

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input type="checkbox"/>	Endorsed: Some LMI Criteria Met <input checked="" type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
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Program LMI Endorsement Criteria

	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Supply Gap:	<i>Comments:</i> There are projected to be 1,224 middle-skill annual job openings throughout Los Angeles and Orange counties for these welding occupations, which is more than the 459 awards conferred by educational institutions.	
Living Wage: (Entry-Level, 25 th)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
	<i>Comments:</i> All annual job openings for these welding occupations have entry-level hourly wages below the OC living wage of \$20.63.	
Education:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	<i>Comments:</i> Though both welding occupations typically requires a high school diploma or equivalent, approximately one-third of workers in the field have completed some college or an associate degree as their highest level of education.	

Emerging Occupation(s)		
Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>
<i>Comments:</i> N/A		

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to two middle-skill occupations:

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

Based on the available data, there appears to be a supply gap for these welding occupations and typical education requirements align with a community college education. However, typical entry-level wages are below the living wage. **Therefore, due to some regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25 th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Welders, Cutters, Solderers, and Brazers (51-4121)	LA: 750	LA: 383			
	OC: 374	OC: 76	OC: \$20.34	High school diploma or equivalent	32%
	<i>TTL: 1,123</i>	<i>TTL: 459</i>			
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122)	LA: 62				
	OC: 39	<i>Accounted for Above</i>	OC: \$18.27	High school diploma or equivalent	32%
	<i>TTL: 100</i>				
Total	1,224	459	N/A	N/A	N/A

Demand:

- The number of jobs related to these welding occupations is projected to increase 0.4% through 2027, equating to 1,224 annual job openings.
- Hourly entry-level wages for these welding occupations range from \$18.27 to \$20.34 in Orange County; all annual job openings have entry-level wages below the living wage.
- There were 928 online job postings for these welding occupations over the past 12 months. The highest number of postings were for welders, TIG welders, and soldering technicians.
- The typical entry-level education for these welding occupations is a high school diploma or equivalent.
- Approximately 32% of workers in the field have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 272 awards conferred by 13 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions conferred an average of 187 awards from 2019 to 2021.
- Orange County community college students that exited welding technology programs in the 2020-21 academic year had a median annual wage of \$40,980 (\$19.70 per hour) after exiting the program and 46% attained the regional living wage.
- Throughout Orange County, 58% of welding technology students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for these supply chain occupations from 2017 through 2027. Though there was a 7% decline across all occupations in Los Angeles and Orange counties from 2019 to 2020 due to the COVID-19 pandemic, employment in these welding occupations decreased only 3% during the same period and increased from 2020 to 2022.

In the years preceding the pandemic, employment for these occupations fluctuated, with a decline in 2017 before steady increases in 2018 and 2019. However, employment for these welding occupations is projected to remain flat, albeit slightly below all occupations, through 2027.

Exhibit 2: Annual Percent Change in Jobs for Welding Occupations, 2017-2027

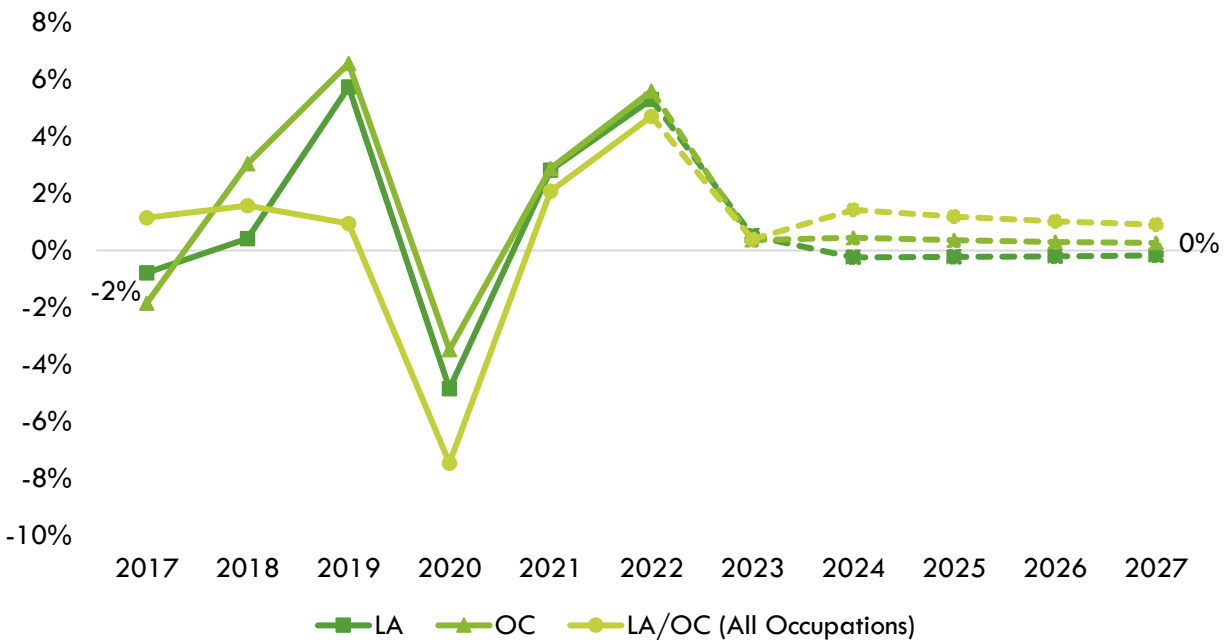


Exhibit 3 shows the five-year occupational demand projections for these welding occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase 0.4% through 2027. There is projected to be 1,224 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties¹

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	8,236	8,209	(27)	(0.3%)	811
Orange	4,032	4,103	71	1.8%	412
Total	12,268	12,312	44	0.4%	1,224

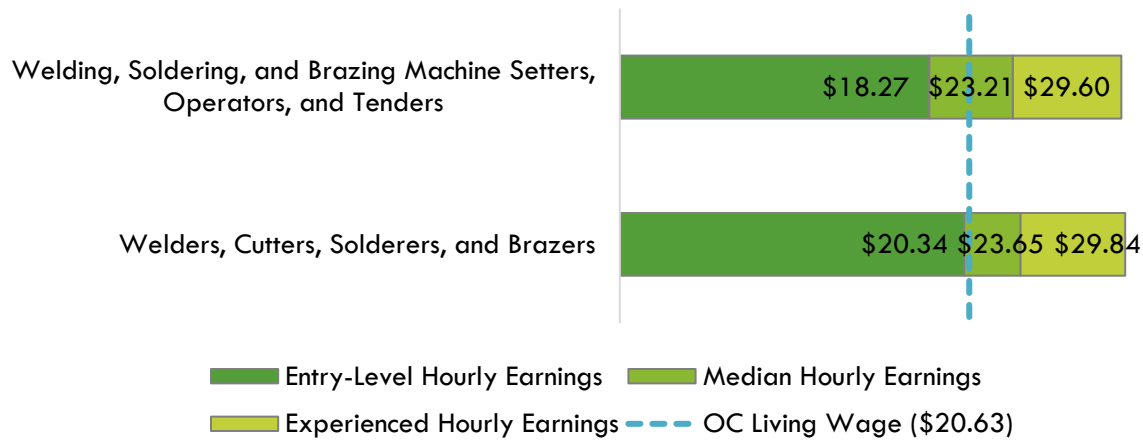
¹ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these welding occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below to provide a complete analysis of the LA/OC region.

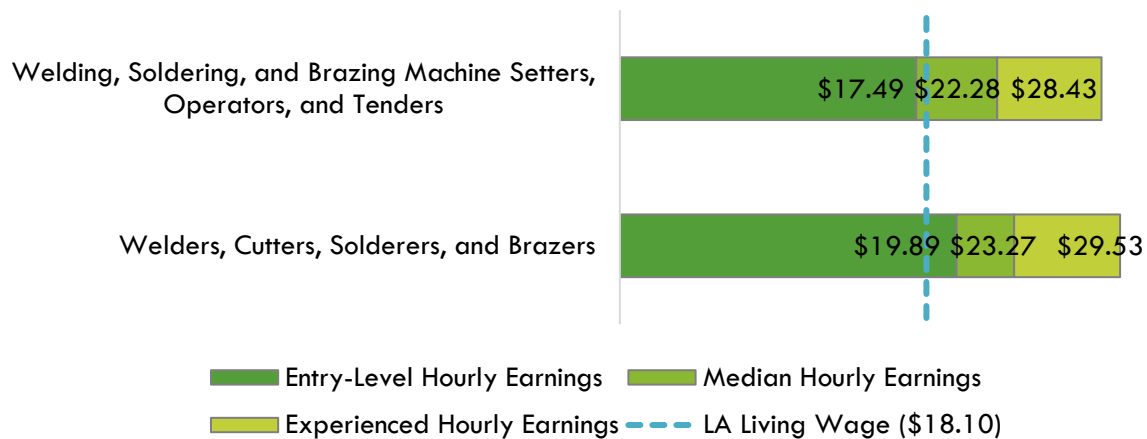
All annual openings for these welding occupations have entry-level wages below the living wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages range between \$18.27 and \$20.34. Orange County's average wages of \$26.14 are below the average statewide wage of \$26.76 for these occupations. Exhibit 4 shows the wage range for each of these welding occupations in Orange County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 4: Wages by Occupation in Orange County



Nearly 92% of annual openings for these welding occupations have entry-level wages above the living wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages range between \$17.49 and \$19.89. Los Angeles County's average wages of \$25.96 are below the average statewide wage of \$26.76 for these occupations. Exhibit 5 shows the wage range for each of these welding occupations in Los Angeles County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Los Angeles County



Job Postings:

Important Online Job Postings Data Note: Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.² For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast’s database.

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

There were 928 online job postings related to these welding occupations listed in the past 12 months. Exhibit 6 shows the number of job postings by occupation. Nearly all (96%) job postings were for welders, cutters, solderers, and brazers and only 4% were for welding, soldering, and brazing machine setters, operators, and tenders.

Exhibit 6: Number of Job Postings by Occupation (n=928)

Occupation	Job Postings	Percentage of Job Postings
Welders, Cutters, Solderers, and Brazers	890	96%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	38	4%
Total Postings	928	100%

The top employers in the region, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=928)

Employer	Job Postings	Percentage of Job Postings
ManpowerGroup	54	6%
ManpowerGroup	54	6%
SpaceX	34	4%
Acara Solutions	19	2%
Aerojet Rocketdyne	18	2%
Volt	16	2%
Precision Castparts	15	2%
Disability Solutions	14	2%
Kelly Services	10	1%
Randstad	10	1%

² K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), <https://link.springer.com/book/10.1007/978-81-322-3972-7>.

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

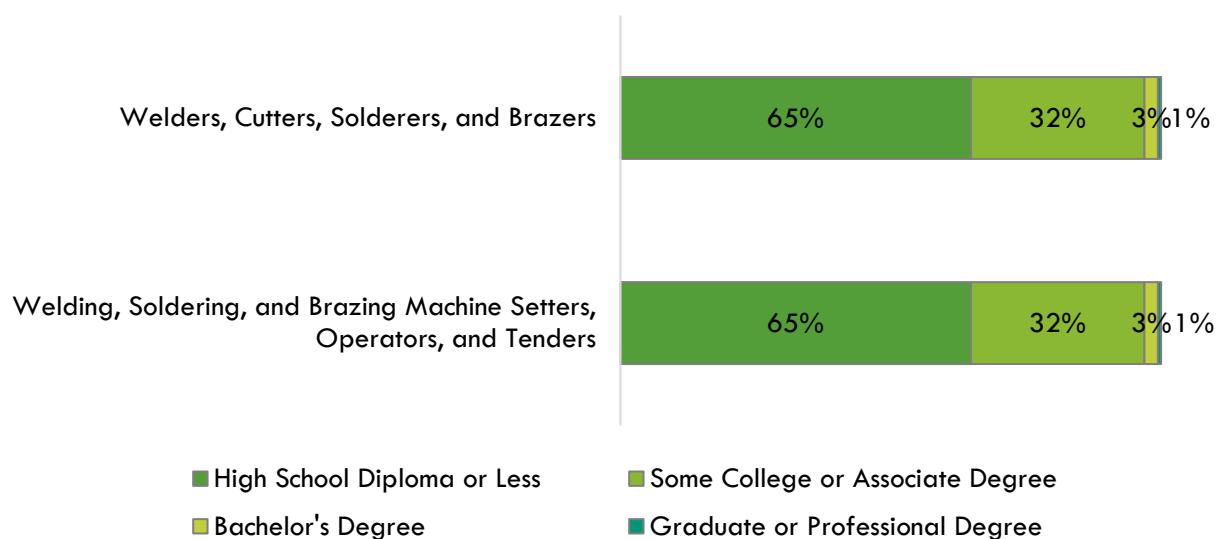
Exhibit 8: Top Skills by Number of Job Postings (n=928)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Welding (337)	Communication (165)	Microsoft Excel (12)
Gas Tungsten Arc Welding (300)	Lifting Ability (129)	Microsoft Office (12)
Metal Inert Gas (MIG) Welding (268)	Troubleshooting (Problem Solving) (87)	Application Programming Interface (API) (10)
Fabrication (187)	Detail Oriented (83)	Microsoft Word (10)
Aluminum (166)	Operations (77)	Fleet Maintenance Software (8)
Soldering (151)	Fine Motor Skills (74)	Protractor (Software) (8)
Hand Tools (116)	Mathematics (64)	SAP Applications (6)
Blueprinting (113)	Quality Control (56)	Enterprise Document Management System (2)
Welding Equipment (87)	Tape Measure (53)	G-Codes (2)
Calipers (86)	English Language (48)	Microsoft Dynamics 365 (2)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for both welding occupations. However, the national-level educational attainment data indicates almost a third of workers (32%) in the field have completed some college or an associate degree as their highest level of education. Exhibit 9 shows the educational attainment for each occupation, sorted by highest community college educational attainment to lowest.

Exhibit 9: National-level Educational Attainment for Occupations



Of the 39% of the cumulative job postings for these welding occupations that listed a minimum education requirement in Los Angeles/Orange County, 98% (352) requested a high school diploma or an associate degree and 2% (9) requested a bachelor's degree.

Educational Supply

Community College Supply:

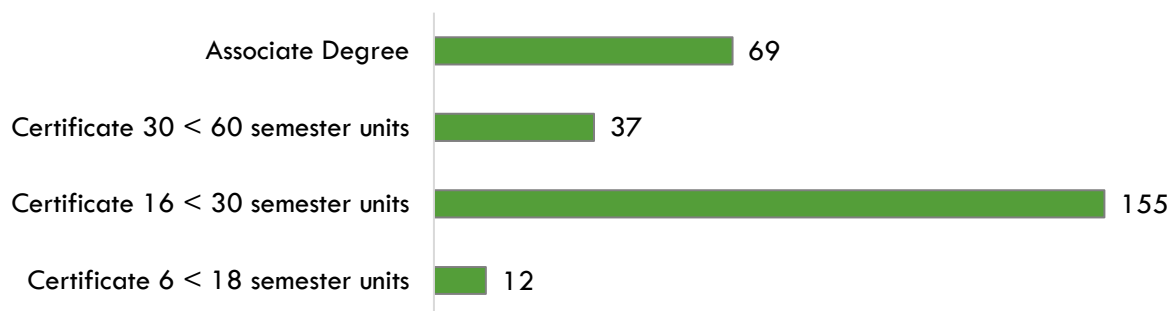
Exhibit 10 shows the three-year average number of awards conferred by community colleges in the related TOP code: Welding Technology (0956.50). The colleges with the most completions in the region are Cerritos, Santa Ana, and LA Trade. Over the past 12 months, there were no related program recommendation requests from regional community colleges.

Exhibit 10: Regional Community College Awards (Certificates and Degrees), 2019-2022

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0956.50	Welding Technology	Cerritos	118	66	93	92
		Compton	5	0	1	2
		El Camino	30	2	9	14
		Glendale	4	6	10	7
		LA Pierce	0	2	5	2
		LA Trade	26	10	53	30
		Long Beach	8	20	19	16
		Mt San Antonio	23	16	34	24
		Pasadena	4	3	4	4
		Rio Hondo	10	2	5	6
		LA Subtotal	228	127	233	196
		Fullerton	8	9	7	8
		Orange Coast	19	12	20	17
		Santa Ana	28	96	30	51
		OC Subtotal	55	117	290	272
		Supply Total/Average			283	244

Exhibit 11 shows the annual average community college awards by type from 2019-20 to 2021-22. The plurality of the awards are for certificates between 16 and less than 30 semester units, followed by associate degrees and certificates between 30 and less than 60 semester units.

Exhibit 11: Annual Average Community College Awards by Type, 2019-2022



Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for welding technology programs in North Orange Community College District (NOCCCD), the Orange County Region, and California. Of the 481 welding technology students in the 2020-21 academic year, 25% (118) attended an NOCCCD college.

NOCCCD students that exited welding technology programs in the 2020-21 academic year had higher median annual earnings (\$45,412 or \$21.83 per hour) compared to all welding technology students in Orange County (\$40,980 or \$19.70 per hour). A higher percentage of NOCCCD welding technology students attained the living wage (53%) when compared to all welding technology students in Orange County (46%).

Exhibit 12: Welding Technology (0956.50) Strong Workforce Program Metrics, 2020-21³

SWP Metric	NOCCCD	OC Region	California
SWP Students	118	481	7,853
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	32%	23%	27%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	Insufficient Data	54%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	Insufficient Data	49	647
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	Insufficient Data	13	142
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	86%	58%	70%
Median Annual Earnings for SWP Exiting Students	\$45,412 (\$21.83)	\$40,980 (\$19.70)	\$39,750 (\$19.11)
Median Change in Earnings for SWP Exiting Students	55%	29%	43%
SWP Exiting Students Who Attained the Living Wage	53%	46%	59%

³ All SWP metrics are for 2020-21 unless otherwise noted.

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering welding technology training programs. Exhibit 13 displays the annual and two-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) Code: Welding Technology/Welder (48.0508). No metrics were available for the following CIP Code: Welding Engineering Technology/Technician (15.0614). The available data covers 2019 to 2021. During this period, non-community college institutions in the region conferred an average of 187 awards annually in related programs.

Exhibit 13: Regional Non-Community College Awards, 2019-2021

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
48.0508	Welding Technology / Welder	Hacienda La Puente Adult Education	27	26	27
		Tri-Community Adult Education	123	122	123
		UEI College-Gardena	0	55	28
		Universal Technical Institute-Southern California	0	21	11
Supply Total/Average			150	224	187

Regional Demographics

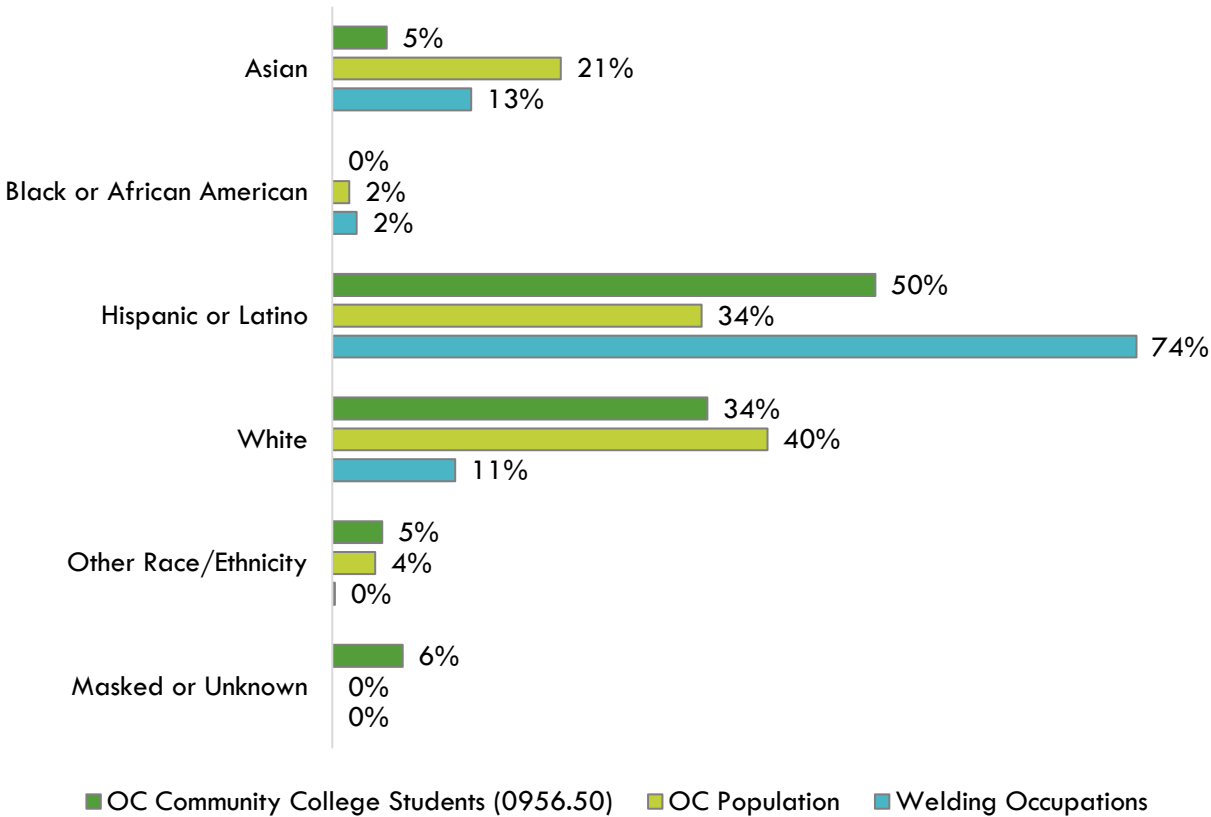
This section examines demographic data for Orange County community college students in welding technology programs compared to OC population, along with occupational data, to identify potential diversity and equity issues addressable by community college programs. It is important to note that demographic data is identical for both welding occupations.

Ethnicity:

Exhibit 14 compares the ethnicity of Orange County community college students enrolled in welding technology programs, the overall Orange County population, and occupation-specific data the two welding occupations included in this report.

Nearly 75% of workers in the field and 50% of community college welding students are Hispanic or Latino; both figures are significantly higher than the population (34%). Conversely, 34% of community college welding technology students are white, which is slightly lower than the population (40%), but three-times higher than workers in the field (11%). Furthermore, though Asian individuals account for 21% of the county population, only 13% of workers in the field and 5% of community college welding students are Asian.

Exhibit 14: Program and County Demographics by Ethnicity

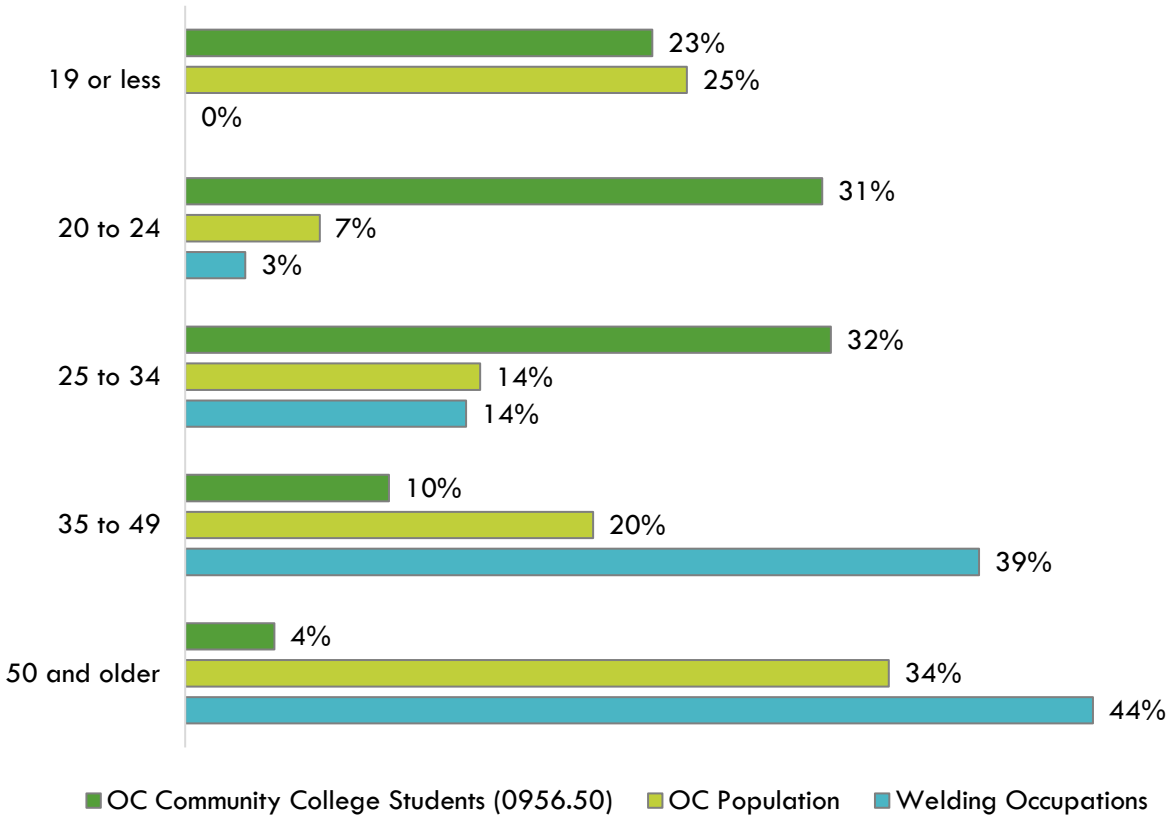


Age:

Exhibit 15 compares the age of Orange County community college students enrolled in welding technology programs, the overall Orange County population, and occupation-specific data for the two welding occupations included in this report.

Though individuals 20 to 34 account for 63% of community college welding technology students and 21% of the county population, persons of this age group represent only 17% of workers in the field. Conversely, despite representing 54% of the county population and a large majority of workers in the field (83%), individuals 35 and older account for only 14% of community college welding technology students.

Exhibit 15: Program and County Demographics by Age

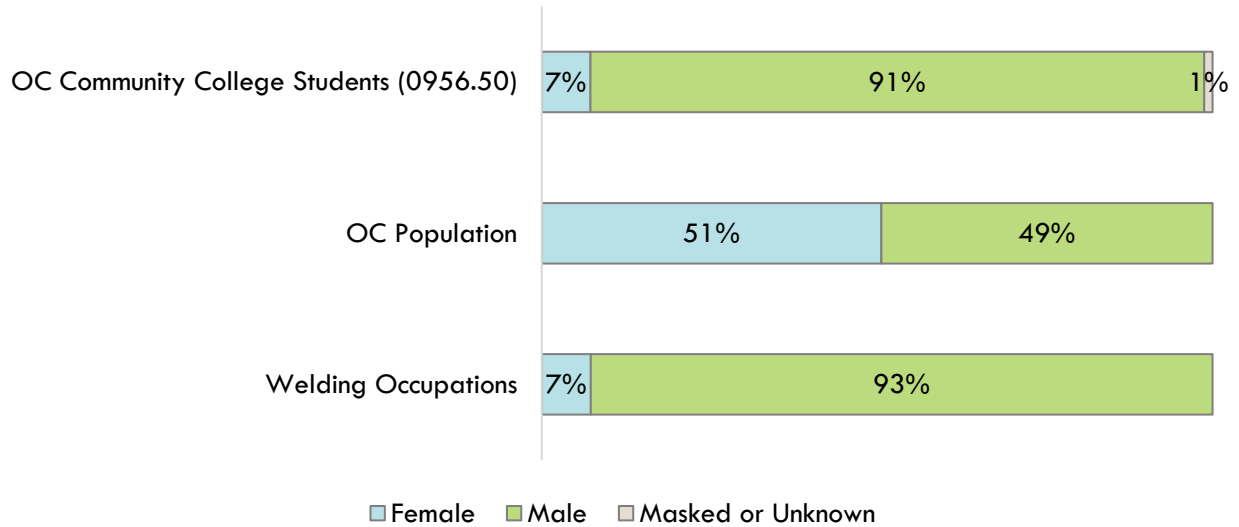


Sex:

Exhibit 16 compares the sex of Orange County community college students enrolled in welding technology programs, the overall Orange County population, and occupation-specific data for the two welding occupations included in this report.

Notably, though the population is split nearly evenly between women and men, only 7% of community college welding technology students and workers in the field are women.

Exhibit 16: Program and County Demographics by Sex



Appendix A: Methodology

The OC COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the OC COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The OC COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the OC COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	<p>Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/</p>
Living Wage	<p>The living wage is derived from the Insight Center’s California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, child care, health care, transportation, and taxes. For more information, see: https://insightccd.org/family-needs-calculator/</p> <p>The living wage for one adult in Orange County is \$20.63 per hour (\$42,910.40 annually). This figure is used by the CCCCCO to calculate the percentage of students that attained the regional living wage.</p>
Typical Education and Training Requirements, and Educational Attainment	<p>The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm</p>
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	<p>The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/</p>
Educational Supply	<p>The CCCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu</p> <p>The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions</p>
Student Metrics and Demographics	<p>LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx</p>

Data Type	Source
Population and Occupation Demographics	<p>The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs</p> <p>Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml</p>

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