

Labor Market Analysis for Program Modification: 0946.00/Environmental Control Technology (Certificate of Achievement)

CVML Center of Excellence, November 2025



Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met ☐	Endorsed: Some LMI Criteria Met ☒	Not LMI Endorsed ☐
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Program LMI Endorsement Criteria

	Yes ☐	No ☒
Supply Gap:	Comments: There are projected to be 364 annual job openings throughout the SCV/SML subregion for <i>HVAC-related occupations</i> , which are less than the 573 awards conferred by educational institutions in the SCV/SML subregion (CC + Non-CC) .	
Living Wage: (Entry-Level, 25th):	Yes ☒	No ☐
	Comments: <i>Sheet Metal Workers</i> and <i>Heating, Air Conditioning, and Refrigeration Mechanics and Installers</i> have an entry-level hourly wage above the SCV/SML living wage of \$16.08 .	
Education:	Yes ☒	No ☐
	Comments: The typical entry-level education for <i>Sheet Metal Workers</i> is a high school diploma or equivalent and the typical entry-level education for <i>Heating, Air Conditioning, and Refrigeration Mechanics and Installers</i> is a postsecondary nondegree award. Additionally, between 32% and 44% have completed some college or an associate degree as their highest level of education .	

Emerging Occupations(s)

Yes ☐	No ☒
Comments: N/A	

The Central Valley/Mother Lode Center of Excellence for Labor Market Research (CVML COE) prepared this report to determine whether there is a supply gap in the South Central Valley/Southern Mother Lode regional labor market related to the following middle-skill occupations:

- Sheet Metal Workers (47-2211)
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)

Middle-skill occupations typically require a community college education while above middle-skill occupations typically require at least a bachelor's degree.

Based on the available data, there does not appear to be a supply gap for *HVAC-related occupations*. In addition to both occupations having entry-level wages above the subregion's living wage, between 32% and 44% of workers in this field have completed some college or an associate degree as their highest level of education. **Therefore, due to some of the 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 *HVAC-related occupations*.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Sheet Metal Workers (47-2211)	NCV/NML: 31 SCV/SML: 61	NCV/NML: 165 SCV/SML: 573	NCV/NML: \$24.65 SCV/SML: \$25.81	High school diploma or equivalent	32%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)	NCV/NML: 139 SCV/SML: 303		NCV/NML: \$23.51 SCV/SML: \$22.86	Postsecondary nondegree award	44%
Total	534	738	-	-	-

Demand:

- The number of jobs related to the two *HVAC-related occupations* in this report are projected to increase 10% through 2029. There will be 364 annual job openings in the SCV/SML subregion.
- The two *HVAC-related occupations* have an entry-level hourly wage above the living wage of \$16.08 in the SCV/SML subregion.
- There were 375 online job postings for *HVAC-related occupations* over the past 12 months.
- The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *Sheet Metal Workers* and lists a postsecondary nondegree award as the typical entry-level education for *Heating, Air Conditioning, and Refrigeration Mechanics and Installers*.
- National-level educational attainment data indicates that between 32% and 44% of workers in the field have completed some college or an associate degree as their highest level of education.

Supply:

- Between 2021 and 2024, there was an average of 110 awards conferred by community colleges in the SCV/SML subregion.
- Between 2020 and 2023, non-community college institutions in the SCV/SML subregion conferred an average of 463 awards in relevant programs.

Demand

Occupational Projections

Exhibit 2 shows the annual percent change in jobs for the two *HVAC-related occupations* from 2019 through 2029. The SCV/SML subregion experienced the highest growth in 2019 at 6%, compared to the 1% growth across all CA occupations. The SCV/SML subregion experienced a 2% decline in 2024, compared to the 1% growth across all CA occupations. From 2025 to 2029, growth is projected to remain fairly steady (between 1% and 3%) in the SCV/SML subregion.

Exhibit 2: Annual Percent Change in Jobs for HVAC-Related Occupations, 2019-2029

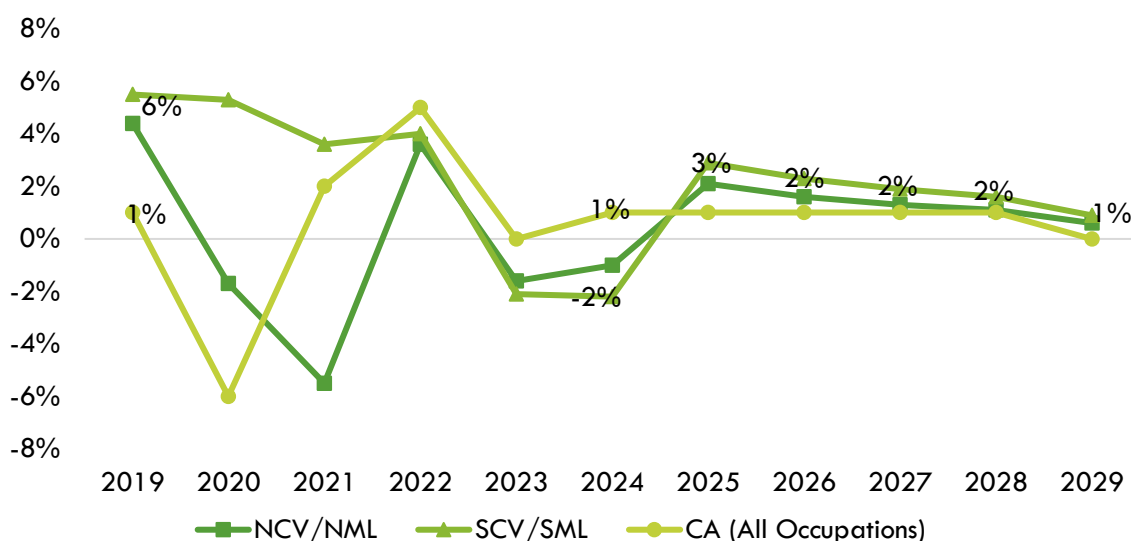


Exhibit 3 shows the five-year occupational demand projections for *HVAC-related occupations*. In the SCV/SML subregion, the number of jobs related to these occupations are projected to increase by 10% through 2029. There are projected to be 364 jobs available annually in the SCV/SML subregion.

Exhibit 3: Occupational Demand in NCV/NML, SCV/SML, and CVML¹

Geography	2024 Jobs	2029 Jobs	2024-2029 Change	2024-2029 % Change	Annual Openings
NCV/NML	1,669	1,786	117	7%	169
SCV/SML	3,362	3,700	338	10%	364
CVML	5,031	5,486	455	9%	533

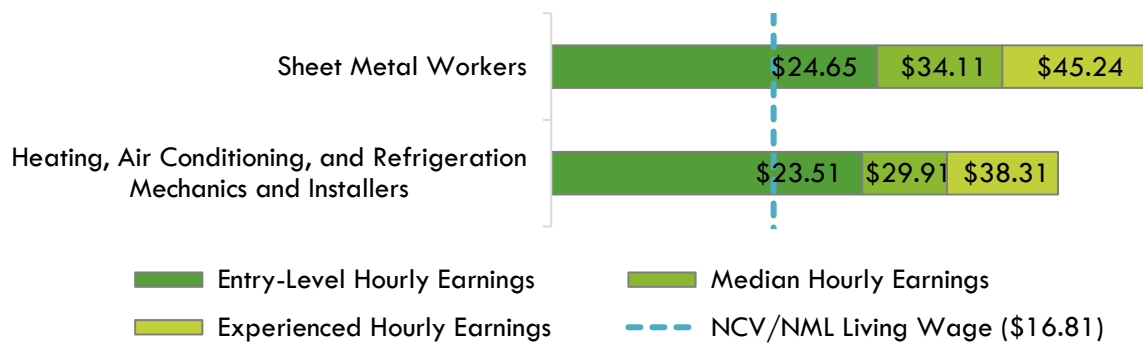
¹Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for the two *HVAC-related occupations* as they relate to the subregions and region's living wage. NCV/NML, SCV/SML, and CVML wages are included below to provide a complete analysis of the region.

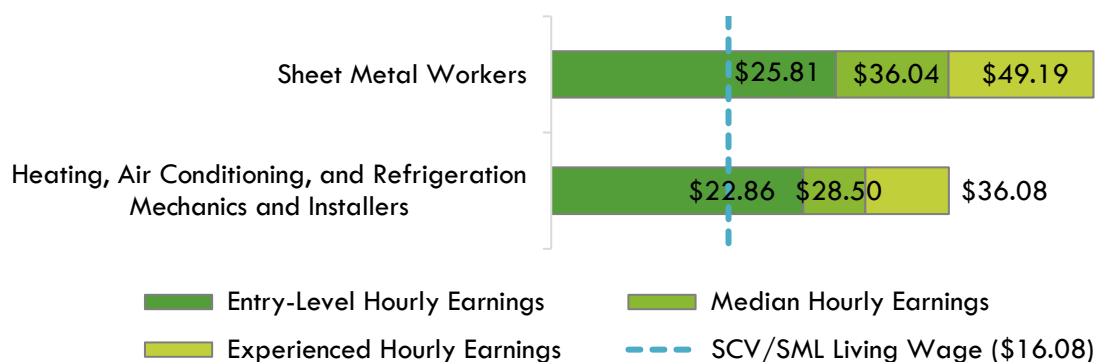
Both *HVAC-related occupations* have an entry-level hourly wage above the living wage for one adult in the NCV/NML subregion (\$16.81). The NCV/NML subregion average wage for these occupations is \$33.59, which is below the average statewide wage of \$36.51. Exhibit 4a shows the wage range for *HVAC-related occupations* and how they compare to the NCV/NML subregion's living wage.

Exhibit 4a: Wages by Occupation in NCV/NML



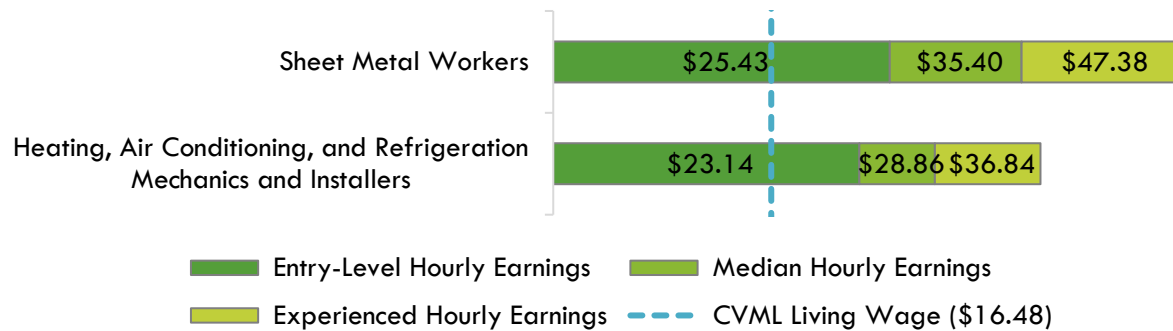
Both *HVAC-related occupations* have an entry-level hourly wage above the living wage for one adult in the SCV/SML subregion (\$16.08). The SCV/SML subregion average wage for these occupations is \$32.95, which is below the average statewide wage of \$36.51. Exhibit 4b shows the wage range for *HVAC-related occupations* and how they compare to the SCV/SML subregion's living wage.

Exhibit 4b: Wages by Occupation in SCV/SML



Both *HVAC-related occupations* have an entry-level hourly wage above the living wage for one adult in the CVML region (\$16.48). The CVML region average wage for these occupations is \$33.16, which is below the average statewide wage of \$36.51. Exhibit 5 shows the wage range for *HVAC-related occupations* and how they compare to the CVML region's living wage.

Exhibit 5: Wages by Occupation in CVML



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 375 online job postings related to HVAC-related occupations listed in the past 12 months (Exhibit 6).

Exhibit 6: Number of Job Postings by Occupation (n=375)

Occupations	Job Postings	Percentage of Job Postings
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	372	99%
Sheet Metal Workers	3	1%

The top employers in the region for HVAC-related occupations, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=375)

Employer	Job Postings	Percentage of Job Postings
EMCOR Group	30	8%

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

Employer	Job Postings	Percentage of Job Postings
Walmart	14	4%
Mammoth Mountain Ski Area	14	4%
Foster Farms	13	3%
Coolsys	13	3%
United Rentals	11	3%
Johnson Controls	9	2%
Nextech Sarl	9	2%
Monarch Home Services	8	2%
Carrier Corporation	7	2%

The top specialized, common, and software skills for *HVAC-related occupations* are listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

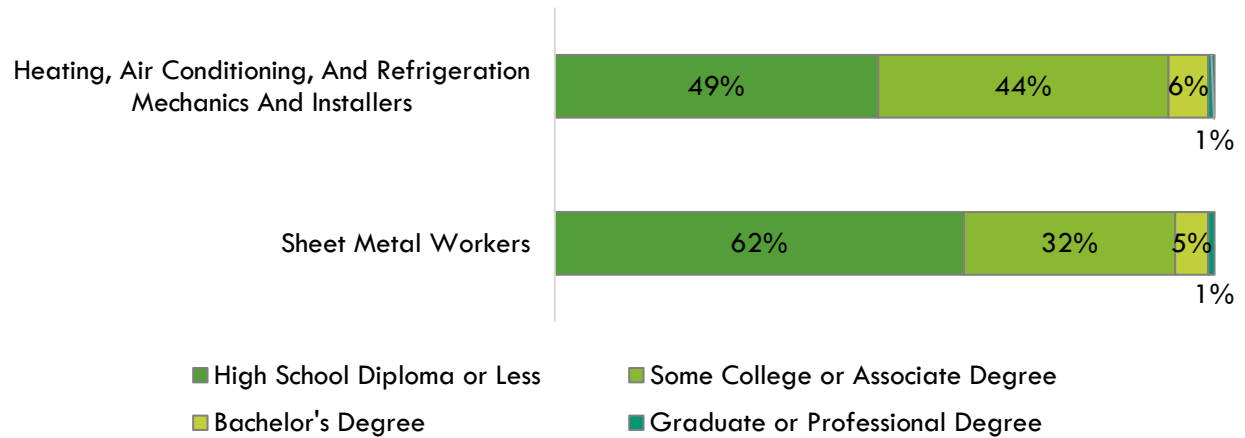
Exhibit 8: Top Skills by Number of Job Postings (n=375)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
HVAC (326)	Troubleshooting (Problem Solving) (157)	R (Programming Language) (53)
Boilers (83)	Communication (115)	Microsoft Excel (19)
Refrigerant (69)	Good Driving Record (102)	Microsoft Office (17)
Refrigeration (68)	Customer Service (88)	Microsoft Outlook (14)
Preventive Maintenance (67)	Operations (64)	Microsoft Word (10)
Ventilation (63)	Lifting Ability (59)	Microsoft PowerPoint (6)
R (Programming Language) (53)	Computer Literacy (52)	Apache Airflow (4)
Hand Tools (50)	English Language (51)	Spreadsheets (4)
Plumbing (42)	Writing (51)	Siemens Desigo (3)
Valves (Piping) (38)	Detail Oriented (44)	Business Software (3)

Educational Attainment:

Of the 375 online job postings, 45% (equivalent to 170 postings) of cumulative job postings for the two HVAC-related occupations listed a minimum education requirement in the SCV/SML subregion. Of the 170 postings, 96% (164) requested a high school or GED.

Exhibit 9: National-level Educational Attainment for HVAC-Related Occupations



Educational Supply

Community College Supply:

Exhibits 10a and 10b show the annual and three-year average number of awards conferred by community colleges in the programs that have historically trained for the occupations included in this report. The colleges with the most completions are Fresno City (South) and Bakersfield (South).

**Exhibit 10a: NCV/NML Community College Awards (Certificates and Degrees)
2021-22 through 2023-24**

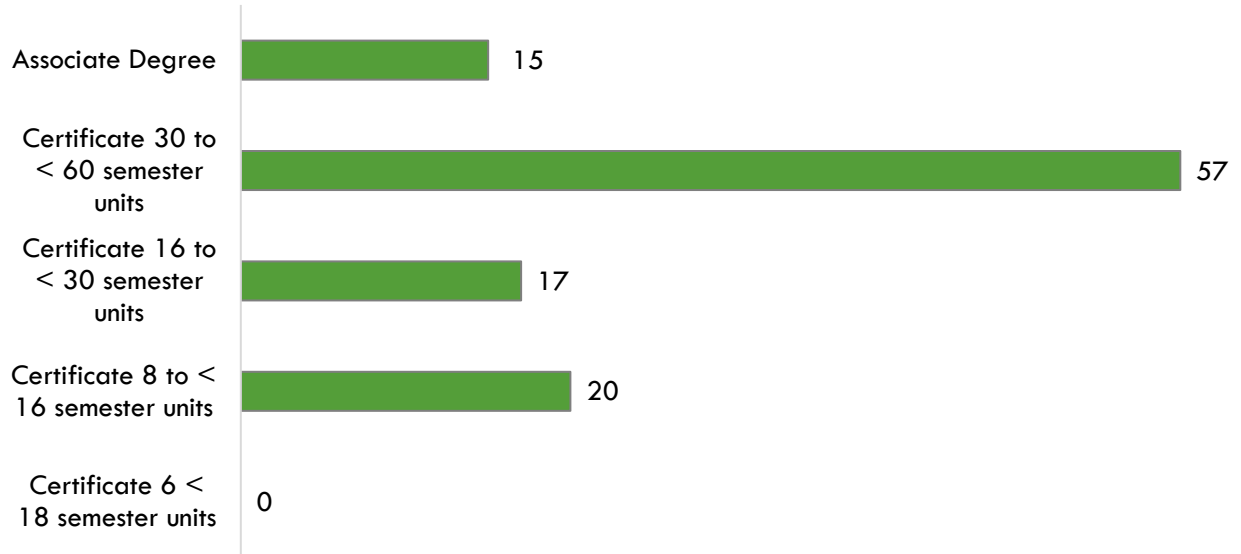
TOP Code	Program	College	2021-2022 Awards	2022-2023 Awards	2023-2024 Awards	3-Year Award Average
0946.00	Environmental Control Technology (HVAC)	Merced	9	26	23	19
		San Joaquin Delta	14	7	15	12
Subtotal/Average			23	33	38	31
0956.40	Sheet Metal and Structural Metal	Modesto	1	9	8	6
Subtotal/Average			1	9	8	6
NCV/NML Supply Grand Total			24	42	46	37

**Exhibit 10b: SCV/SML Community College Awards (Certificates and Degrees)
2021-22 through 2023-24**

TOP Code	Program	College	2021-2022 Awards	2022-2023 Awards	2023-2024 Awards	3-Year Award Average
0946.00	Environmental Control Technology (HVAC)	Bakersfield	6	16	20	14
		Coalinga	18	9	23	17
		Fresno City	32	43	49	41
		Sequoias	30	22	24	25
Subtotal/Average			86	90	116	97
0956.40	Sheet Metal and Structural Metal	Bakersfield	16	15	6	12
Subtotal/Average			16	15	6	12
SCV/SML Supply Grand Total			102	105	122	110

Exhibit 11 shows the annual average community college awards by type from 2021-22 through 2023-24. Of the 110 awards conferred in the SCV/SML subregion, 52% (57) of these awards were for a certificate 30 to < 60 semester units.

Exhibit 11: Annual Average Community College Awards (SCV/SML) by Type, 2021-2024



Community College Student Outcomes:

Exhibits 12 shows the Strong Workforce Program (SWP) metrics for Environmental Control Technology programs in West Hills Community College District (WHCCD), the SCV/SML subregion, the CVML region, and California.

Of the 4,761 environmental control technology (HVAC) program students statewide in the 2023-2024 academic year, 10% (453) attended a CVML institution. WHCCD students that exited environmental control technology (HVAC) programs in the 2022-2023 academic year had greater median annual earnings (\$45,186) compared to all environmental control technology (HVAC) students in SCV/SML subregion (\$41,380). Notably, 62% of CVML environmental control technology (HVAC) students attained a living wage, which is greater than the percentage of students who attained a living wage statewide (53%).

Exhibit 12: Environmental Control Technology (HVAC) (0946.00) Strong Workforce Program Metrics

SWP Metric	WHCCD	SCV/SML Subregion	CVML Region	California
SWP Students	30	286	453	4,761
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	77%	57%	55%	41%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	87%	87%	76%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	77%	35%	28%	18%
SWP Students Who Transferred to a Four-Year Postsecondary Institution	0%	N/A	N/A	0%
SWP Students with a Job Closely Related to Their Field of Study	N/A	N/A	91%	77%
Median Annual Earnings for SWP Exiting Students	\$45,186 (\$21.72)	\$41,380 (\$19.89)	\$39,564 (\$19.02)	\$52,088 (\$25.04)
Median Change in Earnings for SWP Exiting Students	-13%	20%	22%	32%
SWP Exiting Students Who Attained the Living Wage	71%	65%	62%	53%



2023-2024



2022-2023



2021-2022



N/A

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for the occupations studied in this report. Exhibits 13a and 13b show the annual and three-year average number of awards conferred by non-community college institutions in programs that have historically trained for the occupations of interest.

Between 2020 and 2023, non-community college institutions in the SCV/SML subregion conferred an average of 463 awards annually in related programs.

Exhibit 13a: NCV/NML Subregional Non-Community College Awards, 2020-2023

CIP Code	Program	Institution	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Award Average
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	DeHart Technical School	49	62	50	54
		UEI College-Stockton	62	104	58	75
Subtotal/Average			111	166	108	128
NCV/NML Supply Grand Total			111	166	108	128

Exhibit 13b: SCV/SML Subregional Non-Community College Awards, 2020-2023

CIP Code	Program	Institution	2020-21 Awards	2021-22 Awards	2022-23 Awards	3-Year Award Average
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Institute of Technology	106	178	122	135
		San Joaquin Valley College-Bakersfield	31	21	29	27
		San Joaquin Valley College-Fresno	8	-	-	3
		San Joaquin Valley College-Trades Education Center	9	14	11	11
		San Joaquin Valley College-Visalia	53	74	60	62
		UEI College-Bakersfield	104	75	91	90
		UEI College-Fresno	91	139	173	134
Subtotal/Average			402	501	486	463
SCV/SML Supply Grand Total			402	501	486	463

Appendix A: Methodology

The CVML 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 CVML 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 CVML 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 CVML 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	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/
Living Wage	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, childcare, health care, transportation, and taxes. For more information, see: https://selfsufficiencystandard.org/California/ Wage figures are used by the CCCCCO to calculate the percentage of students that attained the regional living wage.
Typical Education and Training Requirements, and Educational Attainment	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
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	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/
Educational Supply	The CCCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu 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
Student Metrics and Demographics	DataVista, 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://datavista.cccco.edu/
Population and Occupation Demographics	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 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

For more information, please contact the Central Valley/Mother Lode Center of Excellence:

Patricia Salinas, District Director

patricia.salinas@sccd.edu

Ignacio Faria, Senior Research and Planning Analyst

ignacio.faria@sccd.edu

Angela Steitz, Program Specialist

angela.steitz@sccd.edu

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