



Summary

Program LMI Endorsement	All LMI Criteria Met	Some LMI Criteria Met (Proceed with Caution)	LMI Criteria NOT Met
	✓	<input type="checkbox"/>	<input type="checkbox"/>

Program LMI Endorsement Criteria		
Supply Gap	Yes ✓	No <input type="checkbox"/>
	<i>Comments:</i> There is <i>projected</i> to be 1,350 annual job openings throughout the Inland Empire/Desert region, which is more than the 620 annual average awards conferred by educational institutions over the last 3 years . Supply data includes both community college awards (124) and non-community college awards (596).	
Living Wage	Yes ✓	No <input type="checkbox"/>
	<i>Comments:</i> All (100%) of annual job openings for these four occupations have entry-level hourly wages above the IE/D living wage of 13.74. ¹	
Education	Yes ✓	No <input type="checkbox"/>
	<i>Comments:</i> Most job postings for target occupations require a high school degree or equivalent (69%) . See exhibits 8 and 9 for more details.	

The Inland Empire/ Desert (IE/D) Center of Excellence for Labor Market Research (IE/D COE) reviewed the following occupations to prepare this report:

- Middle-Skill (typically require training/education above a HS diploma but less than a bachelor’s degree)
 - Calibration Technologists and Technicians (17-3028)
 - Miscellaneous Construction and Related Workers (47-4098)
 - First-Line Supervisors of Mechanics, Installers, and Repairers (49-1011)
 - Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)

Summary of findings

Demand

- The number of jobs related to the middle-skill occupations – Calibration Technologists and Technicians, Miscellaneous Construction and Related Workers, First-Line Supervisors of Mechanics, Installers, and Repairers, Heating, Air Conditioning, and Refrigeration Mechanics and Installers - is projected to increase 7% through 2027, with 1,350 annual job openings (new and replacement jobs).
- Hourly entry-level wages for all occupations are above living wage at the 25th percentile hourly wage ranging from \$19.87 to \$29.30 in IE/D.
- There were 2,006 online job postings from 812 employers over the past 12-months with the highest postings for maintenance supervisors and maintenance managers.
- Most job postings for target occupations require a high school degree or equivalent (69%), followed by bachelor’s degree (22%), and associate degree (9%).

Supply

- On average, there were 620 annual awards conferred by educational institutions over the last 3 years in related fields: 124 from community colleges and 596 from other institutions (e.g., 4-year universities, private schools).
- IE/D community college students that exited these programs in the 2021-22 academic year earned a median annual wage of \$40,888 (\$19.66 per hour).
- 69% of students that exited their program in 2021-22 reported that they are working in a job closely related to their field of study.
- Community college programs play an important role diversifying the talent pipeline in these occupations. Most IE/D professionals in environmental technology occupations are Hispanic/Latino or White (89%), “mid career” or “late career” age categories (71%), and male (95%). Most community college students in related programs are Hispanic/Latino (80%), “pre-career/college” age category (51%), and male (96%)..

¹ While the [UW self-sufficiency standard](#) is currently used by the CO and other COEs, the self-sufficiency standard was last updated by UW in 2021, does not account for significant increases in the cost of living in the Inland Empire the last three years, and is below the State of California minimum wage of \$16.00. For these reasons, the COE will provide an alternative living wage calculation from MIT in the analysis below as an additional reference point. MIT estimates, the living wage for an adult with no kids living in 2024 is \$26.30 in Riverside County and \$25.17 in San Bernadino County.

Introduction

California Community College Environmental Control Technology (HVAC) (TOP 0946.00) programs prepare students for employment in the assembly, installation, operation, maintenance, and repair of air conditioning, heating, and refrigeration systems. (Taxonomy of Programs, 2023). The knowledge, skills, and abilities trained by Environmental Control Technology (HVAC) programs lead to employment in occupations related to environmental technology.

Job Demand

In 2022, there were 12,730 jobs in occupations related to environmental technology in the IE/D region. Regional employment for this occupation group is projected to increase by 7% through 2027 with 1,350 job openings projected annually. Exhibit 1 displays the job count, five-year projected job growth, and job openings in the region.

Exhibit 1. Five-year projections for occupations related to environmental technology, IE/D Region, 2022-2027

Occupation	SOC	2022 Jobs	2027 Jobs	2022 - 2027 % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	49-9021	6,294	6,847	9%	3314	663
First-Line Supervisors of Mechanics, Installers, and Repairers	49-1011	6,032	6,682	11%	3232	646
Miscellaneous Construction and Related Workers	47-4098	375	391	4%	190	38
Calibration Technologists and Technicians	17-3028	29	31	6%	16	3
Total		12,730	13,951	7%	6751	1,350

SOURCE: LIGHTCAST 2024.1

Job Postings

The following analysis for occupations related to environmental technology using online job posting data.

Important note: The data produced in this section were generated by leveraging online job posting data sourced from Lightcast, which is the labor market analytics software tool COEs use to produce these briefs. The job posting data is collected from scraping online job boards such as LinkedIn, Indeed, Glassdoor and many others. The process Lightcast uses to assemble this data does have some limitations due to methods that recruitment professionals sometimes use (e.g., posting one job to fill multiple positions). For example, the number of jobs posted is not necessarily the same as the number of job vacancies.² While not perfect, Lightcast leverages machine learning and other AI technologies to enrich, deduplicate and aggregate this information to make it a meaningful dataset.

Exhibit 2 displays the number of job ads posted for occupations related to environmental technology over the last 12 months and the median posting duration. Over the previous 12 months, there were 2,006 unique job postings for occupations related to environmental technology in the region from 812 employers.

² "Job Posting Analytics (JPA) Methodology." Lightcast Knowledge Base, <https://kb.lightcast.io/en/articles/6957446-job-posting-analytics-jpa-methodology>

Exhibit 2. Job ads and posting duration, IE/D Region, May 2023 – April 2024

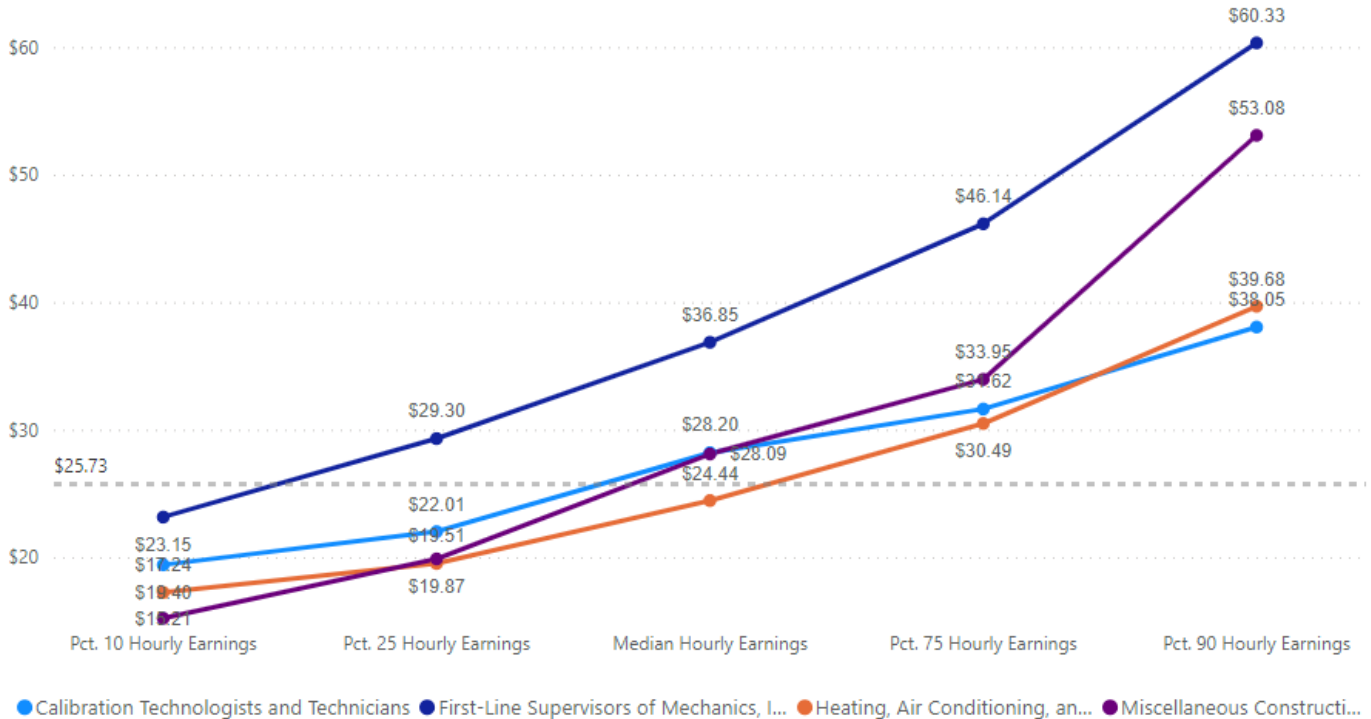
Job Title	Job Ads	Median Posting Duration
First-Line Supervisors of Mechanics, Installers, and Repairers	1,347	30 days
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	575	27 days
Miscellaneous Construction and Related Workers	55	36 days
Calibration Technologists and Technicians	29	31 days
Total	2,006	

SOURCE: LIGHTCAST 2024.1

Earnings

Exhibit 3 displays the hourly earnings for occupations related to environmental technology and includes comparison of hourly earnings as compared to the MIT IE/D living wage of \$25.73.³

Exhibit 3. Hourly earnings by percentile for occupations related to environmental technology, IE/D Region, 2022



SOURCE: LIGHTCAST 2024.1

All entry-level earnings (that is, the earnings of the lowest paid 10% of employees in the IE/D) were above the UW Self-Sufficiency Standard for the IE/D⁴. One of the four occupations was also above the MIT living wage for an adult with no children (\$25.73).

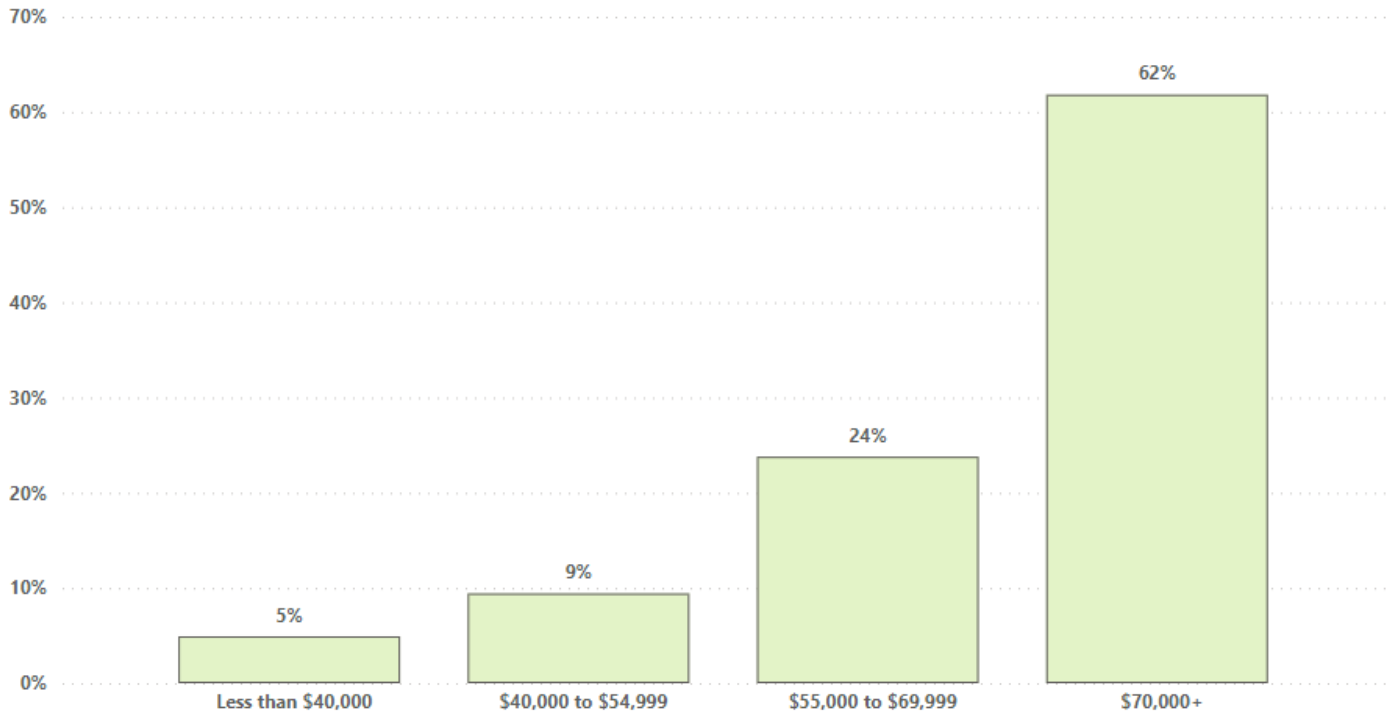
³ While the [UW self-sufficiency standard](#) is currently used by the CO and other COEs, the self-sufficiency standard was last updated by UW in 2021, does not account for significant increases in the cost of living in the Inland Empire the last three years, and is below the State of California minimum wage of \$16.00. While the COE uses this standard for the LMI Wage criteria, For these reasons, the provides an alternative living wage calculation from MIT in the analysis as an additional reference point. MIT estimates, the living wage for an adult with no kids living in 2024 is \$26.30 in Riverside County and \$25.17 in San Bernadino County.

⁴ *ibid*

Advertised Salary from Online Job Ads

Exhibit 4 displays the regional online advertised salaries for the occupations related to environmental technology over the last 12 months. Online job ad salary information data suggests most employers (62%) advertise an annual salary greater than \$70,000.

Exhibit 4. Online advertised salaries occupations related to environmental technology, IE/D Region, May '23 to April '24



SOURCE: LIGHTCAST 2024.1

Online Job Advertisements: top job titles, skills, education & work experience.

Exhibit 5 displays the job titles most frequently used in job postings for the occupations related to environmental technology over the last 12 months. Assessing the top advertised job titles may provide insight into the types of positions sought by employers.

Exhibit 5. Job titles most frequently used in job ads, IE/D May '23 to April '24

Job Title	Unique Postings
Maintenance Supervisors	246
Maintenance Managers	90
HVAC Technicians	59
HVAC Installers	49
HVAC Service Technicians	49
Maintenance Leads	41
Maintenance Directors	38
Refrigeration Technicians	34
Area Maintenance Managers	26
Maintenance Coordinators	26

SOURCE: LIGHTCAST 2024.1

Exhibit 6 displays the employers posting the most job ads for this occupational group during the last 12 months. Showing employer names can provide insight into where students may find employment after completing a program and may inform job development and other employer engagement targets for faculty and staff involved in related programs. Walmart and Pearce Services had the highest unique job posts for this occupational group in the last 12 months. Posting intensity is the ratio of total job posts to unique job posts which are deduplicated. A higher posting intensity can represent the level of effort and activity the organization is putting into hiring for that position. The following report comes directly from Lightcast's Job Posting Analytics dashboard.

Exhibit 6. Employers posting the most job ads, IE/D May '23 to April '24

Company	Total/Unique (May 2023 - Apr 2024)	Posting Intensity	Median Posting Duration
Walmart	76 / 39	2 : 1	31 days
Pearce Services	60 / 31	2 : 1	46 days
State of California	25 / 21	1 : 1	17 days
EMCOR Group	47 / 17	3 : 1	n/a
American Residential Services	26 / 15	2 : 1	54 days
Greystar	29 / 14	2 : 1	26 days
Penske Automotive Group	145 / 14	10 : 1	32 days
Timos.Com	52 / 13	4 : 1	4 days
Service Champions	22 / 13	2 : 1	33 days
Equity Lifestyle Properties	27 / 12	2 : 1	37 days

SOURCE: LIGHTCAST 2024.1

Exhibit 7 displays the top common, specialized and computer skills that were included in the job postings over the last 12 months. Today's demand is an important indicator of which skills employers are looking for in the current market. Analyzing skills from a historical perspective as well as projecting the future needs of employers may provide insight into

how the job posting skills demand compares to the market as a whole. Rapidly growing skills are those that are increasing in demand at a faster rate than the market as a whole.⁵

Exhibit 7. Top 10 in-demand skills from employer job ads, IE/D May '23 to April '24

Common skills	Total Postings	Skill Growth Relative to Market
Communication	798	Lagging
Management	719	Stable
Operations	685	Stable
Customer Service	589	Stable
Troubleshooting (Problem Solving)	438	Growing
Leadership	432	Stable
Scheduling	370	Growing
Problem Solving	327	Growing
Planning	276	Growing
Lifting Ability	273	Growing

Specialized skills	Total Postings	Skill Growth Relative to Market
HVAC	756	Stable
Plumbing	384	Growing
Preventive Maintenance	340	Growing
Construction	239	Growing
Carpentry	217	Growing
Machinery	187	Stable
Painting	185	Growing
Facility Repair And Maintenance	156	Growing
Occupational Safety and Health Administration (OSHA)	155	Growing
Project Management	151	Rapidly Growing

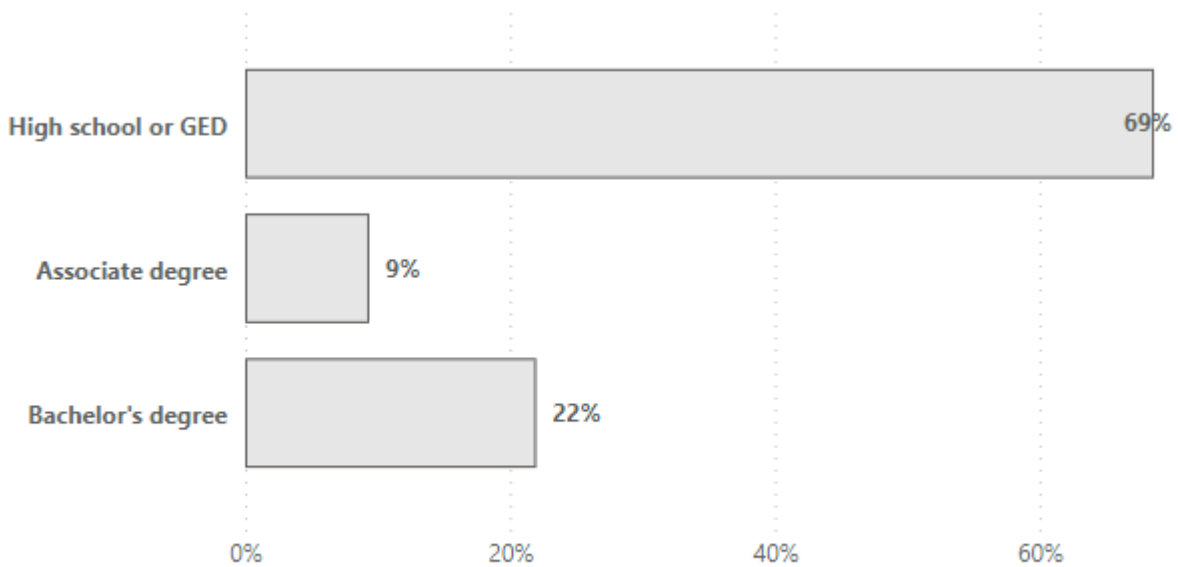
Computer Skills	Total Postings	Skill Growth Relative to Market
Microsoft Office	208	Growing
Microsoft Excel	179	Growing
Microsoft Outlook	124	Rapidly Growing
Microsoft Word	82	Stable
Microsoft PowerPoint	75	Rapidly Growing
SAP Applications	55	Rapidly Growing
Inventory Control Systems	46	Growing
Spreadsheets	31	Rapidly Growing
Project Management Software	28	Stable
Yardi (Property Management Software)	25	Growing

SOURCE: LIGHTCAST 2024.1

⁵ "What are Lightcast Skill Projects", Lightcast Knowledge base, <https://kb.lightcast.io/en/articles/8496296-what-are-lightcast-skill-projections>

Exhibit 8 includes the minimum educational requirements from job postings for this occupational group with high school diploma or equivalent (69%) significantly greater than associate degree (9%) or bachelor's degree (22%).

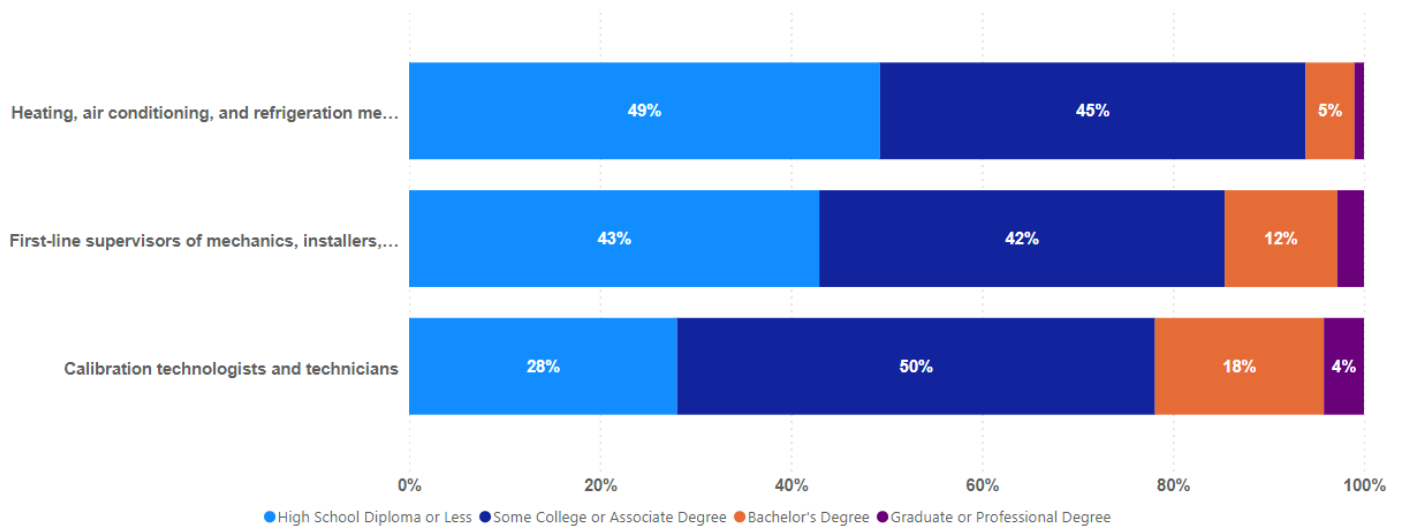
Exhibit 8 Minimum educational requirements in job postings for this occupational group, May '23 to April '24



SOURCE: LIGHTCAST 2024.1

For the middle-skill occupations, the Bureau of Labor Statistics (BLS) education attainment data in Exhibit 9 for current professionals in the occupations of interest indicates that between 45% and 50% of workers have completed some college or an associate degree as their highest level of education.

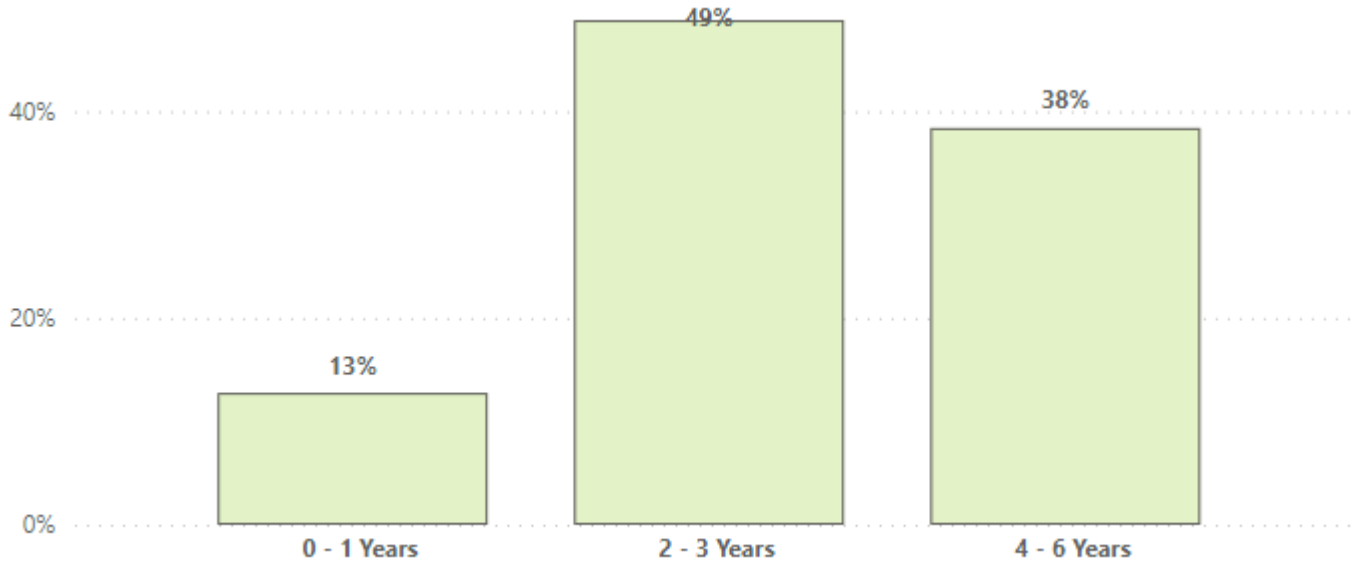
Exhibit 9 National-level Education Attainment for Occupations



SOURCE: BLS 2021

Exhibit 10 displays the work experience typically required from employer job ads for this occupational group. The plurality (49%) of employers listing minimum experience requirements sought candidates with 2 – 3 years of previous work experience.

Exhibit 10 Work experience requirements, IE/D May '23 to April '24



SOURCE: LIGHTCAST 2024.1

Student Completions and Program Outcomes

Exhibit 11 displays student completions for the Environmental Control Technology (HVAC) (TOP 0946.00) programs over the last three academic years (2020-2023). In the previous three academic years, five regional community colleges issued an average of 124 awards in relevant programs.

Exhibit 11 Annual average community college awards for Environmental Control Technology (HVAC) (TOP 0946.00)

Top Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0946.00	Environmental Control Technology (HVAC)	Riverside	45	41	81	56
0946.00	Environmental Control Technology (HVAC)	Desert	41	66	42	50
0946.00	Environmental Control Technology (HVAC)	San Bernardino	13	12	12	12
0946.00	Environmental Control Technology (HVAC)	Norco College	8	4	2	5
0946.00	Environmental Control Technology (HVAC)	Chaffey	0	1	4	2
Total			107	124	141	124

SOURCE: MIS DATA MART

Non-Community College Supply

Award completion data is available for Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician (47.0201) and Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician (15.0501) in the IE/D for non-community college programs.

In the previous three academic years, 12 regional non-community colleges institutions issued an average of 596 awards in relevant programs.

CIP	CIP with Title	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	UEI College-Ontario	115	115	166	132
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	UEI College-Riverside	106	133	120	120
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Mayfield College	77	64	46	62
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	Summit College	84	99	0	61
15.0501	15.0501 - Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician	Summit College	0	0	130	43
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	San Joaquin Valley College-Temecula	43	44	39	42
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	San Joaquin Valley College-Ontario	35	33	32	33
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	San Joaquin Valley College-Hesperia	38	21	30	30
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	CET-Colton	28	21	18	22
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	CET-Coachella	16	18	32	22
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	American College of Healthcare and Technology	13	6	12	10
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	InterCoast Colleges-Riverside	16	4	8	9
47.0201	47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	San Joaquin Valley College-Rancho Mirage	0	10	17	9
Total			571	568	650	596

SOURCE: IPEDS

California program outcome data may provide useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibit 12.

Exhibit 12 Environmental Control Technology (HVAC) strong workforce program outcomes, IE/D, most recent academic year

Program metric title	Inland Empire/Desert	Statewide
Attained a living wage (completers and skills-builders)	68%	66%
Completed 9+ career education units in one year	45%	40%
Job closely related to the field of study	69%	71%
Median annual earnings (all exiters)	\$40,888	\$47,082
Students who attained a noncredit workforce milestone in a year	86%	89%
Students who earned a degree, certificate, or attained apprenticeship	55	622
Unduplicated count of enrolled students	393	3,193

SOURCE: LAUNCHBOARD

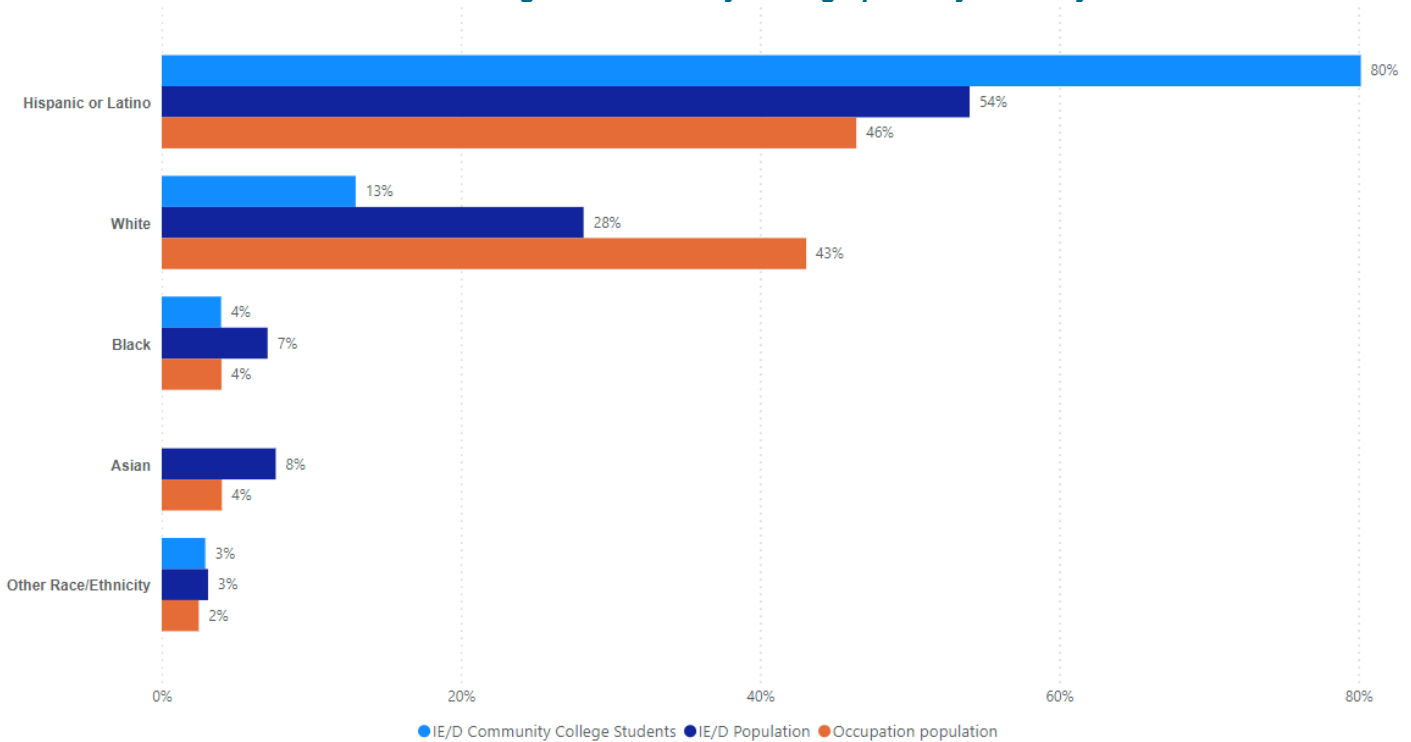
Building an Inclusive Economy

This section examines demographic data for IE/D community college students in Environmental Control Technology (HVAC) programs compared to the IE/D population. We also include demographics for related occupation data for the four occupations related to environmental technology. This analysis can be used to:

- Understand the community college system’s current or potential role supporting a diverse talent pipeline into the occupations of interest.
- Inform students (and the faculty and staff working with them) the extent to which individuals from similar demographic groups are over or underrepresented in the professions related to their field of study.
- Inform employers of the diverse talent pipeline coming from the community college system for the occupations analyzed.

Notably, 80% of students enrolled in Environmental Control Technology (HVAC) programs are Hispanic/Latino, which is significantly higher than Hispanic/Latino workers in occupations related to environmental technology in the IE/D region (46%). Additionally, 43% of the IE/D population that are employed in occupations related to environmental technology are White, which is significantly higher than both IE/D community college students (13%) and IE/D population (28%).

Exhibit 13 Program and County Demographics by Ethnicity



SOURCE: LIGHTCAST 2024.1 AND LAUNCHBOARD

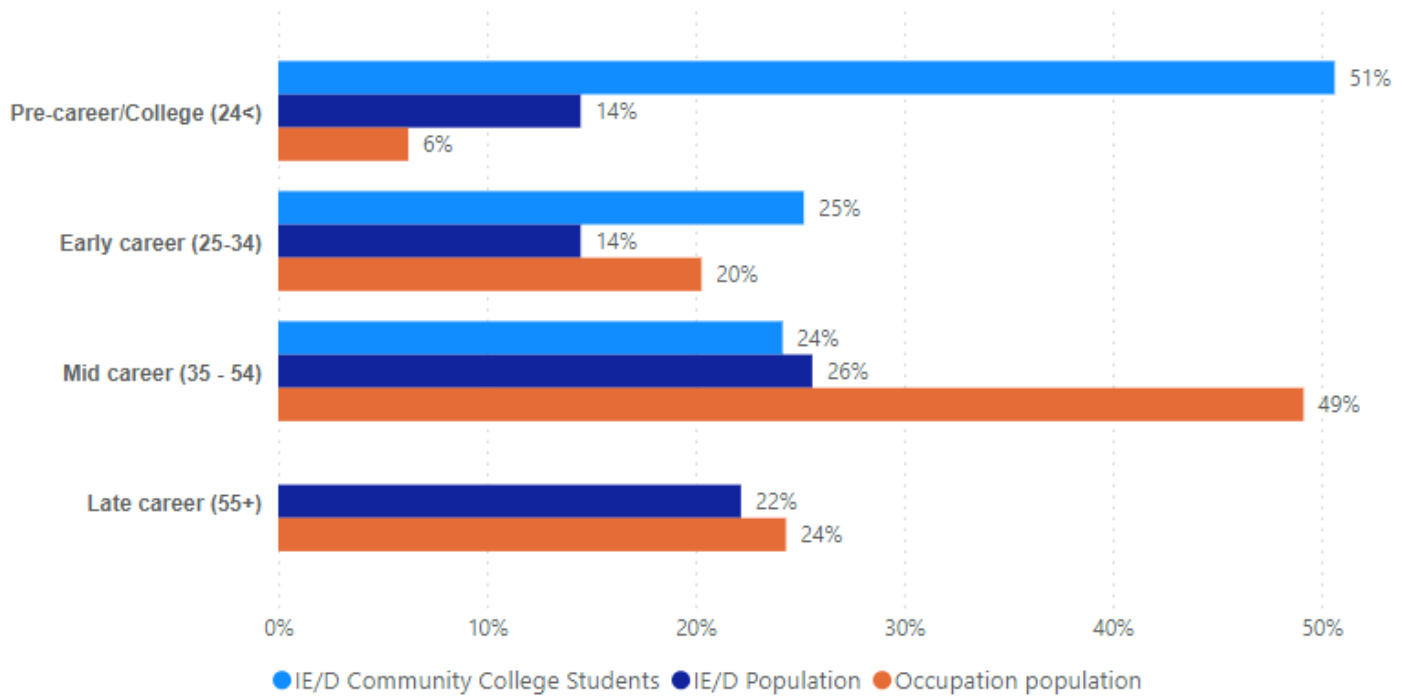
Most IE/D professionals in environmental technology occupations are Hispanic/Latino or White (89%), “mid career” or “late career” age categories (71%), and male (95%). Most community college students in related programs are Hispanic/Latino (80%), “pre-career/college” age category (51%), and male (96%). Major takeaways:

- Community colleges are an important talent source for employers committed to greater racial/ethnic diversity, especially Hispanic/Latino professionals.
- College programs may want to consider strategies to engage more women into these programs.

Exhibit 14 compares the age of IE/D community college students enrolled in Environmental Control Technology (HVAC) programs compared to the IE/D population.

The majority of students enrolled in Environmental Control Technology (HVAC) programs are either in the “pre-career/college” category (51%) or “early career” category (25%) as compared to IE/D population (28%) and workforce (26%) in these four occupations related to environmental technology. These programs are an important entry point for young environmental technology professionals.

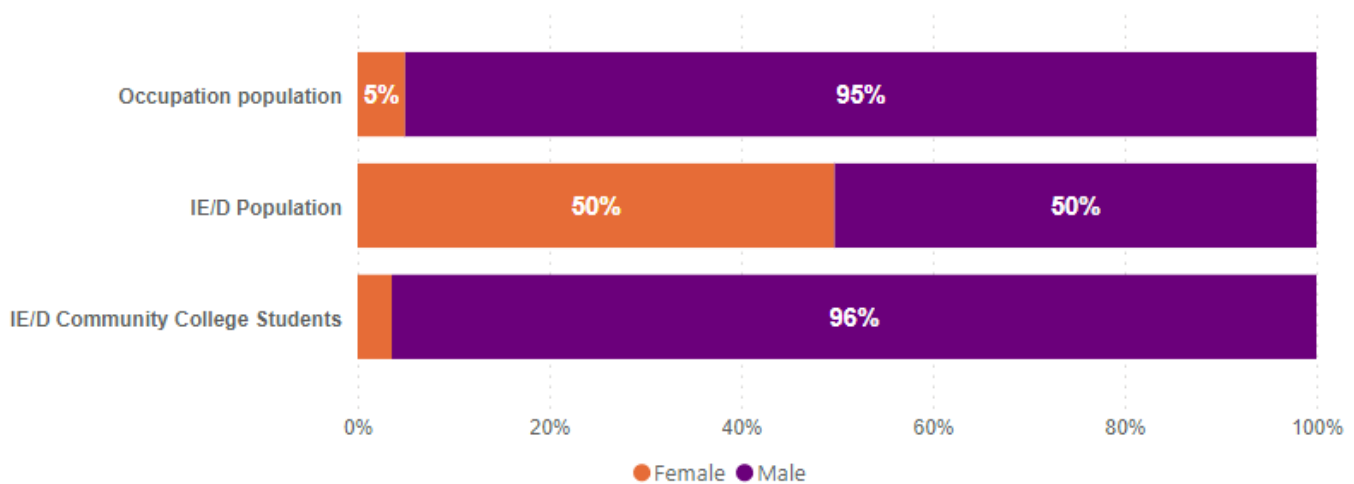
Exhibit 14 Program and County Demographics by Age



SOURCE: LIGHTCAST 2024.1

Exhibit 15 compares the gender of IE/D County community college students enrolled in Environmental Control Technology (HVAC) programs compared to the IE/D population. We also include demographics for related occupation data for the four occupations related to environmental technology to identify potential diversity and equity issues addressable by community college programs.

Exhibit 15 Program and County Demographics by Gender



SOURCE: LIGHTCAST 2024.1

Appendix: Methodology

Exhibit 11 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2020 and 2023 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variations that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from California's Employment Development Department's Unemployment Insurance database. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2023a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS) administered by Santa Rosa Junior College (LaunchBoard, 2023a).

Appendix: References

Type of Data	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. https://lightcast.io/
Living Wage	The living wage is derived from MITs Living Wage 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://livingwage.mit.edu/pages/methodology The living wage for one adult in San Bernardino County is \$25.17 per hour (\$52,353.60 annually). The living wage for one adult in Riverside County is \$26.30 per hour (\$54,704 annually). The average living wage to represent Inland Empire/Desert is \$25.74 per hour (53,539.20 annually)
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
Educational Supply	The CCCC 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	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