

# Labor Market Analysis for Program Review: 0946.00/Environmental Control Technology (HVAC) HVAC Technology

CVML Center of Excellence, January 2025



## Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input checked="" type="checkbox"/>	Endorsed: Some LMI Criteria Met <input type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
<b>Program LMI Endorsement Criteria</b>			
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Supply Gap:	<i>Comments:</i> There is projected to be 1,418 <b>annual job openings</b> throughout the SCV/SML subregion for <i>Environmental Control Technology-related occupations</i> , which is <b>more than the 532 awards conferred by SCV/SML educational institutions (CC + non-CC)</b> .		
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Living Wage: (Entry-Level, 25 <sup>th</sup> )	<i>Comments:</i> All three <i>Environmental Control Technology-related occupations</i> have entry-level hourly wages above the SCV/SML living wage of \$16.08.		
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Education:	<i>Comments:</i> Although the majority of all annual openings (78%) for the occupations studied in this report typically require a high school diploma or equivalent, <b>between 32% and 44% of workers in the field have completed some college or an associate degree as their highest level of education</b> .		
<b>Emerging Occupation(s)</b>			
	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
	<i>Comments:</i> N/A		

The CVML 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 occupations:

- Sheet Metal Workers (SOC 47-2211)
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers (SOC 49-9021)
- Maintenance and Repair Workers, General (SOC 49-9071)

Based on the available data, there appears to be a supply gap for *Environmental Control Technology-related occupations*. All three occupations have entry-level hourly wages above the subregion's living wage, and between 32% and 44% of workers in the field have completed some college or an associate degree as their highest level of education. **Due to all 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 *Environmental Control Technology-related occupations*.

### Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Sheet Metal Workers (47-2211)	NCV/NML: 36 SCV/SML: 72		NCV/NML: \$22.34 SCV/SML: \$23.26	High School Diploma or Equivalent	32%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)	NCV/NML: 137 SCV/SML: 316	NCV/NML: 159 SCV/SML: 532	NCV/NML: \$21.87 SCV/SML: \$21.73	Postsecondary Nondegree Award	44%
Maintenance and Repair Workers, General (49-9071)	NCV/NML: 670 SCV/SML: 1,031		NCV/NML: \$20.05 SCV/SML: \$18.39	High School Diploma or Equivalent	37%
<b>Total</b>	<b>2,262</b>	<b>691</b>	<b>-</b>	<b>-</b>	<b>-</b>

#### Demand:

- The number of jobs related to *Environmental Control Technology-related occupations* is projected to increase 8% through 2028. There will be 1,418 annual job openings (SCV/SML).
- The entry-level hourly wage for *Environmental Control Technology-related occupations* is between \$18.39 and \$23.26 in the South Central Valley/Southern Mother Lode subregion.
- There were 2,865 online job postings for *Environmental Control Technology-related occupations* in the past 12 months.
- The Bureau of Labor Statistics (BLS) lists a postsecondary nondegree award as the typical entry-level education for *Heating, Air Conditioning, and Refrigeration Mechanics and Installers*, and a high school diploma/equivalent for *Sheet Metal Workers* and *Maintenance and Repair Workers, General*.
- 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 2020 and 2023, there was an average of 90 awards conferred by four community colleges in the SCV/SML subregion.
- Between 2019 and 2022, non-community college institutions in the SCV/SML subregion conferred an average of 442 awards in relevant programs.

## Demand

### Occupational Projections

Exhibit 2 shows the annual percent change in jobs for *Environmental Control Technology-related occupations* from 2018 through 2028. Employment in these occupations experienced a 5% increase in 2022 (SCV/SML) but then experienced a decrease of 1% in 2023 (SCV/SML). Employment projections through 2028 for *Environmental Control Technology-related occupations* are expected to remain steady across the two subregions and CVML region (between 1% and 2%).

**Exhibit 2: Annual Percent Change for Jobs in Environmental Control Technology-Related Occupations, 2018-2028**

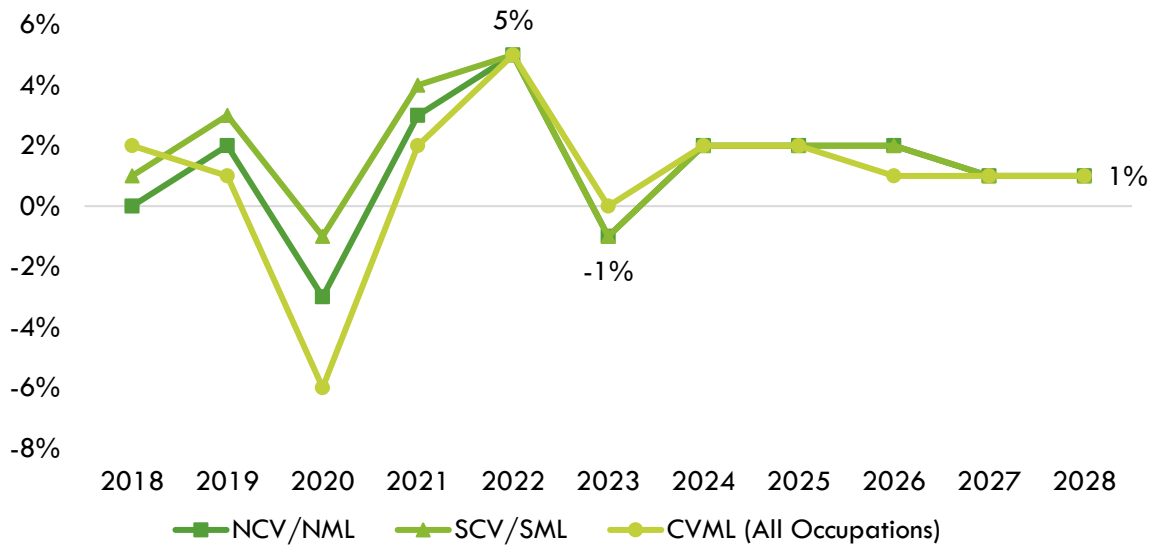


Exhibit 3 shows the five-year occupational demand projections for the *Environmental Control Technology-related occupations*. In the SCV/SML subregion, the number of jobs related to these occupations is projected to increase by 8% through 2028. There are projected to be 1,418 jobs available annually in the SCV/SML subregion.

**Exhibit 3: Occupational Demand in NCV/NML, SCV/SML and CVML<sup>1</sup>**

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
NCV/NML	7,839	8,439	600	8%	844
SCV/SML	13,168	14,200	1,032	8%	1,418
<b>CVML</b>	<b>21,007</b>	<b>22,639</b>	<b>1,632</b>	<b>8%</b>	<b>2,262</b>

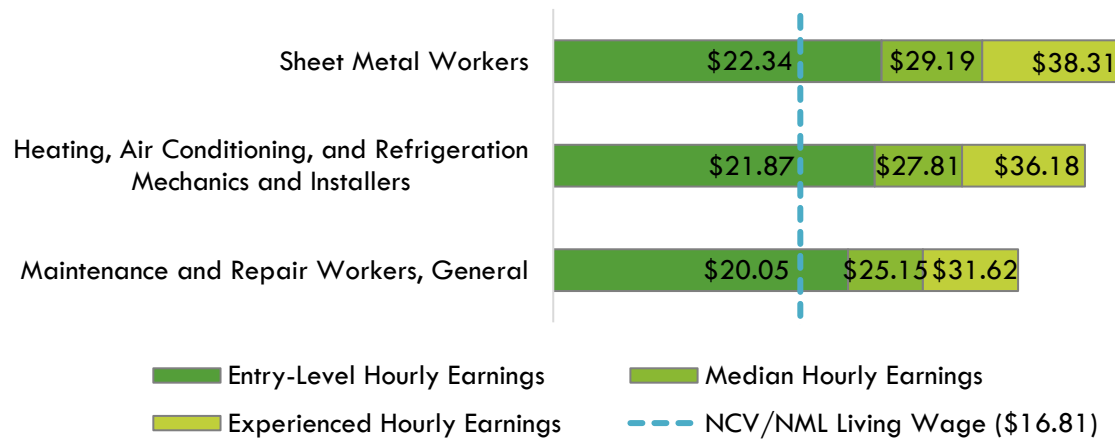
<sup>1</sup> Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

## Wages:

The labor market endorsement in this report considers the entry-level hourly wages for the three occupations of interest 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 subregions and region.

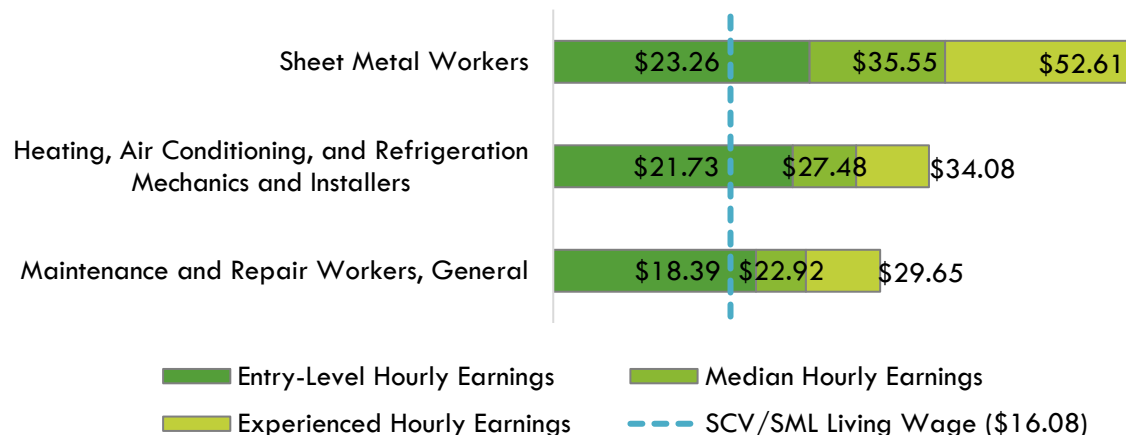
The typical entry-level hourly wage for *Sheet Metal Workers* (\$22.34), *Heating, Air Conditioning, and Refrigeration Mechanics and Installers* (\$21.87), and *Maintenance and Repair Workers, General* (\$20.05) are above the living wage for one adult in the NCV/NML subregion (\$16.81). The NCV/NML average wage for these occupations is \$27.60, which is below the average statewide wage of \$29.42. Exhibit 4a shows the wage range for the three occupations of interest and how they compare to the NCV/NML subregion's living wage.

**Exhibit 4a: Wages by Occupation in NCV/NML**



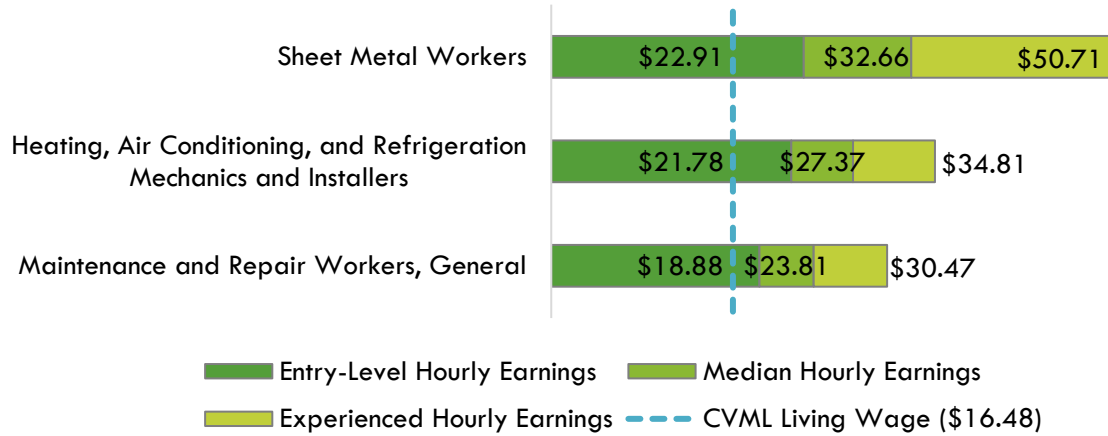
The typical entry-level hourly wage for *Sheet Metal Workers* (\$23.26), *Heating, Air Conditioning, and Refrigeration Mechanics and Installers* (\$21.73), and *Maintenance and Repair Workers, General* (\$18.39) are above the living wage for one adult in the SCV/SML subregion (\$16.08). The SCV/SML average wage for these occupations is \$26.72, which is below the average statewide wage of \$29.42. Exhibit 4b shows the wage range for the three occupations of interest and how they compare to the SCV/SML subregion's living wage.

**Exhibit 4b: Wages by Occupation in SCV/SML**



The typical entry-level hourly wage for *Sheet Metal Workers* (\$22.91), *Heating, Air Conditioning, and Refrigeration Mechanics and Installers* (\$21.78), and *Maintenance and Repair Workers, General* (\$18.88) are above the living wage for one adult in the CVML region (\$16.48). The CVML average wage for these occupations is \$27.05, which is below the average statewide wage of \$29.42. Exhibit 5 shows the wage range for the three occupations of interest and how they compare to the CVML living wage.

### Exhibit 5: Wages by Occupation in CVML



## Job Postings:

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 or phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors. 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 2,865 online job postings for the three Environmental Control Technology-related occupations listed in the past 12 months. Exhibit 6 shows the number of job postings for these occupations.

### Exhibit 6: Number of Job Postings by Occupation (n=2,865)

Occupation	Job Postings	Percentage of Job Postings
Maintenance and Repair Workers, General	2,401	83.8%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	459	16%
Sheet Metal Workers	5	0.2%

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

### Exhibit 7: Top Employers by Number of Job Postings (n=2,865)

Employer	Job Postings	Percentage of Job Postings
Aerotek	119	4%
EMCOR Group	58	2%
Walmart	55	2%
Randstad	39	1%
Foster Farms	34	1%
AWI Management Corporation	34	1%
Mammoth Mountain Ski Area	32	1%
Express Employment Professionals	31	1%
WinnCompanies	30	1%
GSF Properties	26	1%

The top specialized, common, and software skills for *Environmental Control Technology-related occupations* 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=2,865)

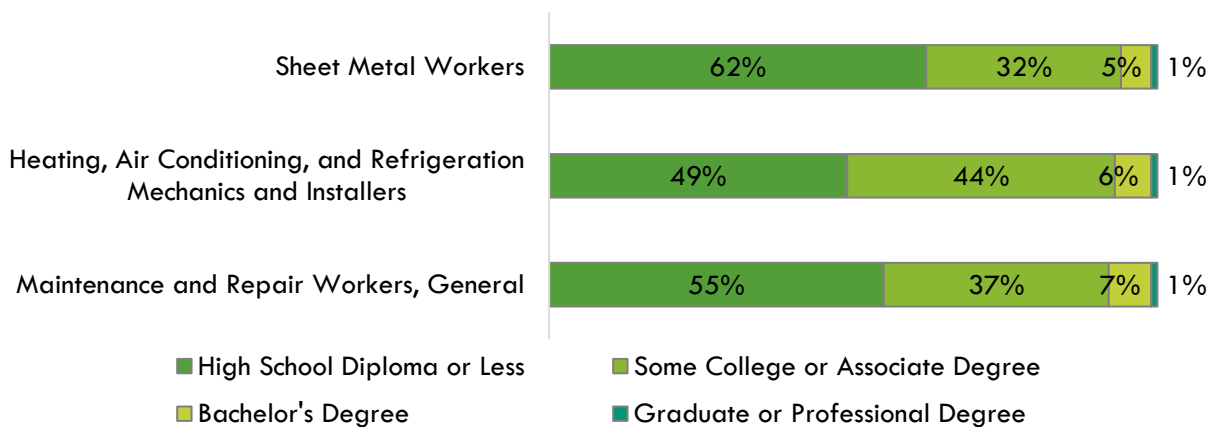
Top Specialized Skills	Top Common Skills	Top Software Skills
HVAC (873)	Troubleshooting (Problem Solving) (1,239)	Microsoft Outlook (188)
Plumbing (739)	Communication (942)	Microsoft Office (149)
Preventive Maintenance (637)	Operations (628)	Microsoft Excel (138)
Painting (498)	Customer Service (596)	Inventory Control Systems (75)
Carpentry (486)	Management (474)	Microsoft Word (66)
Machinery (454)	Lifting Ability (434)	Spreadsheets (58)
Power Tool Operation (384)	English Language (371)	Microsoft PowerPoint (50)
Field Service Management (341)	Detail Oriented (369)	SAP Applications (28)
Hand Tools (323)	Problem Solving (363)	Yardi (Property Management Software) (24)
Hydraulics (290)	Good Driving Record (339)	Gmail (19)

### Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a postsecondary nondegree award as the typical entry-level education for *Heating, Air Conditioning, and Refrigeration Mechanics and Installers*, and a high school diploma or equivalent for *Sheet Metal Workers* and *Maintenance and Repair Workers, General*. National-level educational attainment data indicates that between 32% and 44% of workers have completed some college or an associate degree as their highest level of education, as shown in Exhibit 9.

Of the 2,865 online job postings, 52% (equivalent to 1,496 postings) of cumulative job postings for the occupations of interest listed a minimum education requirement in the SCV/SML subregion, and 74% (1,111) requested a high school diploma or GED.

### Exhibit 9: National-level Educational Attainment for Environmental Control Technology-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 any of the three occupations included in this report. The colleges with the most completions are San Joaquin Delta (North) and Fresno City (South).

**Exhibit 10a: NCV/NML Community College Awards (Certificates and Degrees)  
2020-21 through 2022-23**

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0946.00	Environmental Control Technology (HVAC)	Merced	1	9	26	12
		San Joaquin Delta	19	14	7	13
		<b>Subtotal/Average</b>	<b>20</b>	<b>23</b>	<b>33</b>	<b>25</b>
0956.40	Sheet Metal and Structural Metal	Modesto	4	1	9	5
		<b>Subtotal/Average</b>	<b>4</b>	<b>1</b>	<b>9</b>	<b>5</b>
<b>NCV/NML Supply Grand Total</b>			<b>24</b>	<b>24</b>	<b>42</b>	<b>30</b>

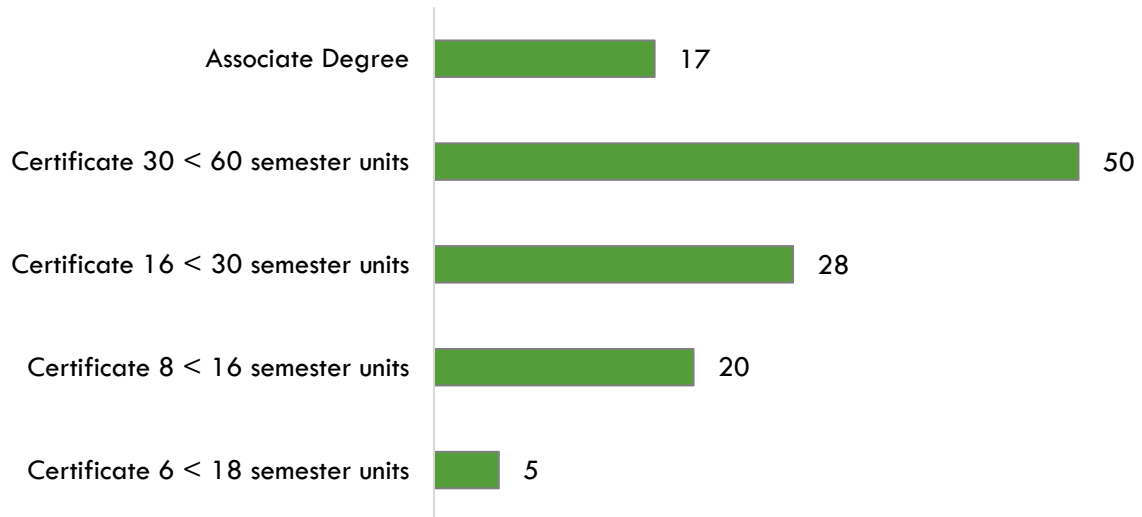
**Exhibit 10b: SCV/SML Community College Awards (Certificates and Degrees)  
2020-21 through 2022-23**

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0946.00	Environmental Control Technology (HVAC)	Bakersfield	11	6	16	11
		Fresno City	19	32	43	31
		Sequoias	29	30	22	27
		West Hills Coalinga	2	18	9	10
		<b>Subtotal/Average</b>	<b>61</b>	<b>86</b>	<b>90</b>	<b>80</b>
0956.40	Sheet Metal and Structural Metal	Bakersfield	-	16	15	10
		<b>Subtotal/Average</b>	<b>-</b>	<b>16</b>	<b>15</b>	<b>10</b>
<b>SCV/SML Supply Grand Total</b>			<b>61</b>	<b>102</b>	<b>105</b>	<b>90</b>



Exhibit 11 shows the annual average community college awards by type from 2020-21 through 2022-23. Of the 120 awards conferred in the CVML region, (50) 42% of all awards were for a certificate 30 < 60 semester units.

**Exhibit 11: Annual Average Community College Awards by Type, 2020-21 through 2022-23**



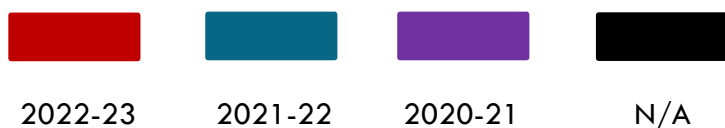
## Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for *Environmental Control Technology related occupations* in the Kern Community College District (KCCD), the SCV/SML subregion, the CVML region, and California. Of the 3,618 Environmental Control Technology students statewide in the 2022-23 academic year, 10% (365) attended a CVML institution.

CVML students that exited Environmental Control Technology programs in the 2021-22 academic year had median annual earnings (\$38,728), which is below the statewide median annual earnings (\$50,028). Notably, 86% of KCCD Environmental Control Technology students attained a living wage, which is higher than the percentage of students who attained a living wage in the SCV/SML region (83%), the CVML region (81%) and statewide (71%).

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

SWP Metric	KCCD	SCV/SML Region	CVML Region	California
SWP Students	72	249	365	3,618
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	57%	56%	58%	41%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	90%	90%	90%	79%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	18%	27%	25%	20%
SWP Students Who Transferred to a Four-Year Postsecondary Institution	0%	N/A	N/A	1%
SWP Students with a Job Closely Related to Their Field of Study	N/A	77%	80%	69%
Median Annual Earnings for SWP Exiting Students	\$43,400 (\$20.87)	\$38,854 (\$18.68)	\$38,728 (\$18.62)	\$50,028 (\$24.05)
Median Change in Earnings for SWP Exiting Students	4%	33%	35%	33%
SWP Exiting Students Who Attained the Living Wage	86%	83%	81%	71%



## 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 any of the three 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 2019 and 2022, non-community colleges in the NCV/NML subregion conferred an average of 129 awards while the SCV/SML subregion conferred an average of 442 awards annually in related training programs.

### Exhibit 13a: NCV/NML Subregional Non-Community College Awards, 2019-2022

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	DeHart Technical School	39	49	62	50
		UEI College-Stockton	71	62	104	79
		<b>Subtotal/Average</b>	<b>110</b>	<b>111</b>	<b>166</b>	<b>129</b>
<b>NCV/NML Supply Grand Total</b>			<b>110</b>	<b>111</b>	<b>166</b>	<b>129</b>

### Exhibit 13b: SCV/SML Subregional Non-Community College Awards, 2019-2022

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	California Aeronautical University	-	-	-	-
		Institute of Technology	121	106	178	135
		San Joaquin Valley College-Bakersfield	22	31	21	25
		San Joaquin Valley College-Fresno	19	8	-	9
		San Joaquin Valley College-Trades Education Center	-	9	14	8
		San Joaquin Valley College-Visalia	55	53	74	61
		Santa Barbara Business College-Bakersfield	10	-	-	3
		UEI College-Bakersfield	95	104	75	91
		UEI College-Fresno	100	91	139	110
				<b>Subtotal/Average</b>	<b>422</b>	<b>402</b>
<b>SCV/SML Supply Grand Total</b>			<b>422</b>	<b>402</b>	<b>501</b>	<b>442</b>

## 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](http://datamart.cccco.edu)) and CIP code data comes from the Integrated Postsecondary Education Data System ([nces.ed.gov/ipeds/use-the-data](http://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	<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 <a href="https://lightcast.io/">https://lightcast.io/</a></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, childcare, health care, transportation, and taxes. For more information, see: <a href="https://selfsufficiencystandard.org/California/">https://selfsufficiencystandard.org/California/</a></p> <p>Wage figures are used by the CCCCOC 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 <a href="https://www.bls.gov/emp/documentation/education/tech.htm">https://www.bls.gov/emp/documentation/education/tech.htm</a></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 <a href="https://www.onetonline.org/help/online/">https://www.onetonline.org/help/online/</a></p>
Educational Supply	<p>The CCCCOC Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: <a href="https://datamart.cccco.edu">https://datamart.cccco.edu</a></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 <a href="https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions">https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions</a></p>
Student Metrics and Demographics	<p>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: <a href="https://datavista.cccco.edu/">https://datavista.cccco.edu/</a></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: <a href="https://www.census.gov/programs-surveys/acs">https://www.census.gov/programs-surveys/acs</a></p> <p>Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: <a href="https://usa.ipums.org/usa/about.shtml">https://usa.ipums.org/usa/about.shtml</a></p>

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January 2025

