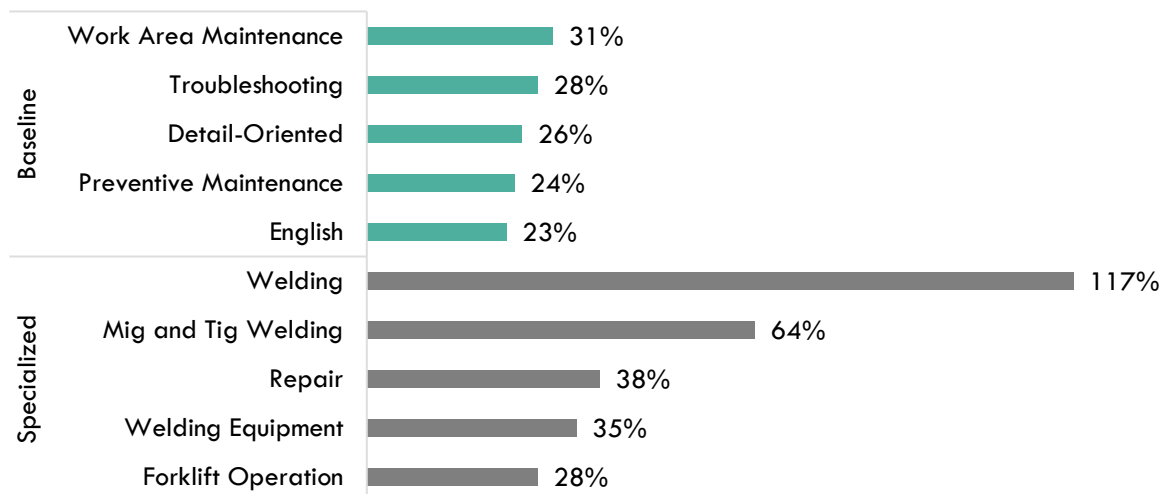
Exhibit 5. Education levels requested in job postings for welding

Education Level	Job Postings	% of Job Postings
High school or vocational training	40	98%
Associate degree	5	12%
Bachelor's degree	1	2%

Baseline and Specialized Skills

Exhibit 6 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are work area maintenance, 31% of job postings, troubleshooting, 28%, and detail oriented, 26%. The top three specialized skills are welding, 117% of job postings, mig and tig welding, 64%, and repair, 38%.

Exhibit 6. In-demand welding baseline and specialized skills

	Skill	%
Baseline	Work Area Maintenance	31%
	Troubleshooting	28%
	Detail-Oriented	26%
	Preventive Maintenance	24%
	English	23%
Specialized	Welding	117%
	Mig and Tig Welding	64%
	Repair	38%
	Welding Equipment	35%
	Forklift Operation	28%

Software Skills

Analysis also included the software skills most in demand by employers. Amazon Web Services and Facebook were the top two software skills identified in job postings (Exhibit 7).
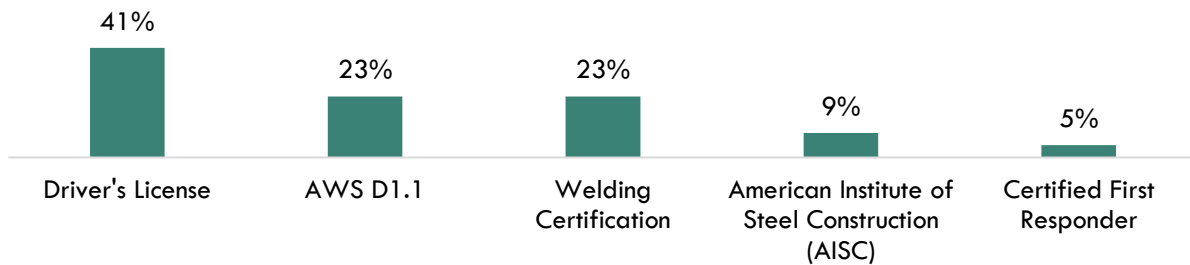
Exhibit 7. In-demand welding software skills

| 1.3% | 1.3% | 1.3% | 1.3% |
| Amazon Web Services (AWS) | Facebook | Microsoft Project | Primavera |

Certifications

Of the 93 job postings, 22 contained certification data. Among those, 41% indicated a need for a driver's license. The next top certifications are AWS D1.1 and welding (Exhibit 8). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 8. Top welding certifications requested in job postings

| 41% | 23% | 23% | 9% | 5% |
| Driver's License | AWS D1.1 | Welding Certification | American Institute of Steel Construction (AISC) | Certified First Responder |

Education, Work Experience & Training

A high school diploma is the typical entry-level education required for the two occupations (Exhibit 9).

Exhibit 9. Education, work experience, training, and Current Population Survey results for welding occupations[3]

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%

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[3] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.
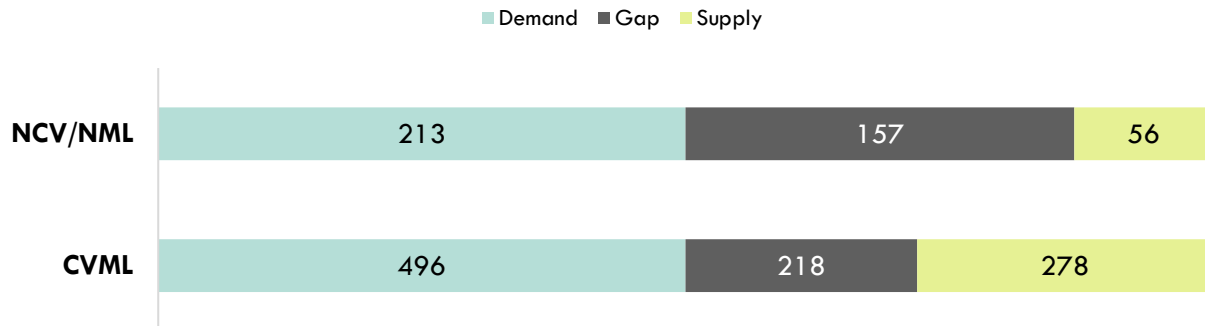
Supply

Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP code and title: 095650 - Welding Technology. Analysis of the last three years of data shows that, on average, 278 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 10).

Exhibit 10. Postsecondary supply for welding occupations in the region

TOP Code - Title	Colleges	Associate Degree	Certificate 12 < 18 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Subtotal
095650 - Welding Technology	Bakersfield	10			8	64	82
	Cerro Coso	6		19	9		33
	Fresno City	7	11		4		23
	Merced	5		6		25	35
	Modesto	4				10	14
	Porterville					7	7
	Reedley College	3		1	19		23
	San Joaquin Delta			15	6		21
	Sequoias	8		15			23
	Taft	2	6			6	13
	West Hills Coalinga			5			5
TOTAL		**43**	**17**	**61**	**46**	**111**	**278**

There is an undersupply of 157 welding workers in the NCV/NML subregion and 218 workers in the region (Exhibit 11).

Exhibit 11. Welding workforce annual demand and supply in the NCV/NML subregion and region

Legend: ■ Demand ■ Gap ■ Supply

Region	Demand	Gap	Supply
NCV/NML	213	157	56
CVML	496	218	278

Student Outcomes

Exhibit 12 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to welding. There were 161 welding technology students who received a degree or certificate or attained apprenticeship journey status and 34 who transferred; 70% of students obtained a job closely related to their field of study; 51% reported a median change in earnings; and 77% attained a living wage.

Exhibit 12. Regional metrics for the TOP codes related to welding

Metric	Welding Technology 095650
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	161
Number of Students Who Transferred	34
Job Closely Related to Field of Study	70%
Median Change in Earnings	51%
Attained a Living Wage	77%
* denotes data not available.	

Conclusion

The entry-level wages of the two occupations exceed the NCV/NML subregion's average living wage. There were 93 job postings in the past six months for occupations related to welding in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is work area maintenance, and the top specialized skill is welding.
- The top software skill is Amazon Web Services.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 157 in the NCV/NML subregion and 218 in the region.

Recommendation

Based on these findings, it is recommended that Merced College work with the Advanced Manufacturing 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.
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.