C·O·E CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

Engineering Technicians

Labor Market Analysis: Imperial County

August 2021

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
Do Not Proceed with New Program	☑ / ☒	☑ / ☒	☐ Bachelor's Degree+ ☑ Associate Degree ☐ Some College or Certificate ☐ HS Diploma or Equivalent ☐ Less than a HS Diploma ☐ Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
The COE defers to the region	MEDIUM	LOW	

This brief provides labor market information about *Engineering Technicians* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Engineering Technicians* include "Electrical and Electronic Engineering Technologists and Technicians," "Electro-Mechanical and Mechatronics Technologists and Technicians," "Environmental Engineering Technologists and Technicians," "Industrial Engineering Technologists and Technicians," and "Mechanical Engineering Technologists and Technicians." According to available labor market information, *Engineering Technicians* in Imperial County have a labor market demand of one annual job opening (while average demand for a single occupation in Imperial County is 12 annual job openings), and only one institution (Imperial Valley College) supplies 45 awards for these occupations, suggesting that there is an oversupply in the labor market. Entry-level and median wages are above the living wage for "Electrical and Electronic Engineering Technologists and Technicians," but there was insufficient data on wages for most occupations analyzed. This brief recommends to not proceed with developing a new program and defers to the region for a program modification because 1) there is an oversupply in the region; 2) there is a low number of annual job openings; and 3) a high number of degrees are awarded for these occupations.

Introduction

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

- **Electrical and Electronic Engineering Technologists and Technicians** (SOC 17-3023): Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, adjust, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions.
- **Electro-Mechanical and Mechatronics Technologists and Technicians** (SOC 17-3024): Operate, test, maintain, or adjust unmanned, automated, servomechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment to observe or record visual information at sites such as oil rigs, crop fields, buildings, or for similar infrastructure, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.
- **Environmental Engineering Technologists and Technicians** (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 scientists. May assist in the development of environmental remediation devices.
- **Industrial Engineering Technologists and Technicians** (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.
- **Mechanical Engineering Technologists and Technicians** (SOC 17-3027): Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under direction of engineering staff or physical scientists.

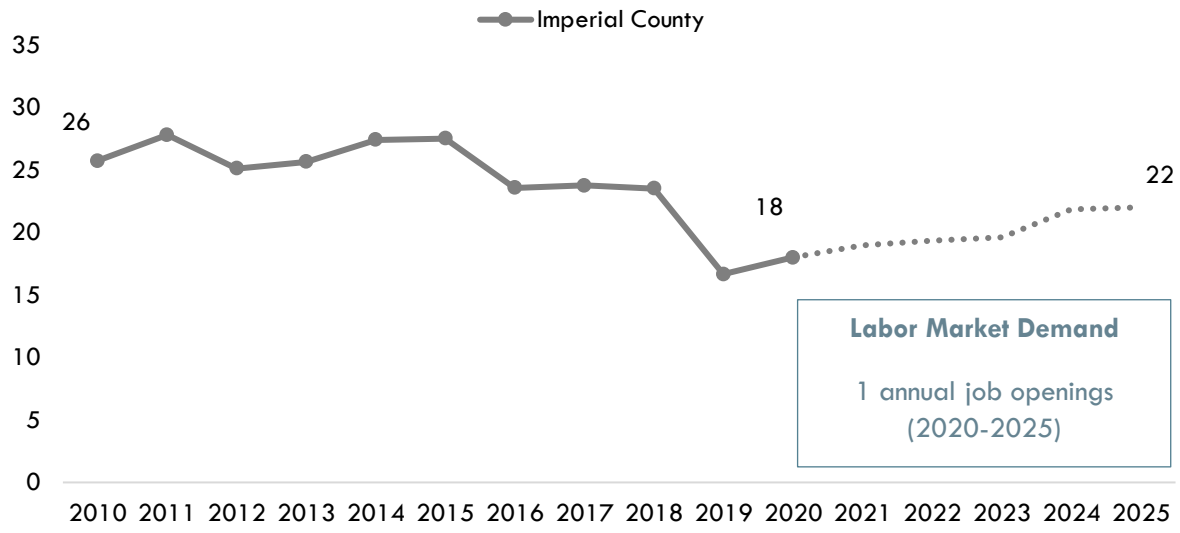
For the purpose of this report, these occupations are referred to as *Engineering Technicians*.

[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.

Projected Occupational Demand

Between 2020 and 2025, *Engineering Technicians* are projected to increase by four net jobs or 22 percent (Exhibit 1a). Employers in Imperial County will need to hire one worker annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1a: Number of Jobs for *Engineering Technicians* (2010-2025)[2]



[2] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

Exhibit 1b disaggregates the projected number of jobs change by occupation. "Electrical and Electronic Engineering Technologists and Technicians" are projected to have the most labor market demand between 2020 and 2025, with one annual job opening.

Exhibit 1b: Number of Jobs for *Engineering Technicians* in Imperial County (2020-2025)[3]

Occupational Title	2020 Jobs	2025 Jobs	2020 - 2025 Net Jobs Change	2020-2025 % Net Jobs Change	Annual Job Openings (Demand)
Electrical and Electronic Engineering Technologists and Technicians	13	16	3	24%	1
Environmental Engineering Technologists and Technicians	3	4	1	33%	0
Industrial Engineering Technologists and Technicians	2	2	0	0%	0
Mechanical Engineering Technologists and Technicians	0	0	0	0%	0
Electro-Mechanical and Mechatronics Technologists and Technicians	0	0	0	0%	0
Total	18	22	4	22%	1

[3] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

Earnings

Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *Engineering Technicians,* specifically "Electrical and Electronic Engineering Technologists and Technicians," are $19.36.

Exhibit 2a: Hourly Earnings for *Engineering Technicians* in Imperial County[4]

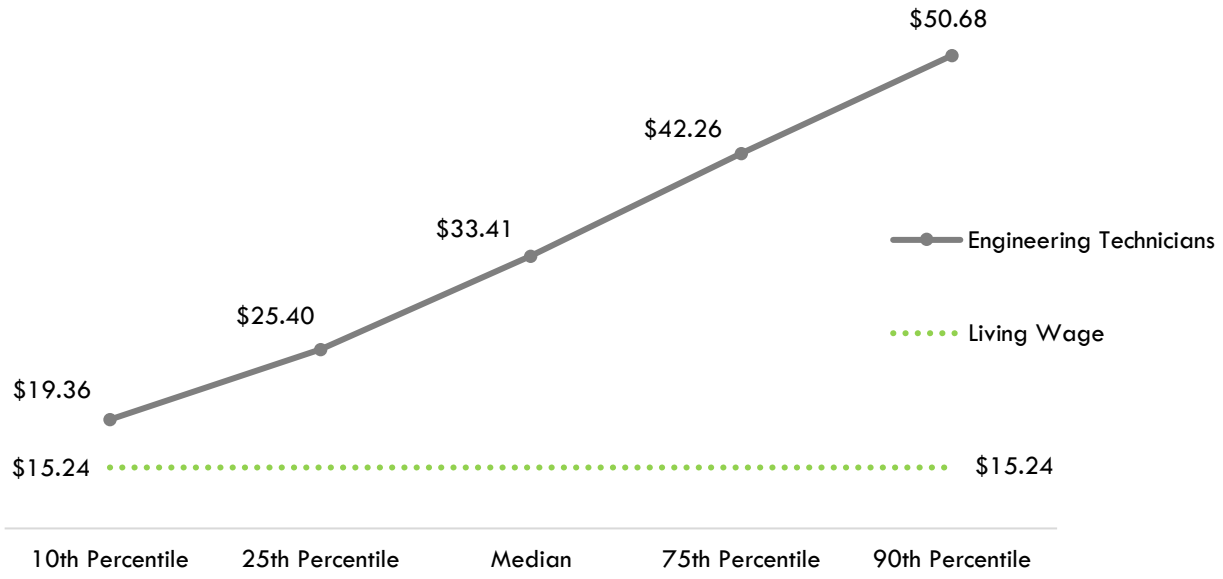
Occupational Title	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Electrical and Electronic Engineering Technologists and Technicians	$19.36	$25.40	$33.41
Electro-Mechanical and Mechatronics Technologists and Technicians	N/A	N/A	N/A
Mechanical Engineering Technologists and Technicians	N/A	N/A	N/A
Environmental Engineering Technologists and Technicians	N/A	N/A	N/A
Industrial Engineering Technologists and Technicians	N/A	N/A	N/A

N/A" indicates insufficient data

[4] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

On average, the entry-level hourly earnings for *Engineering Technicians* are $19.36; this is more than the living wage for a household of two adults and two school-age children in Imperial County, which is $15.24 per hour (Exhibit 2b).[5]

Exhibit 2b: Average Hourly Earnings[6] for *Engineering Technicians* in Imperial County[7]



[5] "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightcced.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 2021.2; 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 12 TOP codes and 28 CIP codes related to *Engineering Technicians* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for *Engineering Technicians*[9]

TOP or CIP Code	TOP or CIP Program Title
TOP 0303.00	Environmental Technology
TOP 0924.00	Engineering Technology, General
TOP 0934.00	Electronics and Electric Technology
TOP 0934.10	Computer Electronics
TOP 0934.20	Industrial Electronics
TOP 0934.40	Electrical Systems and Power Transmission
TOP 0935.00	Electro-Mechanical Technology
TOP 0943.00	Instrumentation Technology
TOP 0945.00	Industrial Systems Technology and Maintenance
TOP 0956.00	Manufacturing and Industrial Technology
TOP 0958.00	Water and Wastewater Technology
TOP 0999.00	Other Engineering and Related Industrial Technologies
CIP 15.0000	Engineering Technology, General
CIP 15.0201	Civil Engineering Technology/Technician
CIP 15.0303	Electrical, Electronic and Communications Engineering Technology/Technician
CIP 15.0306	Integrated Circuit Design
CIP 15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other
CIP 15.0403	Electromechanical Technology/Electromechanical Engineering Technology
CIP 15.0404	Instrumentation Technology/Technician
CIP 15.0405	Robotics Technology/Technician
CIP 15.0406	Automation Engineer Technology/Technician
CIP 15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician
CIP 15.0507	Environmental Engineering Technology/Environmental Technology

[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 in Exhibit 3.

TOP or CIP Code	TOP or CIP Program Title
CIP 15.0508	Hazardous Materials Management and Waste Technology/Technician
CIP 15.0611	Metallurgical Technology/Technician
CIP 15.0612	Industrial Technology/Technician
CIP 15.0613	Manufacturing Engineering Technology/Technician
CIP 15.0699	Industrial Production Technologies/Technicians, Other
CIP 15.0803	Automotive Engineering Technology/Technician
CIP 15.0805	Mechanical Engineering/Mechanical Technology/Technician
CIP 15.1201	Computer Engineering Technology/Technician
CIP 15.1203	Computer Hardware Technology/Technician
CIP 15.9999	Engineering Technologies and Engineering-Related Fields, Other
CIP 46.0301	Electrical and Power Transmission Installation/Installer, General
CIP 47.0101	Electrical/Electronics Equipment Installation and Repair, General
CIP 47.0104	Computer Installation and Repair Technology/Technician
CIP 47.0105	Industrial Electronics Technology/Technician
CIP 47.0199	Electrical/Electronics Maintenance and Repair Technology, Other
CIP 47.0303	Industrial Mechanics and Maintenance Technology
CIP 50.0404	Industrial and Product Design

According to TOP data, one community college supplies the region with awards for these occupations: Imperial Valley College. According to CIP data, no non-community-college institution supplies the region with awards (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)
0934.00	Electronics and Electric Technology	**29**	**0**	**29**
	• Imperial Valley	29	0	
0934.20	Industrial Electronics	**1**	**0**	**1**
	• Imperial Valley	1	0	
0934.40	Electrical Systems and Power Transmission	**2**	**0**	**2**
	• Imperial Valley	2	0	
0958.00	Water and Wastewater Technology	**13**	**0**	**13**
	• Imperial Valley	13	0	
			Total	**45**

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply[10] suggests that there is an oversupply for these occupations in Imperial County, with one annual opening and 45 awards. Comparatively, there are 3,031 annual openings in California and 4,564 awards, suggesting that there is an oversupply across the state[11] (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**
Imperial	1	45	**44**
California	3,031	4,564	**1,533**

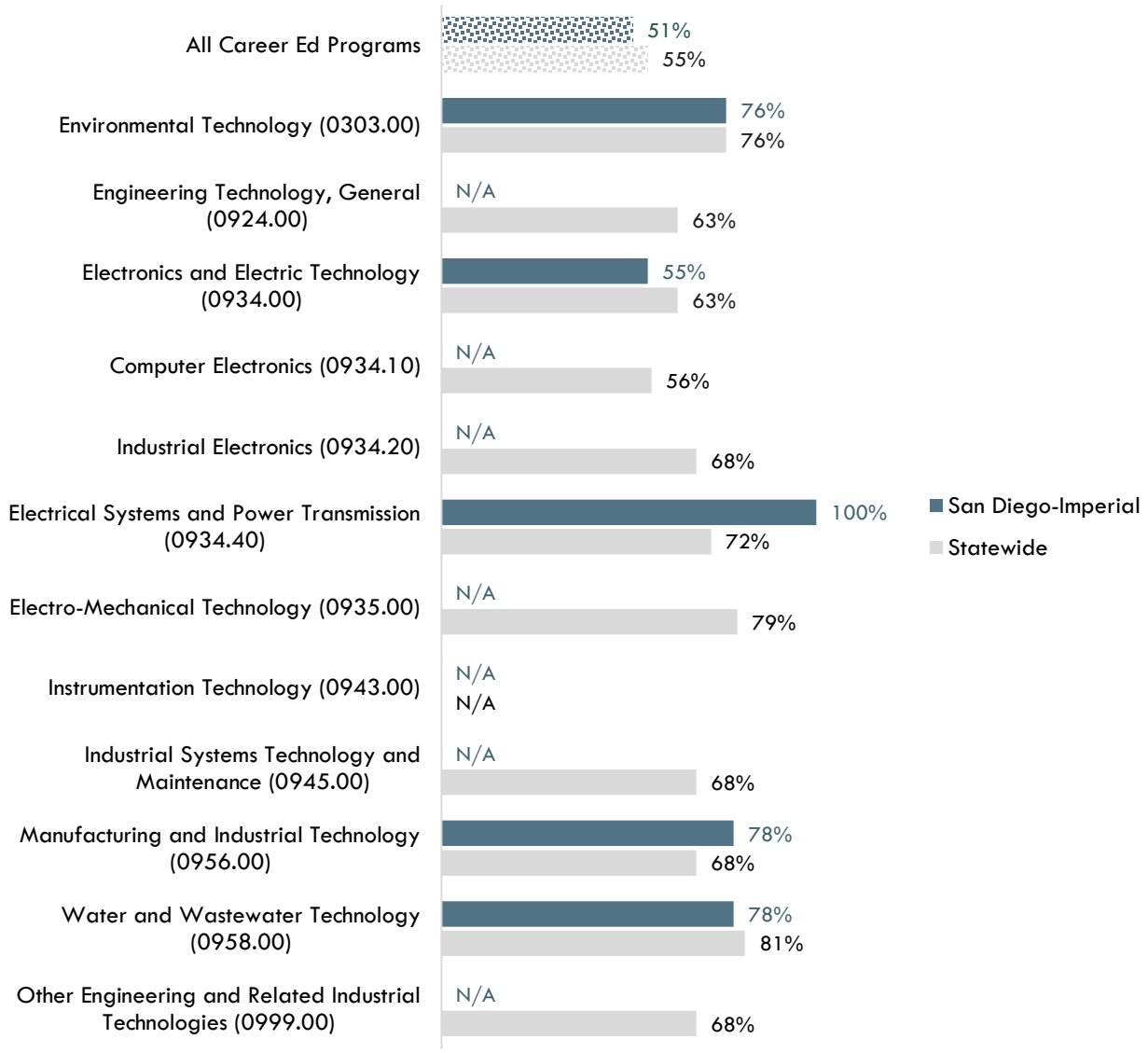
Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; 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, coeccc.net/Supply-and-Demand.aspx.

Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 55 to 100 percent of students in the San Diego-Imperial region earned a living wage after completing a program related to *Engineering Technicians*, compared to 56 to 81 percent statewide and 55 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, PY2017-18[13]

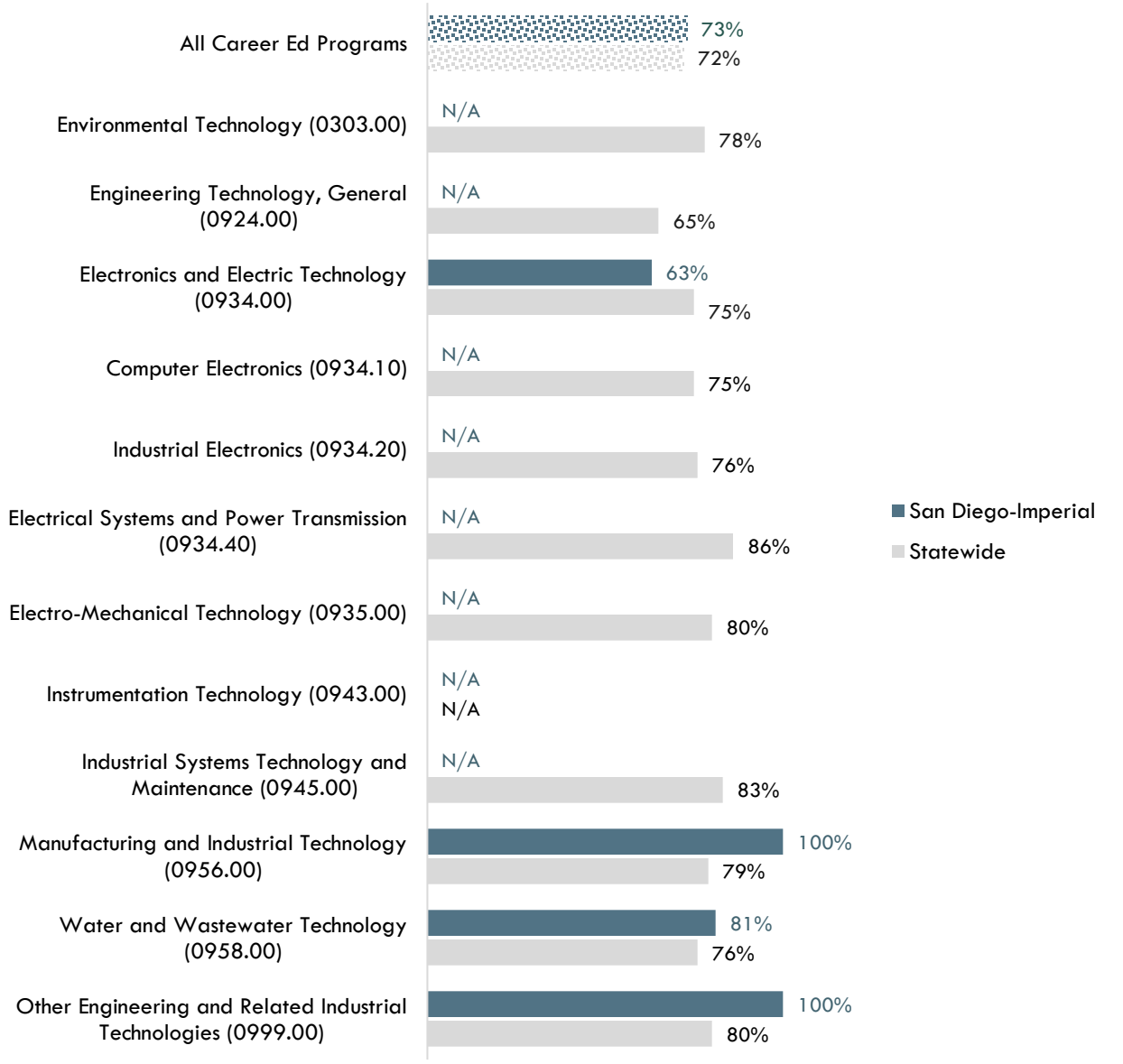


"N/A" indicates insufficient data

[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, 63 to 100 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 *Engineering Technicians*, compared to 65 to 86 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, PY2016-17[15]



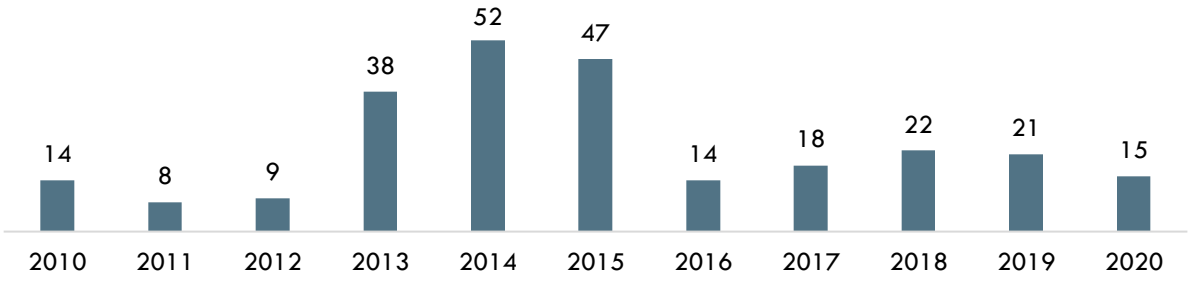
"N/A" indicates insufficient data

[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 2016-17. 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

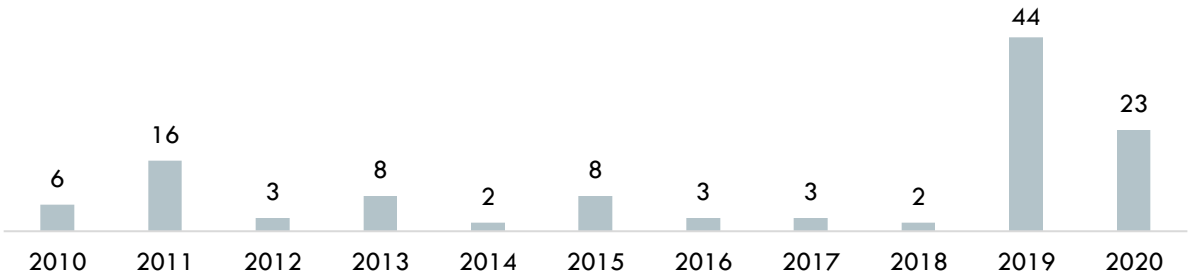
This report analyzes not only historical and projected (traditional LMI) data, but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market that are not captured by historical data. Between 2010 and 2020, there was an average of 23 online job postings per year for *Engineering Technicians* in Imperial County (Exhibit 7a). 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 7a: Number of Online Job Postings for *Engineering Technicians* in Imperial County (2010-2020)[16]



The COE also analyzed online job postings to examine the frequency in which the keywords "geothermal energy" were specified by employers in online job postings. Between 2010 and 2020, an average of 11 online job postings per year included the keywords "geothermal energy" (Exhibit 7b).

Exhibit 7b: Number of Online Job Postings with the Keywords "Geothermal Energy" in Imperial County (2010-2020)[17]



[16] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.
[17] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.

Top Employers

Between January 1, 2018 and December 31, 2020, the top five employers in Imperial County for *Engineering Technicians* were MidAmerican Energy, Ormat Technologies, Advanced Technology Services, Air Methods, and Imperial Irrigation District based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for *Engineering Technicians* in Imperial County[18]

Top Employers	
• MidAmerican Energy	• Empire Cat
• Ormat Technologies, Inc.	• Brawley Union High School District
• Advanced Technology Services	• Department of Parks and Recreation
• Air Methods	• Heber Elementary School District
• Imperial Irrigation District	• Reyes Holdings

Education, Skills, and Certifications

Engineering Technicians have a national educational attainment of an associate degree (Exhibit 9a).

Exhibit 9a: National Educational Attainment for *Engineering Technicians*[19]

Occupational Title	Typical Entry-Level Education
Electrical and Electronic Engineering Technologists and Technicians	Associate degree
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree
Environmental Engineering Technologists and Technicians	Associate degree
Industrial Engineering Technologists and Technicians	Associate degree
Mechanical Engineering Technologists and Technicians	Associate degree

[18] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.
[19] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

Based on online job postings between January 1, 2018 and December 31, 2020 in Imperial County, employers posted a high school diploma or equivalent as the educational requirement for *Engineering Technicians* (Exhibit 9b).[20]

Exhibit 9b: Educational Requirements for *Engineering Technicians* in Imperial County[21]

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 10: Top Skills for *Engineering Technicians* in Imperial County[22]

Specialized Skills	Soft Skills	Software Skills
• Repair • Cleaning • Computer Hardware/Software Knowledge • Spreadsheets • Hand Tools • Predictive / Preventative Maintenance • Scheduling • Machinery • Welding • Actuators • Electrical Work • Lifting Ability • Algebra • Electrical Troubleshooting • Geometry	• Troubleshooting • Physical Abilities • Preventive Maintenance • English • Communication Skills • Work Area Maintenance • Problem Solving • Multi-Tasking • Prioritizing Tasks • Teamwork / Collaboration • Writing • Computer Literacy • Creativity • Planning • Research	• Microsoft Excel • Microsoft PowerPoint • Microsoft Word • Enterprise Resource Planning • Microsoft Access • SCADA

[20] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.
[21] "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.
[22] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Exhibit 11 lists the top certification that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 11: Top Certification for *Engineering Technicians* in Imperial County[23]

Top Certification in Online Job Postings
1. First Aid CPR AED
2. OSHA Forklift Certification
3. Air Brake Certified
4. CDL Class A
5. CDL Class C
6. Certified Crane Operator

[23] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

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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.