Labor Market Analysis for Program Recommendation: 0303.00/Environmental Technology (*Environmental Science/Public Health Technology*)
Orange County Center of Excellence, January 2024

Summary

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

Program LMI Endorsement Criteria		
	Yes ☑	No ☐
Supply Gap:	*Comments:* There is projected to be **272 annual job openings** throughout Los Angeles and Orange counties for these middle-skill environmental technology occupations, which **is more than the 74 awards conferred by educational institutions**.	
	Yes ☐	No ☑
Living Wage: (Entry-Level, 25th)	*Comments:* **The majority (78%) of annual job openings** for these middle-skill environmental technology occupations **have entry-level hourly wages below the OC living wage of $20.63**.	
	Yes ☑	No ☐
Education:	*Comments:* The typical entry-level education for these two middle-skill environmental technology occupations is an **associate degree and more than one-third of workers in the field in each occupation have completed some college or an associate degree as their highest level of education.**	

Emerging Occupation(s)	
Yes ☐	*No* ☑
Comments: 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 the following two environmental technology occupations:

- Environmental Engineering Technologists and Technicians (17-3025)
- Environmental Science and Protection Technicians, Including Health (19-4042)

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 appears to be a supply gap for these two middle-skill environmental technology occupations in the region. Although the typical education requirements for these middle-skill environmental technology occupations align with a community college education, the majority of annual openings have entry-level wages below the Orange County living wage. **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 the two environmental technology occupations included in this report.

Exhibit 1: Occupational Demand and Supply in Los Angeles/Orange Counties

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Environmental Engineering Technologists and Technicians (17-3025)	LA: 35	*Accounted for Below*	OC: $28.05	Associate degree	51%
	OC: 19				
	TTL: 54				
Environmental Science and Protection Technicians, Including Health (19-4042)	LA: 152	LA: 65	OC: $19.99	Associate degree	34%
	OC: 66	OC: 9			
	TTL: 218	*TTL: 74*			
Total	**272**	**74**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these middle-skill environmental technology occupations is projected to increase 6% through 2027. There is projected to be 272 annual job openings.
- Hourly entry-level wages for these occupations range from $19.99 to $28.05 in Orange County; 78% of annual job openings have entry-level wages below the living wage.
- There were 559 online job postings for these middle-skill environmental technology occupations over the past 12 months. The highest number of postings were for environmental technicians, field technicians, smog technicians, environmental health and safety specialists, environmental test technicians, monitoring technicians, and hazardous waste technicians.
- The typical entry-level education for these middle-skill environmental technology occupations is an associate degree.
- Between 34% and 51% of workers in these middle-skill occupations have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 74 awards conferred by five community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions did not confer any awards from 2019 to 2021.
- Orange County community college students that exited environmental technology programs in the 2020-21 academic year had a median annual wage of $33,758 after exiting the program and 36% of students attained the living wage.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for both environmental technology occupations researched in this report from 2017 through 2027. Employment in these environmental technology occupations declined 13% from 2019 to 2020 in Orange County, which is higher than the 7% decline across all occupations due to the COVID-19 pandemic. Employment in these environmental technology occupations is projected to grow at a similar rate when compared to all occupations through 2027.

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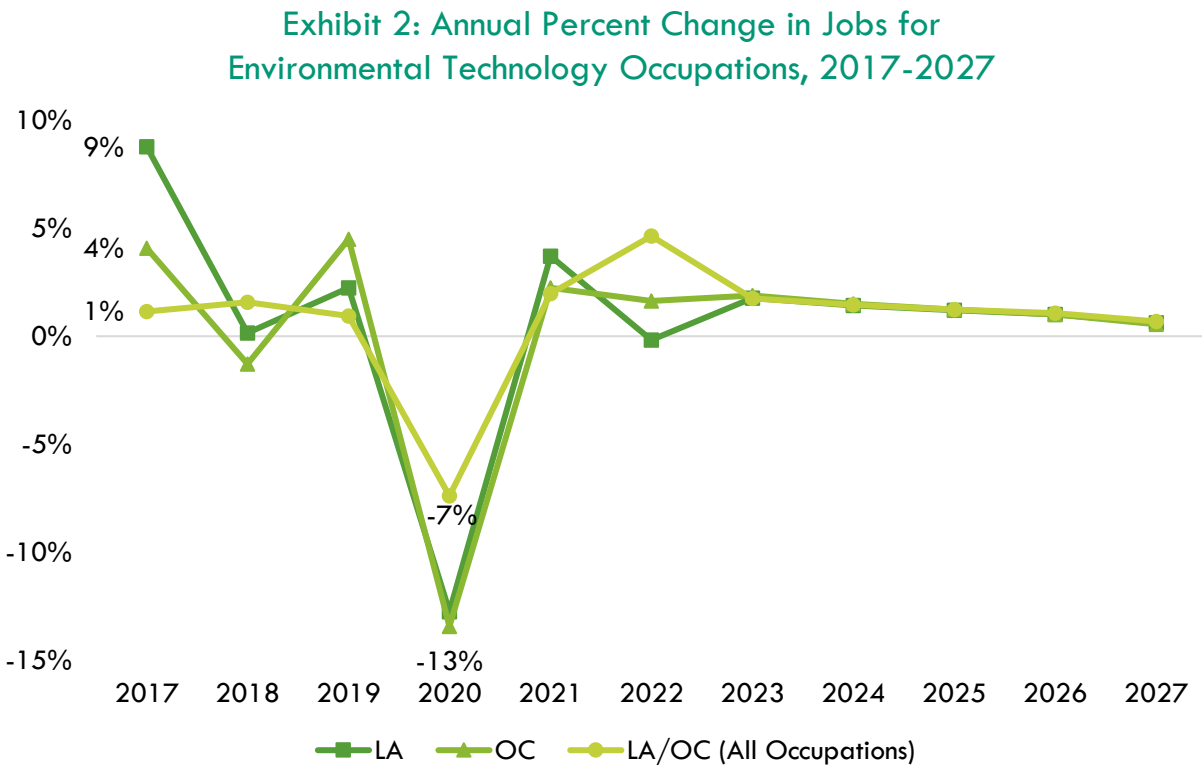

Exhibit 3 shows the five-year occupational demand projections for these middle-skill environmental technology occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 6% through 2027. There is projected to be 272 jobs available annually. Of those, 69% (187) are projected to be in Los Angeles County.

Exhibit 3: Middle-Skill Occupational Demand in Los Angeles and Orange Counties[1]

| Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	1,579	1,677	97	6%	187
Orange	720	765	46	6%	85
Total	**2,299**	**2,442**	**143**	**6%**	**272**

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[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 middle-skill environmental technology occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region.

The majority (78%) of annual openings for these middle-skill environmental technology occupations have entry-level wages below the living wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages for these middle-skill environmental technology occupations range from $19.99 to $28.05. Orange County's average wage ($29.70) is below the average statewide wage of $31.73 for these middle-skill occupations. Exhibit 4 shows the wage range for each of these 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
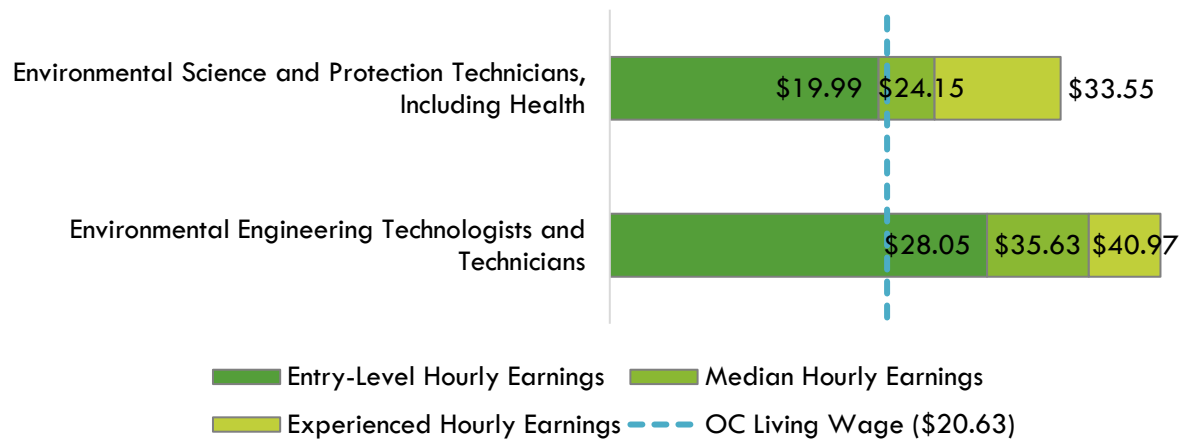
All annual openings for these middle-skill environmental technology occupations have entry-level wages above the living wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages for these middle-skill environmental technology occupations range from $21.05 to $28.54. Los Angeles County's average wage ($30.78) is below the average statewide wage of $31.73 for these middle-skill occupations. Exhibit 5 shows the wage range for each of these 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
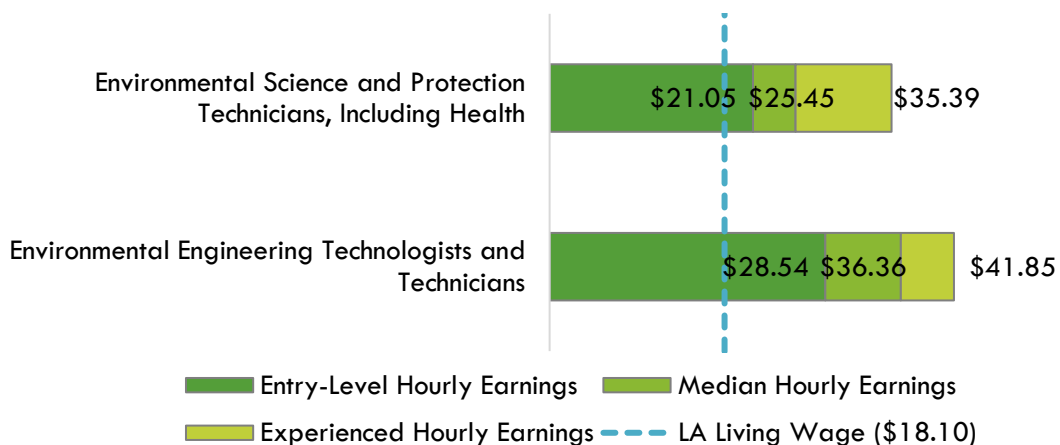
Job Postings:

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 559 online job postings related to these environmental technology occupations listed in the past 12 months. Notably, nearly all (95%) postings were for *environmental science and protection technicians, including health*. Exhibit 6 shows the number of job postings by occupation.

Exhibit 6: Number of Job Postings by Occupation (n=559)

Occupation	Job Postings	Percentage of Job Postings
Environmental Science and Protection Technicians, Including Health	530	95%
Environmental Engineering Technologists and Technicians	29	5%
Total	**559**	**100%**

The top employers for these middle-skill environmental technology occupations in the region, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Middle-Skill Employers by Number of Job Postings (n=559)

Employer	Job Postings	Percentage of Job Postings
Aerotek	30	5%
Montrose Environmental Group	26	5%
Alltech Environmental Services	16	3%
Clean Harbors	14	3%
Clean Earth	12	2%
Harsco Corporation	12	2%
Actalent	11	2%
AECOM	10	2%
United States Government	9	2%
HPC Industrial	8	1%

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[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) for the two middle-skill environmental technology occupations are shown in Exhibit 8.

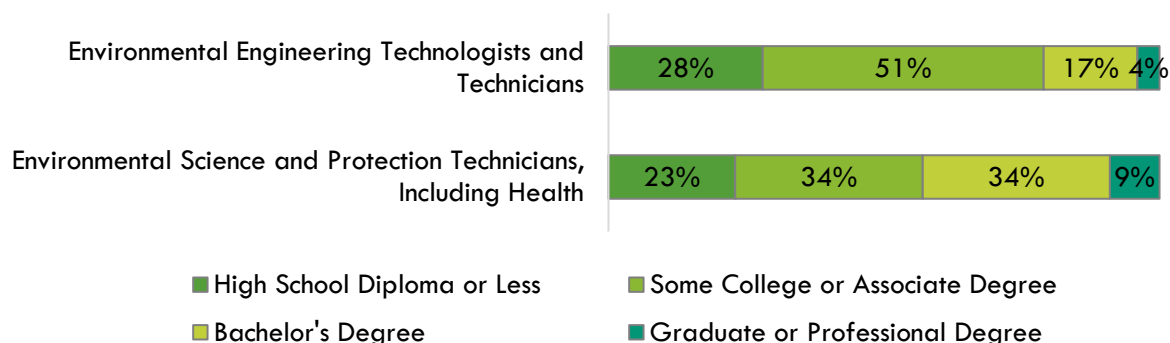### Exhibit 8: Top Skills for Middle-Skill Occupations by Number of Job Postings (n=559)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Environment Health and Safety (83)	Communication (133)	Microsoft Office (64)
Occupational Safety and Health Administration (OSHA) (75)	Management (92)	Microsoft Excel (49)
Project Management (68)	Operations (81)	Microsoft Outlook (28)
Forklift Truck (50)	Detail Oriented (79)	Microsoft PowerPoint (24)
Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) (48)	Lifting Ability (60)	Microsoft Word (11)
Emergency Response (45)	Writing (58)	Google Workspace (11)
Soil Science (43)	Good Driving Record (57)	Microsoft SharePoint (9)
Biology (41)	Computer Literacy (44)	Operating Systems (8)
Auditing (39)	Customer Service (42)	ArcGIS (GIS Software) (7)
Environmental Science (38)	Verbal Communication Skills (42)	Database Software (6)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists an associate degree as the typical entry-level education for *environmental engineering technologists and technicians*; and *environmental science and protection technicians, including health*. The national-level educational attainment data indicates between 34% and 51% of workers in these middle-skill occupations 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.

Of the 53% of the cumulative job postings for these middle-skill environmental technology occupations that listed a minimum education requirement in Los Angeles/Orange County, 28% (82) requested a bachelor's degree and 69% (205) requested a high school diploma or an associate degree.

Exhibit 9: National-level Educational Attainment for Occupations

Environmental Engineering Technologists and Technicians	28%	51%	17% 4%
Environmental Science and Protection Technicians, Including Health	23%	34%	34% 9%

■ High School Diploma or Less   ■ Some College or Associate Degree
■ Bachelor's Degree   ■ Graduate or Professional Degree

Educational Supply
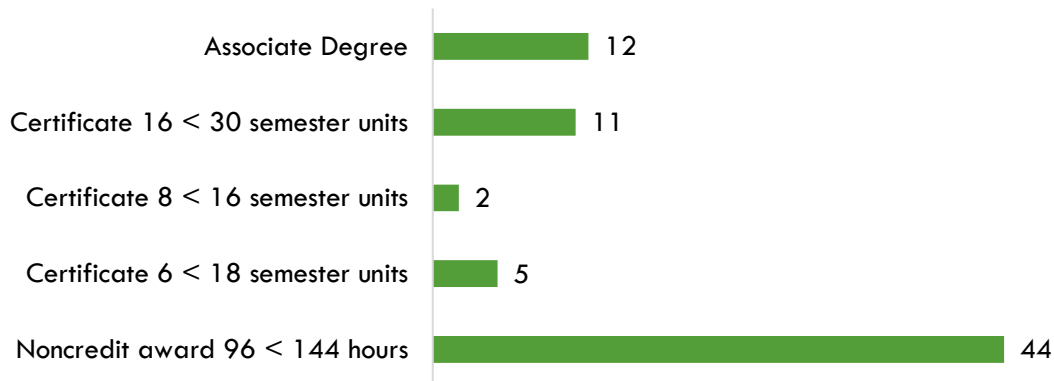
Community College Supply:

Exhibit 10 shows the annual and three-year average number of awards conferred by community colleges in the related TOP code: Environmental Technology (0303.00). The community college with the most completions in the region is Santa Monica. Over the past 12 months, there were no other 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
0303.00	Environmental Technology	Rio Hondo	9	4	14	9
		Santa Monica	37	74	57	56
		LA Subtotal	**46**	**78**	**71**	**65**
		Irvine Valley	4	9	8	7
		Saddleback	-	-	1	0
		Santiago Canyon	3	-	2	2
		OC Subtotal	**7**	**9**	**11**	**9**
		Supply Total/Average	**53**	**87**	**82**	**74**

Exhibit 11 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality of the awards is for noncredit awards of 96 to less than 144 hours (59%), followed by associate degrees (16%), and certificates of 16 to less than 30 semester units (15%).

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

Award Type	Count
Associate Degree	12
Certificate 16 < 30 semester units	11
Certificate 8 < 16 semester units	2
Certificate 6 < 18 semester units	5
Noncredit award 96 < 144 hours	44

Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for environmental technology programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Currently, one RSCCD college (Santiago Canyon) offers environmental technology programs. However, am analysis of course data from the Chancellor's Office Curriculum Inventory (COCI) shows that there are no courses listed under the Environmental Technology (0303.00) TOP code. Therefore, student outcomes data for RSCCD is not available. Of the 1,942 environmental technology students in California, 10% (196) attended an Orange County community college.

Orange County students that exited environmental technology programs in the 2020-21 academic year had a 43% median change in earnings, which is significantly higher than students throughout the state (19%). However, median annual earnings for Orange County students ($33,758) were lower than students throughout the state ($52,288). Notably, a lower percentage of environmental technology students in Orange County attained the living wage (36%) when compared to all environmental technology students in California (64%)

Exhibit 12: Environmental Technology (0303.00) Strong Workforce Program Metrics, 2020-21[3]

SWP Metric	RSCCD	OC Region	California
SWP Students	N/A	196	1,942
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	26%	23%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	Insufficient Data	20%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	Insufficient Data	100
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	Insufficient Data	77
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	Insufficient Data	75%
Median Annual Earnings for SWP Exiting Students	N/A	$33,758 ($16.23)	$52,288 ($25.13)
Median Change in Earnings for SWP Exiting Students	N/A	43%	19%
SWP Exiting Students Who Attained the Living Wage	N/A	36%	64%

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

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 these environmental technology occupations. However, there were no awards conferred by other institutions under the related Classification of Instructional Programs (CIP) Codes:

- Environmental/Environmental Engineering Technology/Technician (15.0507); and
- Hazardous Materials Management and Waste Technology/Technician (15.0508)

Between 2019 and 2021, non-community colleges in the region did not confer any awards under these CIP codes.
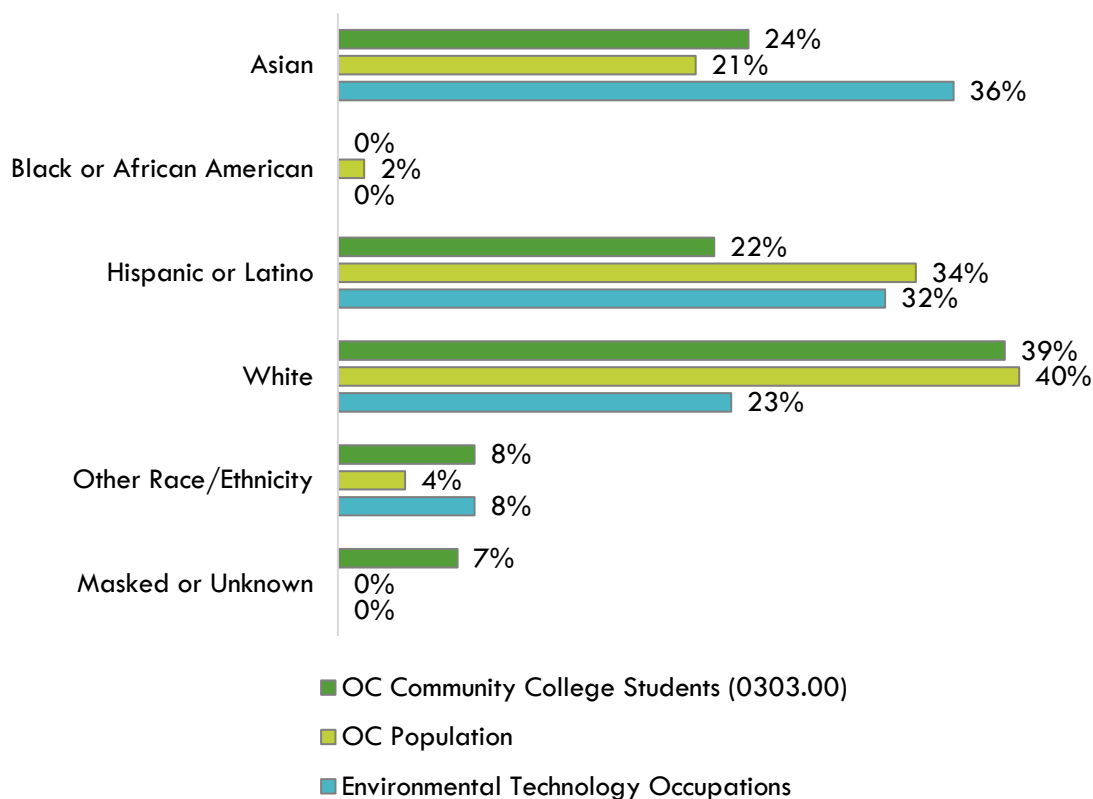
Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in environmental technology programs compared to the OC population, as well occupational data, for the purpose of identifying potential diversity and equity issues that can be addressed by community college programs.

Ethnicity:

Exhibit 13 shows the ethnicity of Orange County community college students enrolled in environmental technology programs compared to the overall Orange County population, as well as the two environmental technology occupations included in this report. Notably, 36% of workers employed in these environmental technology occupations are Asian, which is higher than the population (21%) and community college environmental technology students (24%). Conversely, 39% of environmental technology students are white, which is slightly lower than the Orange County population (40%), but higher than workers in these environmental technology occupations (23%).

Examining disaggregated data for each occupation (not shown), Asian workers comprise the largest group of workers in both occupations, representing 36% of *environmental engineering technologists and technicians;* and 51% of *environmental science and protection technicians, including health.*

Exhibit 13: Program and County Demographics by Ethnicity

Asian
- OC Community College Students: 24%
- OC Population: 21%
- Environmental Technology Occupations: 36%

Black or African American
- OC Community College Students: 0%
- OC Population: 2%
- Environmental Technology Occupations: 0%

Hispanic or Latino
- OC Community College Students: 22%
- OC Population: 34%
- Environmental Technology Occupations: 32%

White
- OC Community College Students: 39%
- OC Population: 40%
- Environmental Technology Occupations: 23%

Other Race/Ethnicity
- OC Community College Students: 8%
- OC Population: 4%
- Environmental Technology Occupations: 8%

Masked or Unknown
- OC Community College Students: 7%
- OC Population: 0%
- Environmental Technology Occupations: 0%

Legend:
- OC Community College Students (0303.00)
- OC Population
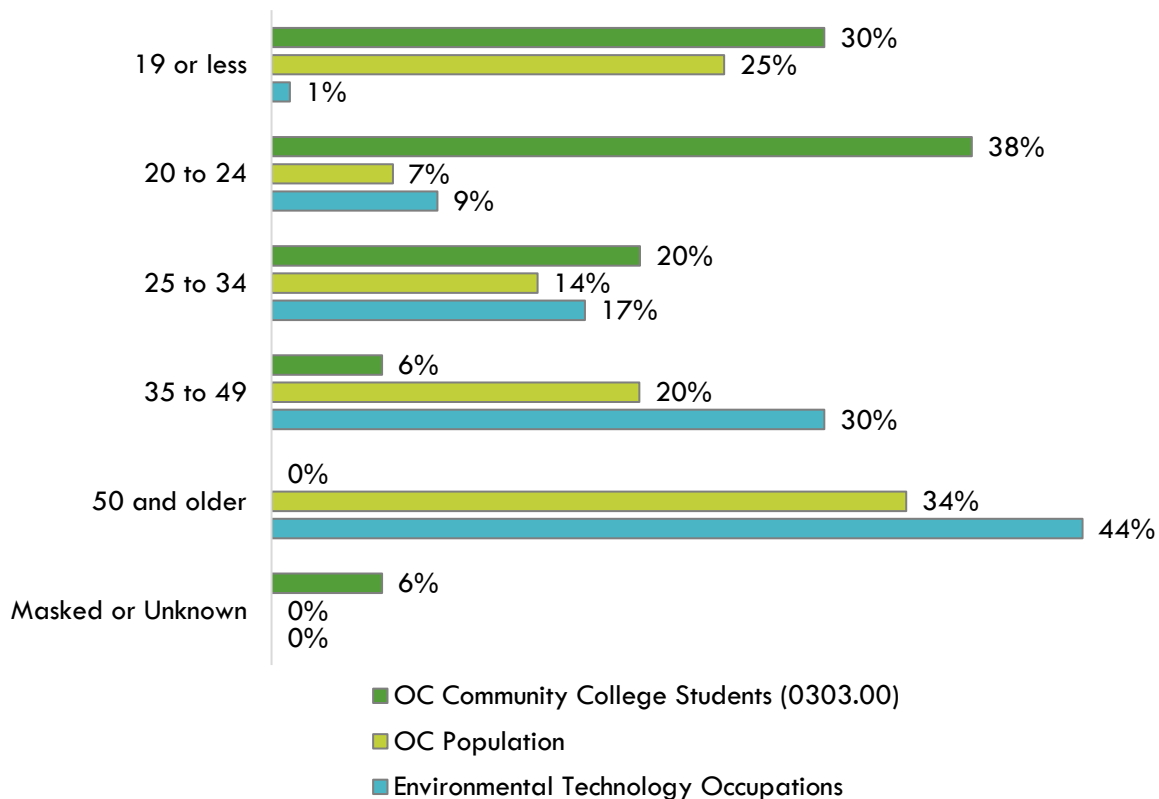- Environmental Technology Occupations

Age:

Exhibit 14 shows the age of Orange County community college students enrolled in environmental technology programs compared to the overall Orange County population, as well as the two environmental technology occupations included in this report. The plurality of workers in these environmental technology occupations are age 50 and older (44%), which is higher than the population (34%); there are no community college environmental technology students that are age 50 and older. More than two-thirds (68%) of community college environmental technology students are age 24 or younger, which is higher than the Orange County population (32%) and the workers in these environmental technology occupations (10%) for this same age group.

Examining disaggregated data for each occupation (not shown), 50 and older is the largest age group for both environmental technology occupations: *environmental engineering technologists and technicians (44%) and environmental science and protection technicians, including health (54%).*

Exhibit 14: Program and County Demographics by Age

Age Group	OC Community College Students (0303.00)	OC Population	Environmental Technology Occupations
19 or less	30%	25%	1%
20 to 24	38%	7%	9%
25 to 34	20%	14%	17%
35 to 49	6%	20%	30%
50 and older	0%	34%	44%
Masked or Unknown	6%	0%	0%

■ OC Community College Students (0303.00)
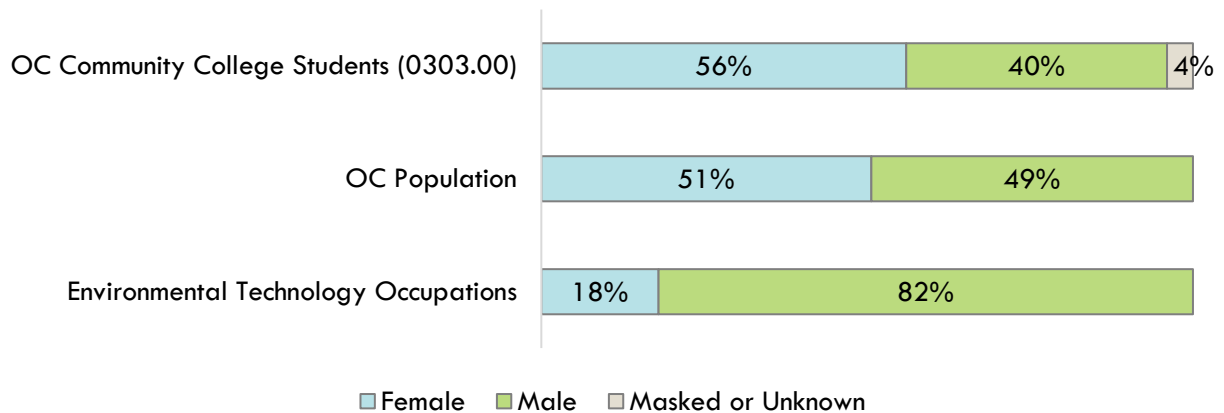■ OC Population
■ Environmental Technology Occupations

Sex:

Exhibit 15 shows the sex of Orange County community college students enrolled in environmental technology programs compared to the overall Orange County population, as well as the two environmental technology occupations included in this report.

Though the Orange County population is split nearly evenly between men and women, 56% of environmental technology students are women. However, 82% of workers in these two environmental technology occupations are men.

Examining disaggregated data for each occupation (not shown), male workers comprise the largest group of workers in each of these occupations, representing 81% of *environmental science and protection technicians, including health*, and 82% of *environmental engineering technologists and technicians*.

Exhibit 15: Program and County Demographics by Sex

	Female	Male	Masked or Unknown
OC Community College Students (0303.00)	56%	40%	4%
OC Population	51%	49%	
Environmental Technology Occupations	18%	82%	

Legend: ☐ Female ☐ Male ☐ Masked or Unknown

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	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, child care, health care, transportation, and taxes. For more information, see: https://insightcced.org/family-needs-calculator/ The living wage for one adult in Orange County is $20.63 per hour ($42,910.40 annually). This figure is used by the CCCCO 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 CCCCO 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

Data Type	Source
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

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