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# Heating Ventilation and Air Conditioning (HVAC) Occupations

## Labor Market Information Report

Prepared by the San Francisco Bay Center of Excellence  
for Labor Market Research  
March 2018

## Recommendation

Based on all available data, there appears to be an undersupply of HVAC workers compared to the demand for this cluster of occupations in the Bay region and the Silicon Valley sub-region. The annual gap between demand and supply from Environmental Control Technology (HVAC) programs is about 1,325 in the region and 290 in the Silicon Valley sub-region. Even when only the demand for the Heating Air Conditioning and Refrigeration Mechanics and Installers occupation is used, and compared to the supply from Environmental Control Technology (HVAC) programs, there is still an undersupply of about 580 in the region and a 69 in the sub-region.

This report also provides student outcomes data on employment and earnings for regional and sub-regional Environmental Control Technology (HVAC) programs compared to other community college programs on TOP 0946.00 in the state. It is recommended that this data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state, region and sub-region as well as to outcomes across all programs at Gavilan College and in the region.

## Introduction

This report profiles HVAC occupations in the 12 county Bay Region and Silicon Valley sub-region (Santa Clara County) to help inform the decision regarding the creation of a new HVAC program at Gavilan College.

- **Heating Air Conditioning and Refrigeration Mechanics and Installers (SOC 49-9021):** Install or repair heating, central air conditioning, or refrigeration systems, including oil burners, hot-air furnaces, and heating stoves.

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*Entry-Level Educational Requirement: Postsecondary Nondegree Award*

*Training Requirement: Long-term on-the-job training*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:  
42%*

- **Environmental Engineering Technician (SOC 17-3025):** Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientist. May assist in the development of environmental remediation devices.

*Entry-Level Educational Requirement: Associate Degree*

*Training Requirement: None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:  
54%*

- **Industrial Engineering Technician (SOC 17-3026):** Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.

*Entry-Level Educational Requirement: Associate Degree*

*Training Requirement: None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:  
54%*

- **Sheet Metal Workers (SOC 47-2211):** Fabricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.

*Entry-Level Educational Requirement: High school diploma or equivalent*

*Training Requirement: Apprenticeship*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:  
33%*

- **Electrical and Electronics Repairers, Commercial and Industrial Equipment (SOC 49-2094):** Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.

*Entry-Level Educational Requirement: Postsecondary Nondegree Award*

*Training Requirement: Long-term on-the-job training*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:  
52%*

# Occupational Demand

**Table 1. Employment Outlook for HVAC Occupations in Bay Region**

Occupation	2016 Jobs	2021 Jobs	5-Yr Change	5-Yr % Change	5-Year Openings	Annual Openings	10% Hourly Wage	Median Hourly Wage
Environmental Engineering Technicians	878	929	51	6%	433	87	\$17.89	\$29.48
Industrial Engineering Technicians	1,312	1,408	96	7%	673	135	\$19.56	\$30.70
Sheet Metal Workers	2,558	2,876	318	12%	1,711	342	\$15.45	\$29.37
Electrical & Electronics Repairers, Commercial & Industrial Equipment	1,858	1,939	81	4%	896	179	\$16.79	\$32.09
Heating, Air Conditioning & Refrigeration Mechanics & Installers	6,293	7,293	1,000	16%	4,200	840	\$14.23	\$24.98
<b>Total</b>	<b>12,899</b>	<b>14,445</b>	<b>1,546</b>	<b>12%</b>	<b>7,914</b>	<b>1,583</b>	<b>\$15.63</b>	<b>\$27.76</b>

Source: EMSI 2017.4

Bay Region includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for HVAC Occupations in Silicon Valley**

Occupation	2016 Jobs	2021 Jobs	5-Yr Change	5-Yr % Change	5-Year Openings	Annual Openings	10% Hourly Wage	Median Hourly Wage
Environmental Engineering Technicians	210	225	15	7%	106	21	\$20.18	\$34.55
Industrial Engineering Technicians	577	582	5	1%	253	51	\$19.71	\$31.71
Sheet Metal Workers	697	793	96	14%	471	94	\$15.20	\$34.96
Electrical & Electronics Repairers, Commercial & Industrial Equipment	655	660	5	1%	288	58	\$15.35	\$23.89
Heating, A & Refrigeration Mechanics & Installers	1,849	2,151	302	16%	1,231	246	\$14.93	\$36.71
<b>Total</b>	<b>3,989</b>	<b>4,411</b>	<b>422</b>	<b>11%</b>	<b>2,350</b>	<b>470</b>	<b>\$16.01</b>	<b>\$33.46</b>

Source: EMSI 2017.4

Silicon Valley Sub-Region includes Santa Clara County

## Job Postings in Bay Region and Silicon Valley Sub-Region

**Table 3. Number of Job Postings for HVAC Occupation for latest 12 months (February 2017– January 2018)**

Occupation	Bay	Silicon Valley
Heating and Air Conditioning Mechanics and Installers (49-9021.01)	807	239
Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094.00)	66	18

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Refrigeration Mechanics and Installers (49-9021.02)	61	8
Sheet Metal Workers (47-2211.00)	54	18
Industrial Engineering Technicians (17-3026.00)	51	36
Environmental Engineering Technicians (17-3025.00)	15	1
<b>Total</b>	<b>1,054</b>	<b>320</b>

Source: Burning Glass

**Table 4. Top Job Titles for HVAC Occupations for latest 12 months (February 2017 – January 2018)**

Common Title	Bay	Silicon Valley	Common Title	Bay	Silicon Valley
HVAC Technician	181	49	Estimator	30	1
HVAC Service Technician	116	42	HVAC Journeyman	25	4
HVAC Installer	110	35	Engineering Technician	17	12
Refrigeration Technician	56	8	HVAC/Plumbing Project Manager	17	0
HVAC Project Manager	50	22	Low Voltage Technician	16	5
Mechanic	41	11	Deburr	15	3
HVAC Mechanic	33	11	Quality Engineer	12	0

Source: Burning Glass

## Industry Concentration

**Table 5. Industries Hiring HVAC Occupations in Bay Region**

Industry – 4 Digit NAICS (North American Industry Classification) Codes	Jobs in Industry (2016)	Jobs in Industry (2021)	% Change (2016-21)	% in Industry (2016)
Building Equipment Contractors (2382)	5,992	7,073	18%	46.3%
Semiconductor & Other Electronic Component Manufacturing (3344)	593	557	(6%)	4.5%
Residential Building Construction (2361)	374	386	3%	2.9%
Foundation, Structure & Building Exterior Contractors (2381)	362	407	12%	2.8%
Architectural, Engineering & Related Services (5413)	329	358	9%	2.6%
Architectural & Structural Metals Manufacturing (3323)	284	325	14%	2.2%
Local Government excluding Education & Hospitals (9039)	289	304	5%	2.2%
Navigational, Measuring, Electromedical & Control Instruments Manufacturing (3345)	259	273	5%	2.1%
Building Finishing Contractors (2383)	259	253	(2%)	2.0%
Management, Scientific & Technical Consulting Services (5416)	239	262	10%	1.9%
Federal Government, Civilian (9011)	240	237	(1%)	1.9%
Scientific Research & Development Services (5417)	207	232	12%	1.6%
Other Specialty Trade Contractors (2389)	189	178	(6%)	1.4%
Household Appliances & Electrical & Electronic Goods Merchant Wholesalers (4236)	159	171	8%	1.2%

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Pharmaceutical & Medicine Manufacturing (3254)	150	189	26%	1.2%
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*Source: EMSI 2017.4*

**Table 6. Top Employers Posting Jobs for HVAC Occupations for latest 12 months (Feb. 2018 – Jan. 2018)**

Employer	Bay	Employer	Bay	Employer	Silicon Valley
Sears	35	Johnson Controls In	13	Sears	13
Cameron Craig Group	28	Job Juncture, Inc	11	Jones Lang Lasalle Inc.	9
Blue Mountain Air Inc	19	Uc San Diego	11	Ars Rescue Rooter	6
Blue Mountain Construction	17	Jll	10	Kellogg Company	6
Jones Lang Lasalle Inc	17	Job Juncture	10	Cameron Craig Group	5
Bellows Plumbing Inc.	16	Emcor Group	9	Flagship Facility Services	5

*Source: Burning Glass*

## Educational Supply

There are three community colleges in the Bay region issuing 129 awards annually on Environmental Control Technology (TOP 09460.00) and three other educational institutions issuing 128 awards annually, for a total of 257 annual awards. Three of these educational institutions are in the Silicon Valley sub-region and issue a total of 177 awards annually.

**Table 7. Number of Degrees and Certificates and Headcount on TOP 0946.00 - Environmental Control Technology and CIP 47.0201 Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology**

College	Sub-Region	CC Headcount	Associate Degrees	Certificates or Other Credit Awards	Total Awards
Diablo Valley	East Bay	73	0	0	0
Foothill	Silicon Valley	40	0	0	0
Laney	East Bay	215	12	34	46
Los Medanos	East Bay	60	0	0	0
San Francisco	Mid-Peninsula	151	0	18	18
San Jose	Silicon Valley	220	10	55	65
Solano	North Bay	n<10	0	0	0
CET-Sobrato	Silicon Valley	n/a	0	26	26
Institute for Business and Technology	Silicon Valley	n/a	0	86	86
InterCoast Colleges-Fairfield	North Bay	n/a	0	16	16
<b>Total for Bay Region</b>		<b>758</b>	<b>22</b>	<b>235</b>	<b>257</b>
<b>Total for Silicon Valley</b>		<b>260</b>	<b>10</b>	<b>167</b>	<b>177</b>

*Source: Data Mart and Launchboard and IPEDS*

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NOTE: Headcount of students who took one or more courses is for 2015-16. Awards for Community Colleges is the annual average for 2014-17 (except for CCSF which is just for 2016-17), and awards for other postsecondary educational institutes is for 2016-17, the latest year available from IPEDS

## Gap Analysis

There is a large labor market gap in the Bay region for HVAC occupations, with annual openings of 1,583 and annual supply of 257. This represents an undersupply of 1,326 students. In the Silicon Valley sub-region, there are 470 annual openings and 177 awards for a gap of 293. Even when only the demand for Heating Air Conditioning and Refrigeration Mechanics and Installers is used, and compared to the supply from Environmental Control Technology (HVAC) programs, there is still an undersupply of about 580 in the region and a 69 in the sub-region.

## Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0946.00 – Environmental Controls Technology in 2014-15**

2014-15	Bay Region (All Programs)	Gavilan (All Programs)	State (0946.00)	Bay Region (0946.00)	Silicon Valley Sub-Region (0946.00)	Top Performing College in Bay Region (0946.00)	
% Employed Four Quarters After Exit	68%	79%	71%	80%	81%	Solano	100%
Median Earnings Two Quarters After Exit	\$12,640	\$18,000	\$10,270	\$13,710	\$13,465	Solano	\$17,045
Median % Change in Earnings	37%	30%	41%	41%	34%	Laney	53%
% of Students Earning a Living Wage	51%	68%	63%	72%	78%	Diablo Valley	90%

Source: Launchboard

## Skills & Certifications

**Table 9. Top Skills for HVAC Occupations in the Bay Region (February 2017 – January 2018)**

Skill	Postings	Skill	Postings	Skill	Postings
HVAC	657	Hand Tools	92	Power Tools	54
Repair	516	Microsoft Excel	80	Sales	53
Inspection	181	Budgeting	77	Estimating	48
Plumbing	143	Occupational Health & Safety	74	Switches	46
Microsoft Office	137	Machinery	70	Cleaning	45
Ventilation	136	Mechanical Engineering	69	Business Development	43
Wiring	123	Schematic Diagrams	68	Heat Exchange	41
Scheduling	121	Equipment Repair	65	Soldering	41
Project Management	118	Wiring Diagrams	58	Welding	41
Boilers	112	Cooling Towers	57	Building Codes	40
Customer Service	101	Microsoft Project	55	Supervisory Skills	39

Source: Burning Glass

**Table 10. Top Certifications for HVAC Occupations in the Bay Region (February 2017 – January 2018)**

Note: 74% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

Certification	Postings	Certification	Postings
Environmental Protection Agency Certification	129	Electrician Certification	6
HVAC Technician Certification (e.g. EPA 608)	57	Hazwoper	6
Refrigeration Technician Certification (E.G. CFC Type 2)	19	Project Management Certification (e.g. PMP)	6
Commercial Driver's License	13	First Aid CPR AED	5
EPA 608	10	Hazardous Materials Certification	5
Electrical Certification (e.g.. Electrical Installation Certification)	7	Leadership In Energy And Environmental Design (LEED)	5

Source: Burning Glass

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**Table 11. Education (Minimum Advertised) for HVAC Occupations in the Bay Region**

Note: 70% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

Education (minimum advertised)	Latest 12 Mos. Postings
High school or vocational training	269 (86%)
Associate Degree	27 (9%)
Bachelor's or Higher	18 (6%)

Source: Burning Glass

## Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCCO Data Mart.

## Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

## Contacts

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