










HVAC Occupations

Labor Market Analysis: San Diego County

May 2022

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 Proceed with New Program	 	 	<input type="checkbox"/> Bachelor's Degree+ <input type="checkbox"/> Associate Degree <input type="checkbox"/> Some College or Certificate <input checked="" type="checkbox"/> HS Diploma or Equivalent <input type="checkbox"/> Less than a HS Diploma <input type="checkbox"/> Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
 	<p>HIGH</p> 	<p>HIGH</p> 	

This brief provides labor market information about *HVAC Occupations* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *HVAC Occupations* include “First-Line Supervisors of Construction Trades and Extraction Workers,” “Heating, Air Conditioning, and Refrigeration Mechanics and Installers,” and “Plumbers, Pipefitters, and Steamfitters.” According to available labor market information, *HVAC Occupations* in San Diego County have a labor market demand of 1,707 annual job openings (while average demand for a single occupation in San Diego County is 245 annual job openings), and ten institutions supply 516 awards for these occupations, suggesting that there is a supply gap in the labor market. Entry-level and median wages are above the living wage for all occupations. This brief recommends proceeding with a new program and supports a program modification because 1) these occupations’ entry-level and median earnings are above the living wage and 2) a supply gap exists for these occupations. Colleges should note that **employers typically require a high school diploma or equivalent as the minimum educational requirement for these occupations.**

Introduction

This report provides labor market information in San Diego County for the following occupational codes in the Standard Occupational Classification (SOC)¹ system:

- **First-Line Supervisors of Construction Trades and Extraction Workers (SOC 47-1011):** Directly supervise and coordinate activities of construction or extraction workers.
- **Heating, Air Conditioning, and Refrigeration Mechanics and Installers (SOC 49-9021):** Install or repair heating, central air conditioning, HVAC, or refrigeration systems, including oil burners, hot-air furnaces, and heating stoves.
- **Plumbers, Pipefitters, and Steamfitters (SOC 47-2152):** Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters.

For the purpose of this report, these occupations are referred to as *HVAC Occupations*.

¹ The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. [bls.gov/soc](https://www.bls.gov/soc).

Projected Occupational Demand

Between 2021 and 2026, HVAC Occupations are projected to increase by 699 net jobs or four percent (Exhibit 1a). Employers in San Diego County will need to hire 1,707 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

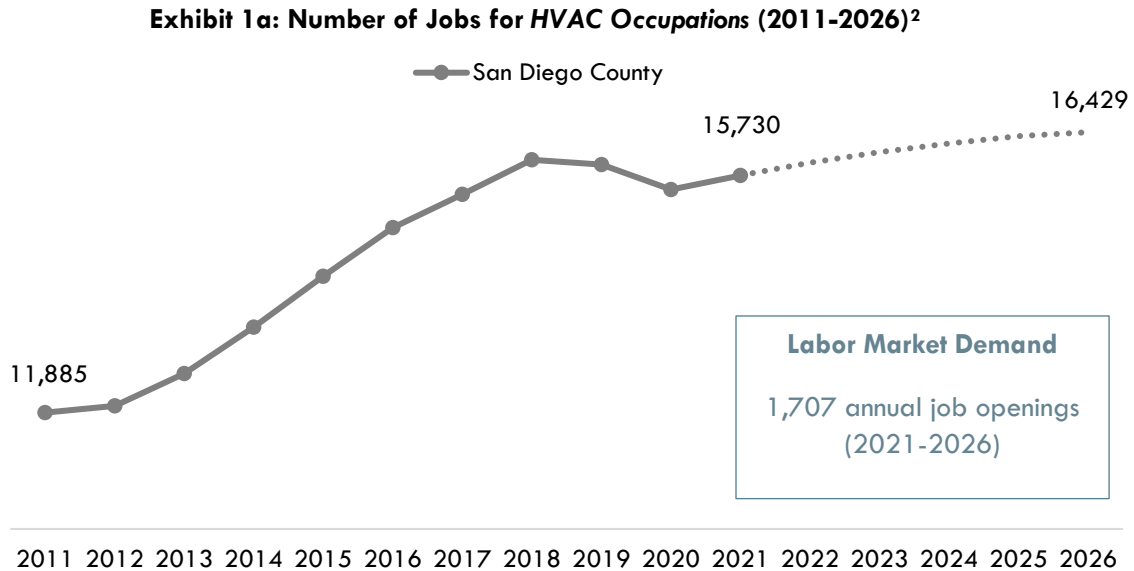


Exhibit 1b disaggregates the projected number of jobs change by occupation. “First-Line Supervisors of Construction Trades and Extraction Workers” are projected to have the most labor market demand between 2021 and 2026, with 712 annual job openings.

Exhibit 1b: Number of Jobs for HVAC Occupations in San Diego County (2021-2026)³

Occupational Title	2021 Jobs	2026 Jobs	2021 - 2026 Net Jobs Change	2021 - 2026 % Net Jobs Change	Annual Job Openings (Demand)
First-Line Supervisors of Construction Trades and Extraction Workers	7,011	7,179	168	2%	712
Plumbers, Pipefitters, and Steamfitters	5,876	6,198	322	5%	674
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	2,843	3,052	209	7%	321
Total	15,730	16,429	699	4%	1,707

² EMSI 2022.1; QCEW, Non-QCEW, Self-Employed.

³ EMSI 2022.1; QCEW, Non-QCEW, Self-Employed.

Earnings

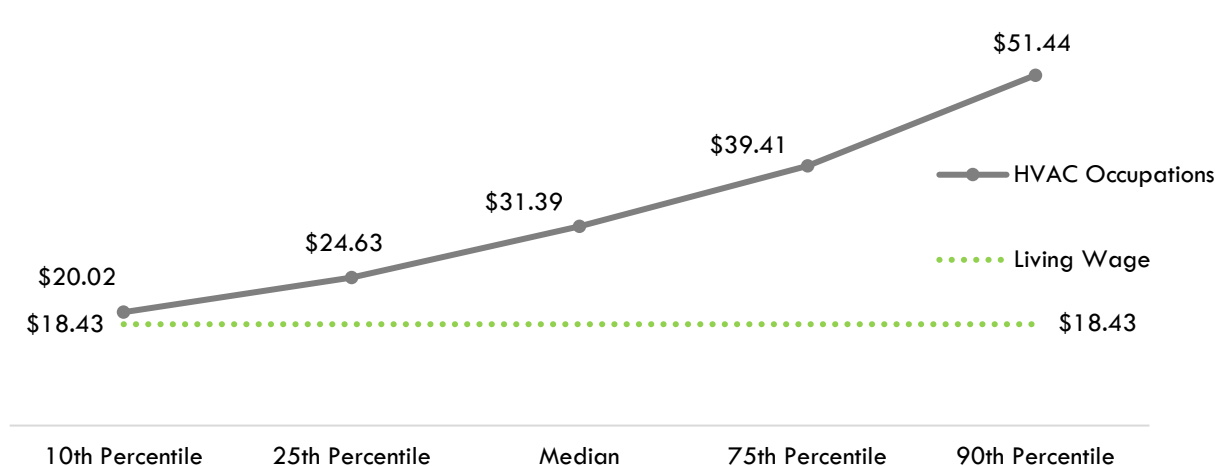
Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *HVAC Occupations* range from \$21.49 to \$29.18.

Exhibit 2a: Hourly Earnings for HVAC Occupations in San Diego County⁴

Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
First-Line Supervisors of Construction Trades and Extraction Workers	\$29.18	\$37.13	\$47.27
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	\$23.23	\$29.03	\$35.42
Plumbers, Pipefitters, and Steamfitters	\$21.49	\$28.02	\$35.55

On average, the entry-level hourly earnings for *HVAC Occupations* are \$24.63; this is more than the living wage for a single adult in San Diego County, which is \$18.43 per hour (Exhibit 2b).⁵

Exhibit 2b: Average Hourly Earnings⁶ for HVAC Occupations in San Diego County⁷



⁴ EMSI 2022.1; QCEW, Non-QCEW, Self-Employed.

⁵ "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightccd.org/family-needs-calculator/.

⁶ 10th and 25th percentiles could be considered entry-level wages, and 75th and 90th percentiles could be considered experienced wages for individuals who may have been in the occupation longer, received more training than others, etc.

⁷ EMSI 2022.1; QCEW, Non-QCEW, Self-Employed.

Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.⁸ There are **nine** TOP codes and **14** CIP codes related to *HVAC Occupations* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for HVAC Occupations⁹

TOP or CIP Code	TOP or CIP Program Title
TOP 0946.00	Environmental Control Technology
TOP 0946.10	Energy Systems Technology
TOP 0952.00	Construction Crafts Technology
TOP 0952.10	Carpentry
TOP 0952.20	Electrical
TOP 0952.30	Plumbing, Pipefitting and Steamfitting
TOP 0957.00	Civil and Construction Management Technology
TOP 0957.20	Construction Inspection
TOP 2102.10	Public Works
CIP 15.0501	Heating, Ventilation, Air Conditioning and Refrigeration
CIP 15.0503	Energy Management and Systems Technology/Technician
CIP 46.0000	Construction Trades, General
CIP 46.0201	Carpentry/Carpenter
CIP 46.0302	Electrician
CIP 46.0403	Building/Home/Construction Inspection/Inspector
CIP 46.0412	Building/Construction Site Management/Manager
CIP 46.0415	Building Construction Technology
CIP 46.0499	Building/Construction Finishing, Management, and Inspection, Other
CIP 46.0502	Pipefitting/Pipefitter and Sprinkler Fitter
CIP 46.0503	Plumbing Technology/Plumber
CIP 47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician
CIP 49.0207	Flagging and Traffic Control
CIP 52.2001	Construction Management

⁸ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

⁹ This brief uses a conservative estimate of program supply and only calculates awards from the TOP codes listed in Exhibit 3.

According to TOP data, five community colleges supply the region with awards for these occupations: Palomar College, San Diego City College, San Diego College of Continuing Education, San Diego Mesa College, and Southwestern College. According to CIP data, five non-community-college institutions supply the region with awards: CET-San Diego, National University, Newschool of Architecture and Design, United Education Institute-Chula Vista and United Education Institute-UEI College San Marcos (Exhibit 4).

**Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions
(Program Year 2016-17 through PY2019-20 Average)**

TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY17-18 to PY19-20)	Other Educational Institutions 3-Yr Annual Average Awards (PY16-17 to PY18-19)	3-Yr Total Average Supply (PY16-17 to PY19-20)
0946.00	Environmental Control Technology	180	0	180
	• San Diego City	60	0	
	• San Diego Cont Ed	120	0	
0952.10	Carpentry	23	0	23
	• Palomar	23	0	
0952.20	Electrical	46	0	46
	• Palomar	46	0	
	• San Diego City	0	0	
0952.30	Plumbing, Pipefitting and Steamfitting	104	0	104
	• San Diego City	1	0	
	• San Diego Cont Ed	103	0	
0957.00	Civil and Construction Management Technology	8	0	8
	• San Diego Mesa	5	0	
	• Southwestern	3	0	
0957.20	Construction Inspection	35	0	35
	• Palomar	6	0	
	• San Diego Mesa	19	0	
	• Southwestern	10	0	
2102.10	Public Works	1	0	1
	• Palomar	1	0	

TOP or CIP Code	TOP or CIP Program Title	3-Yr Annual Average CC Awards (PY17-18 to PY19-20)	Other Educational Institutions 3-Yr Annual Average Awards (PY16-17 to PY18-19)	3-Yr Total Average Supply (PY16-17 to PY19-20)
46.0000	Construction Trades, General	0	0	0
	• National University	0	0	
46.0415	Building Construction Technology	0	37	37
	• CET-San Diego	0	37	
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	0	64	64
	• United Education Institute-Chula Vista	0	38	
	• United Education Institute-UEI College San Marcos	0	26	
52.2001	Construction Management	0	18	18
	• National University	0	6	
	• Newschool of Architecture and Design	0	12	
			Total	516

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply¹⁰ suggests that there is a **supply gap** for these occupations in San Diego County, with **1,707** annual openings and **516** awards. Comparatively, there are **17,767** annual openings in California and **5,847** awards, suggesting that there is a supply gap across the state¹¹ (Exhibit 5).

Exhibit 5: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
San Diego	1,707	516	1,146
California	17,767	5,847	11,920

Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

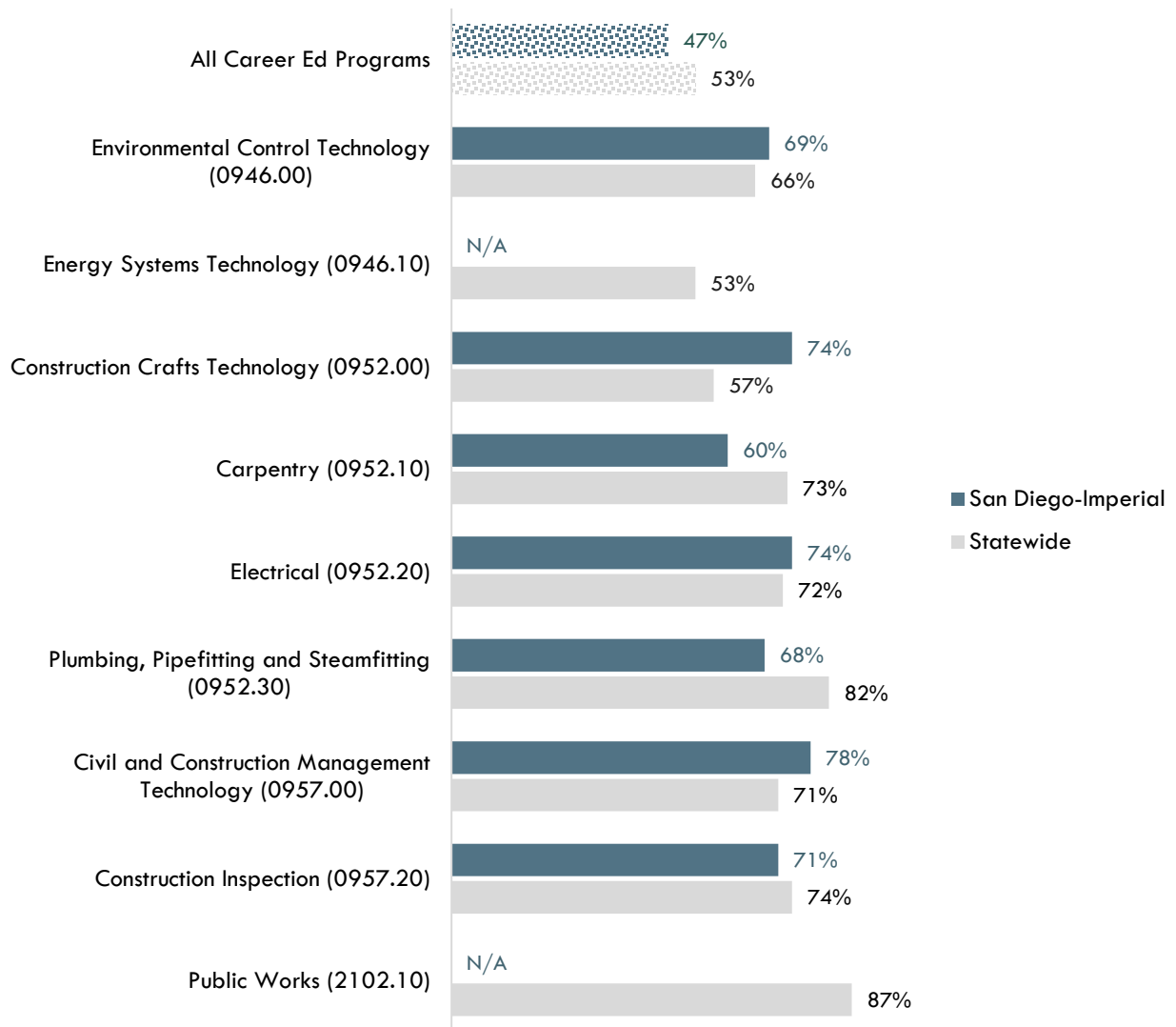
¹⁰ Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

¹¹ "Supply and Demand," Centers of Excellence Student Outcomes, coecc.net/Supply-and-Demand.aspx.

Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 60 to 78 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *HVAC Occupations*, compared to 53 to 87 percent statewide and 53 percent of students in Career Education programs in general across the state (Exhibit 6a).¹²

Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program, PY2018-19¹³



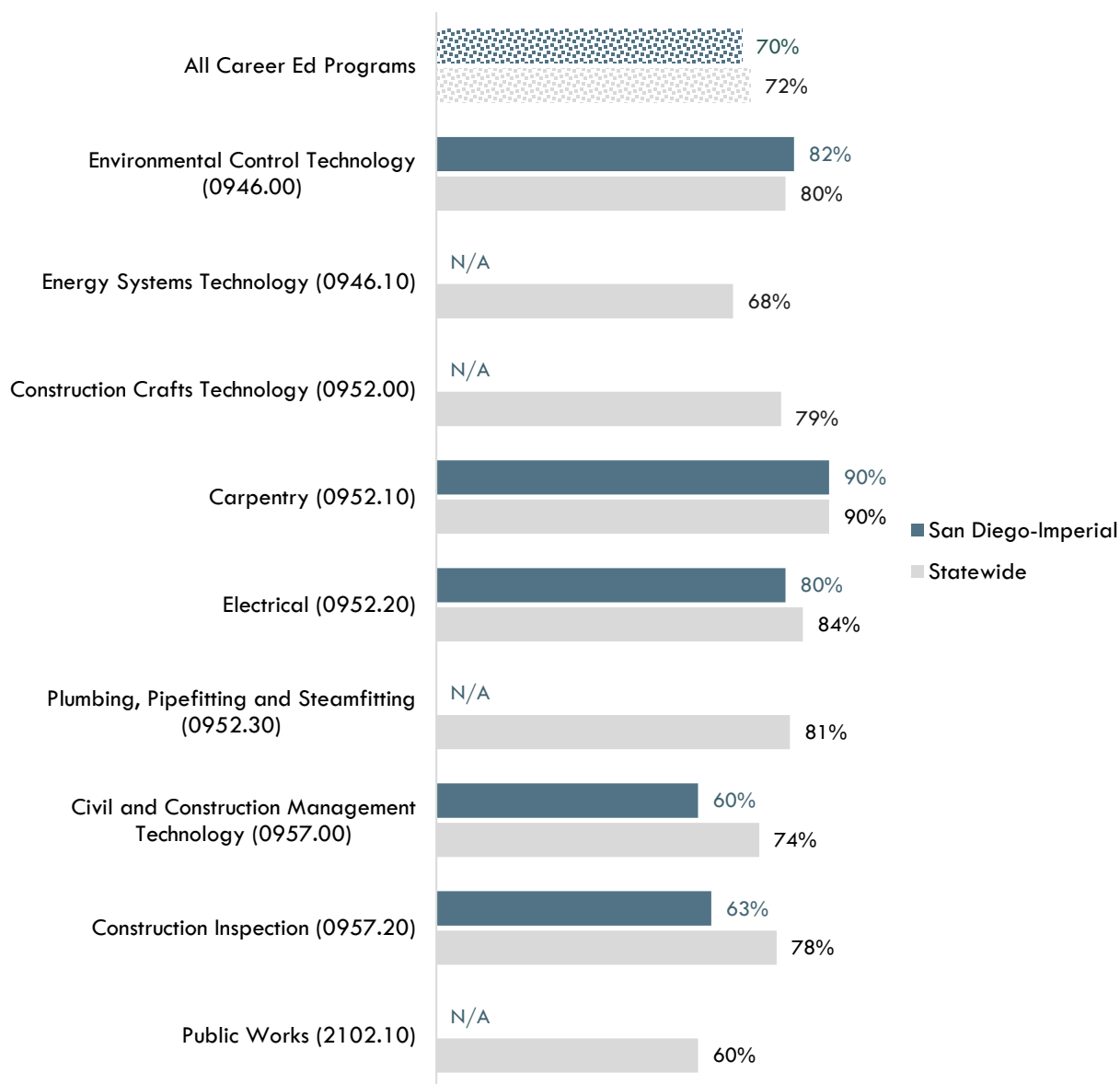
"N/A" indicates insufficient data

¹² "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹³ Among completers and skills builders who exited, the proportion of students who attained a living wage.

According to the California Community Colleges LaunchBoard, 60 to 90 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a program related to HVAC Occupations, compared to 60 to 90 percent statewide and 72 percent of students in Career Education programs in general across the state (Exhibit 6b).¹⁴

Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program, PY2017-18¹⁵



"N/A" indicates insufficient data

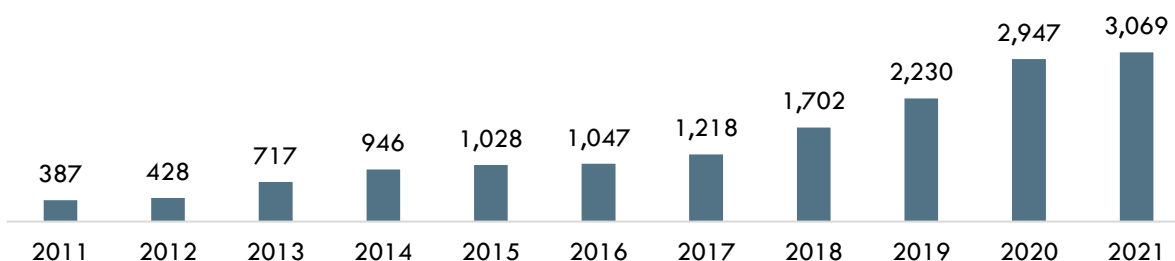
¹⁴ "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹⁵ Most recent year with available data is Program Year 2017-18. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

Online Job Postings

This report analyzes not only historical and projected (traditional LMI) data, but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market that are not captured by historical data. Between 2011 and 2021, there was an average of 1,429 online job postings per year for HVAC Occupations in San Diego County (Exhibit 7). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 1b). Employers may post a position multiple times for various reasons, such as increasing the pool of applicants, for example.

Exhibit 7: Number of Online Job Postings for HVAC Occupations in San Diego County (2011-2021)¹⁶



Top Employers

Between January 1, 2019 and December 31, 2021, the top five employers in San Diego County for HVAC Occupations were Sears, Lincoln Property Company, L3Harris, Semper Solaris, and General Dynamics based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for HVAC Occupations in San Diego County¹⁷

Top Employers	
<ul style="list-style-type: none"> • Sears • Lincoln Property Company • L3Harris • Semper Solaris • General Dynamics 	<ul style="list-style-type: none"> • Sherlock Heating and Air Conditioning Inc. • BAE Systems • Alliance Residential Company • American Residential Services • Ars Rescue Rooter

¹⁶ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2011-2022.

¹⁷ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2019-2021.

Education, Skills, and Certifications

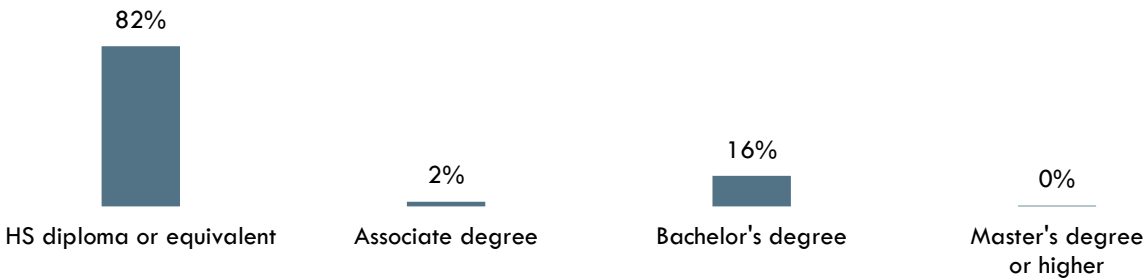
HVAC Occupations have a national educational attainment ranging from a high school diploma or equivalent to a postsecondary non-degree award (Exhibit 9a).

Exhibit 9a: National Educational Attainment for HVAC Occupations¹⁸

Occupational Title	Typical Entry-Level Education
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Postsecondary non-degree award
First-Line Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent
Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent

Based on online job postings between January 1, 2019 and December 31, 2021 in San Diego County, employers posted a high school diploma or equivalent as the educational requirement for *HVAC Occupations* (Exhibit 9b).¹⁹

Exhibit 9b: Educational Requirements for HVAC Occupations in San Diego County²⁰



*may not total 100 percent due to rounding

¹⁸ EMSI 2022.1; QCEW, Non-QCEW, Self-Employed.

¹⁹ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2019-2021.

²⁰ "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified April 9, 2021. bls.gov/emp/tables/educational-attainment.htm.

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2019 and December 31, 2021.

Exhibit 10: Top Skills for HVAC Occupations in San Diego County²¹

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Repair • HVAC • Plumbing • Occupational Health and Safety • Scheduling • Customer Service • Hand Tools • Predictive / Preventative Maintenance • Ventilation • PipeFitting • Power Tools • Budgeting • Project Management • Construction Management • Cleaning • Welding 	<ul style="list-style-type: none"> • Communication Skills • Troubleshooting • Physical Abilities • Preventive Maintenance • Problem Solving • Organizational Skills • Computer Literacy • Detail-Oriented • English • Teamwork / Collaboration • Writing • Planning • Building Effective Relationships • Time Management • Written Communication 	<ul style="list-style-type: none"> • Microsoft Excel • Microsoft Word • Primavera • Microsoft Project • Microsoft Outlook • Primavera P6 • Yardi Software • Vimeo • Microsoft PowerPoint • Solaris • Salesforce • Lotus Applications • Lotus Notes • Customer Relationship Management • Facebook

²¹ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2019-2021.

Exhibit 11 lists the top certification that appeared in online job postings between January 1, 2019 and December 31, 2021.

Exhibit 11: Top Certification for HVAC Occupations in San Diego County²²

Top Certification in Online Job Postings

1. Environmental Protection Agency Certification
 2. EPA CFC/HCFC Certification
 3. Security Clearance
 4. North American Technician Excellence (NATE)
 5. Appliance Repair Certificate
 6. Occupational Safety and Health Administration Certification
 7. First Aid CPR AED
 8. Plumbing License
 9. Plumbing Certification
 10. OSHA Safety 30 Hour
 11. Backflow Prevention Certification
 12. Electrician Certification
 13. EPA 608
 14. OSHA Safety 10 Hour
 15. Contractor's License
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²² Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2019-2021.

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Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; 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 the report 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.

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.