

# Occupations for Energy and Geo-Environmental Engineering

## Labor Market Analysis: San Diego County

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December 2018

### Summary

According to available labor market information, there is demand for occupations that could be trained by an *Energy and Geo-Environmental Engineering* program. For the purpose of this report, these occupations are referred to as “Energy and Geo-Environmental Engineering Occupations.” *Energy and Geo-Environmental Engineering Occupations* in San Diego County have a labor market demand of 3,053 annual job openings. Nine educational institutions in San Diego County supply 703 awards for these occupations, suggesting that there is a supply gap. These occupations’ median earnings are higher than the Self-Sufficiency Standard, suggesting that students who successfully complete a program and obtain employment in a related field may earn a living wage.

The following list summarizes findings from the labor market analysis for *Energy and Geo-Environmental Engineering Occupations*:

- Between 2017 and 2022, *Energy and Geo-Environmental Engineering Occupations* are projected to increase by 1,953 jobs or seven percent.
- Employers in San Diego County will need to hire 3,053 workers annually to fill new jobs and backfill jobs due to attrition such as retirement or turnover.
- Between 2010 and 2017, there was an average of 857 online job postings per year for *Energy and Geo-Environmental Engineering Occupations* in San Diego County.
- On average, the median hourly earnings for *Energy and Geo-Environmental Engineering Occupations* is \$28.67; this is more than the Self-Sufficiency Standard for a single adult in San Diego County, which is \$15.99 per hour.
- There are 16 TOP codes and 29 CIP codes related to *Energy and Geo-Environmental Engineering Occupations*.
- According to TOP data, eight community colleges supply the region with awards for these occupations: Cuyamaca College, Grossmont College, MiraCosta College, Palomar College, San Diego Continuing Education, San Diego City College, San Diego Mesa, and Southwestern College.

According to CIP data, one non-community college supplies the region with awards, CET – San Diego.

- Comparing labor demand (annual openings) with labor supply suggests that there is a supply gap for these occupations in San Diego County, with 3,053 annual openings and 703 awards. Comparatively, there are 29,182 annual openings in California and 4,771 awards.
- Between January 1, 2015 and December 31, 2017, the top five employers in San Diego County for these occupations were Anthem Blue Cross, Lincoln Military Housing, Sunrun, General Atomics, and SolarCity.
- The majority of *Energy and Geo-Environmental Engineering Occupations* have a typical entry-level education of less than a bachelor's degree

## Introduction

This report analyzes five occupations that could be trained by an *Energy and Geo-Environmental Engineering* program. The occupations are:

- **Business Operations Specialists, All Other** (SOC 13-1199<sup>1</sup>): For this report, all Business Operations Specialists, All Other, are analyzed, including more specific titles such as:
  - **Energy Auditors** (13-1199.01): Conduct energy audits of buildings, building systems, or process systems. May also conduct investment grade audits of buildings or systems.
- **First-Line Supervisors of Construction Trades and Extraction Workers** (SOC 47-1011): Directly supervise and coordinate activities of construction or extraction workers. For this report, First-Line Supervisors of Construction Trades and Extraction Workers include:
  - **Solar Energy Installation Managers** (SOC 47-1011.03): Direct work crews installing residential or commercial solar photovoltaic or thermal systems.
- **Solar Photovoltaic Installer** (SOC 47-2231): Assemble, install, or maintain solar photovoltaic (PV) systems on roofs or other structures in compliance with site assessment and schematics. May include measuring, cutting, assembling, and bolting structural framing and solar modules. May perform minor electrical work such as current checks.
- **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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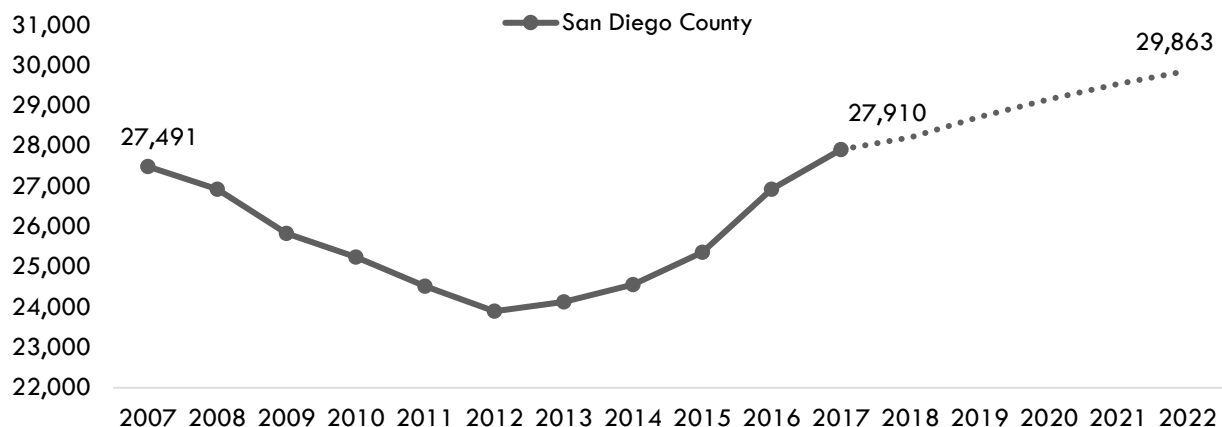
<sup>1</sup> The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. [bls.gov/soc](http://bls.gov/soc).

- **Miscellaneous Construction and Related Workers** (SOC 47-4098): For this report, Miscellaneous Construction and Related Workers, All Other, are also analyzed, including more specific titles such as:
  - **Weatherization Installers and Technicians** (47-4098.03): Perform a variety of activities to weatherize homes and make them more energy efficient. Duties include repairing windows, insulating ducts, and performing heating, ventilating, and air-conditioning (HVAC) work. May perform energy audits and advise clients on energy conservation measures.

## Projected Occupational Demand

Between 2017 and 2022, *Energy and Geo-Environmental Engineering Occupations* are projected to increase by 1,953 jobs or seven percent (Exhibit 1). Employers in San Diego County will need to hire 3,053 workers annually to fill new jobs and backfill jobs due to attrition such as retirement or turnover.

**Exhibit 1: Number of Jobs for Energy and Geo-Environmental Engineering Occupations (2007-2022)<sup>2</sup>**

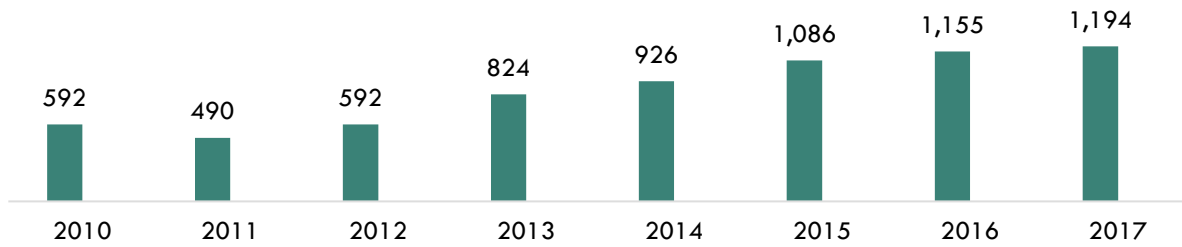


## Online Job Postings

Between 2010 and 2017, there was an average of 857 online job postings per year for *Energy and Geo-Environmental Engineering Occupations* in San Diego County (Exhibit 2).

<sup>2</sup> Economic Modeling Specialists, Int'l. (EMSI). San Diego (6073). 2018.04 Class of Worker. QCEW + Non-QCEW + Self-Employed. 2007-2022.

**Exhibit 2: Number of Online Job Postings for Energy and Geo-Environmental Engineering Occupations in San Diego County (2010-2017)<sup>3</sup>**



## Earnings

The median hourly earnings of *Energy and Geo-Environmental Engineering Occupations* range from \$21.65 to \$37.74 (Exhibit 3a). On average, the median hourly earnings for *Energy and Geo-Environmental Engineering Occupations* is **\$28.67**; this is more than the Self-Sufficiency Standard for a single adult in San Diego County, which is **\$15.99** per hour (Exhibit 3b).<sup>4</sup>

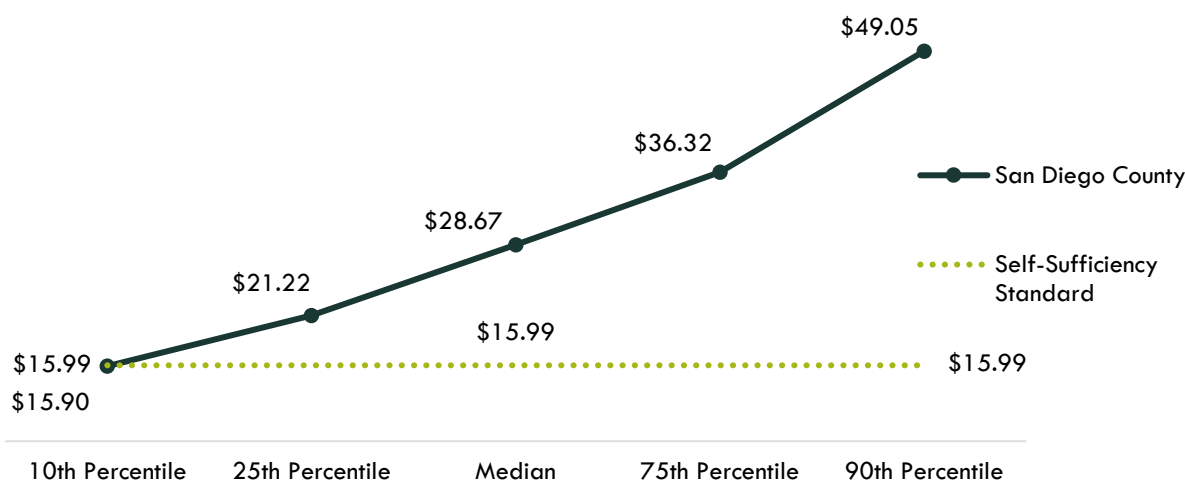
**Exhibit 3a: Hourly Earnings for Energy and Geo-Environmental Engineering Occupations in San Diego County**

Occupational Title	Entry-Level Hourly Earnings (10 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (90 <sup>th</sup> Percentile)
Business Operations Specialists, All Other	\$20.32	\$37.74	\$66.80
First-Line Supervisors of Construction Trades and Extraction Workers	\$15.58	\$35.54	\$55.64
Solar Photovoltaic Installers	\$15.10	\$21.65	\$43.77
Miscellaneous Construction and Related Workers	\$14.37	\$23.82	\$43.03
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	\$14.15	\$25.02	\$36.00

<sup>3</sup> Labor Insight Jobs. Burning Glass Technologies. San Diego, CA. Full years 2010-2017.

<sup>4</sup> The self-sufficiency wage in San Diego for one adult is \$15.99 (insightcced.org/2018-self-sufficiency-standard).

**Exhibit 3b: Hourly Earnings for Energy and Geo-Environmental Engineering Occupations in San Diego County<sup>5</sup>**



## 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.<sup>6</sup> There are 16 TOP codes and 29 CIP codes related to *Energy and Geo-Environmental Engineering Occupations* (Exhibit 4).

**Exhibit 4: Related TOP and CIP Codes for Energy and Geo-Environmental Engineering Occupations**

### *Energy and Geo-Environmental Engineering Occupations*

TOP 030300: Environmental Technology

TOP 050640: Small Business and Entrepreneurship

TOP 050800: International Business and Trade

TOP 050970: E-Commerce (Business Emphasis)

TOP 094600: Environmental Control Technology

TOP 094610: Energy Systems Technology

TOP 095200: Construction Crafts Technology

TOP 095210: Carpentry

<sup>5</sup> EMSI. San Diego (6073). 2018.03 Class of Worker. QCEW + Non-QCEW + Self-Employed. 2017-2022.

<sup>6</sup> 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).

*Energy and Geo-Environmental Engineering Occupations*

TOP 095220: Electrical

TOP 095240: Glazing

TOP 095260: Masonry, Tile, Cement, Lath and Plaster

TOP 095270: Painting, Decorating, and Flooring

TOP 095290: Roofing

TOP 095700: Civil and Construction Management Technology

TOP 095720: Construction Inspection

TOP 210210: Public Works

CIP 15.0201: Civil Engineering Technology/Technician

CIP 15.0406: Automation Engineer Technology/Technician

CIP 15.0501: Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Tech

CIP 15.0503: Energy Management and Systems Technology/Technician

CIP 15.0505: Solar Energy Technology/Technician

CIP 15.0507: Environmental Engineering Technology/Environmental Technology

CIP 15.0508: Hazardous Materials Management and Waste Technology/Technician

CIP 46.0000: Construction Trades, General

CIP 46.0101: Mason/Masonry

CIP 46.0201: Carpentry/Carpenter

CIP 46.0302: Electrician

CIP 46.0303: Lineworker

CIP 46.0402: Concrete Finishing/Concrete Finisher

CIP 46.0403: Building/Home/Construction Inspection/Inspector

CIP 46.0406: Glazier

CIP 46.0408: Painting/Painter and Wall Coverer

CIP 46.0410: Roofer

CIP 46.0412: Building/Construction Site Management/Manager

CIP 46.0413: Carpet, Floor, and Tile Worker

CIP 46.0415: Building Construction Technology

*Energy and Geo-Environmental Engineering Occupations*

CIP 46.0499: Building/Construction Finishing, Management, and Inspection, Other

CIP 46.9999: Construction Trades, Other

CIP 47.0201: Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Tech

CIP 49.0207: Flagging and Traffic Control

CIP 52.0208: E-Commerce/Electronic Commerce

CIP 52.0701: Entrepreneurship/Entrepreneurial Studies

CIP 52.0703: Small Business Administration/Management

CIP 52.1101: International Business/Trade/Commerce

CIP 52.2001: Construction Management

According to TOP data, [eight](#) community colleges supply the region with awards for these occupations: [Cuyamaca College](#), [Grossmont College](#), [MiraCosta College](#), [Palomar College](#), [San Diego Continuing Education](#), [San Diego City College](#), [San Diego Mesa](#), and [Southwestern College](#). According to CIP data, one non-community college supplies the region with awards, [CET – San Diego](#) (Exhibit 5).

**Exhibit 5: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Year 2013-14 through PY2016-17 Average)**

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY14-15 to PY16-17)	Other Educational Institutions 3-Yr Annual Average Awards (PY13-14 to PY15-16)	3-Yr Total Average Supply (PY13-14 to PY16-17)
030300	Environmental Technology	<b>30</b>	<b>0</b>	<b>30</b>
	• Cuyamaca	25	0	
	• Southwestern	5	0	
050640	Small Business and Entrepreneurship	<b>90</b>	<b>0</b>	<b>90</b>
	• Cuyamaca	4	0	
	• MiraCosta	15	0	
	• San Diego Cont. Ed	61	0	

	• San Diego City	10	0	
	• Southwestern	1	0	
050800	International Business and Trade	<b>6</b>	<b>0</b>	<b>6</b>
	• Grossmont	3	0	
	• Palomar	2	0	
	• Southwestern	1	0	
050970	E-Commerce (Business Emphasis)	<b>1</b>	<b>0</b>	<b>1</b>
	• Southwestern	1	0	
094600	Environmental Control Technology	<b>306</b>	<b>0</b>	<b>306</b>
	• San Diego Cont. Ed	237	0	
	• San Diego City	69	0	
095210	Carpentry	<b>40</b>	<b>0</b>	<b>40</b>
	• Palomar	40	0	
095220	Electrical	<b>107</b>	<b>0</b>	<b>107</b>
	• Palomar	56	0	
	• San Diego City	51	0	
095260	Masonry, Tile, Cement, Lath and Plaster	<b>29</b>	<b>0</b>	<b>29</b>
	• Palomar	29	0	
095700	Civil and Construction Management Technology	<b>12</b>	<b>0</b>	<b>12</b>
	• San Diego Mesa	10	0	
	• Southwestern	2	0	
095720	Construction Inspection	<b>28</b>	<b>0</b>	<b>28</b>
	• Palomar	9	0	
	• San Diego Mesa	9	0	
	• Southwestern	10	0	
210210	Public Works	<b>2</b>	<b>0</b>	<b>2</b>
	• Palomar	2	0	
46.0415	Building Construction Technology	<b>0</b>	<b>52</b>	<b>52</b>
	• CET – San Diego	0	52	
			<b>Total</b>	<b>703</b>



## Demand vs. Supply

Comparing labor demand (annual openings) with labor supply<sup>7</sup> suggests that there is a **supply gap** for these occupations in San Diego County, with **3,053** annual openings and **703** awards. Comparatively, there are **29,182** annual openings in California and **4,771** awards<sup>8</sup> (Exhibit 6).

**Exhibit 6: Labor Demand (Annual Openings) Compared to Labor Supply (Average Annual Awards)**

Community Colleges and Other Postsecondary Educational Institutions	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or <b>Oversupply</b>
San Diego	3,053	703	<b>2,350</b>
California	29,182	4,771	<b>24,411</b>

**Please note:** This is a basic analysis of supply and demand of labor. 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. Additionally, the data does not include workers who are currently in the labor force who could fill these positions or workers who are not captured by publicly available data.

## Student Outcomes

Based on the information available in the CTE LaunchBoard, students who took courses in the related TOP codes exhibited the following outcomes (Exhibit 7).

**Exhibit 7: Strong Workforce Program Metrics for TOP 094610: Energy Systems Technology San Diego-Imperial Region vs. California (PY2015-16)**

Metric	San Diego-Imperial	California
Number of course enrollments <sup>9</sup>	55	2,103
Completed 12+ CTE Units in One Year <sup>10</sup>	25	348
Completed 48+ CTE Contact Hours in One Year <sup>11</sup>	0	N/A

<sup>7</sup> 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.

<sup>8</sup> Centers of Excellence Student Outcomes supply table. (coeccc.net/Supply-and-Demand.aspx).

<sup>9</sup> The number of enrollments in courses assigned to the TOP code in the selected year.

<sup>10</sup> The number of students who completed 12 or more credit CTE units.

<sup>11</sup> The number of students who completed 48 or more noncredit CTE instructional contact hours.

Metric	San Diego-Imperial	California
Number of students who got a degree or certificate <sup>12</sup>	N/A	90
Number of students who transferred <sup>13</sup>	0	68
Employed in the second fiscal quarter after exit <sup>14</sup>	N/A	61%
Employed in the fourth fiscal quarter after exit <sup>15</sup>	N/A	60%
Job closely related to field of study <sup>16</sup>	N/A	N/A
Median earnings in the second fiscal quarter after exit <sup>17</sup>	N/A	\$9,027
Median change in earnings <sup>18</sup>	N/A	48%
Attained a living wage <sup>19</sup>	N/A	55%

## Top Employers and Work Locations

Between January 1, 2015 and December 31, 2017, the top five employers in San Diego County for these occupations were [Anthem Blue Cross](#), [Lincoln Military Housing](#), [Sunrun](#), [General Atomics](#), and [SolarCity](#) (Exhibit 8).

### Exhibit 8: Top Employers in San Diego County for *Energy and Geo-Environmental Engineering Occupations*<sup>20</sup>

Top Employers	
<ul style="list-style-type: none"> <li>• Anthem Blue Cross</li> <li>• Lincoln Military Housing</li> <li>• Sunrun</li> <li>• General Atomics</li> <li>• SolarCity</li> </ul>	<ul style="list-style-type: none"> <li>• Booz Allen Hamilton</li> <li>• Triton Incorporated</li> <li>• Sears</li> <li>• Countywide Mechanical Systems</li> <li>• Escondido Union School District</li> </ul>

<sup>12</sup> The number of unduplicated students who earned a locally-issued certificate, Chancellor's Office approved certificate, associate degree, and/or California Community Colleges bachelor's degree in the selected TOP code.

<sup>13</sup> Students who took non-introductory courses or completed a California Community Colleges Chancellor's Office award in the selected TOP code in selected year who subsequently enrolled for the first time in a four-year institution the following year.

<sup>14</sup> Among all exiters with a valid SSN, the percentage who were employed two quarters after exiting California Community Colleges.

<sup>15</sup> Among exiting students with a valid SSN, the percentage who were employed four quarters after exiting California Community Colleges.

<sup>16</sup> Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

<sup>17</sup> Among exiting students, the median second-quarter earnings one year after the year in which they exited California Community Colleges.

<sup>18</sup> Among exiting students with a valid SSN, the percentage change in earnings one year before and one year after exiting California Community Colleges.

<sup>19</sup> Among completers and skills builders who exited, the proportion of students who attained a living wage.

<sup>20</sup> Labor Insight Jobs. Burning Glass Technologies. San Diego, CA. Full years 2010-2017.

## Skills, Education, and Certifications

*Energy and Geo-Environmental Engineering Occupations* have varying educational requirements; they range from a high school diploma or equivalent to a bachelor's degree. The majority of *Energy and Geo-Environmental Engineering Occupations* have a typical entry-level education of less than a bachelor's degree (Exhibit 9a).

**Exhibit 9a: Educational Requirements for *Energy and Geo-Environmental Engineering Occupations***

Occupational Title	Typical Entry-Level Education
Business Operations Specialists, All Other	Bachelor's degree
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
Solar Photovoltaic Installers	High school diploma or equivalent
Miscellaneous Construction and Related Workers	High school diploma or equivalent

Based on online job postings between January 1, 2015 and December 31, 2017, the top listed educational requirement for the four *Energy and Geo-Environmental Engineering Occupations* is a **bachelor's degree** (Exhibit 9b).<sup>21</sup>

**Exhibit 9b: Educational Requirements for *Energy and Geo-Environmental Engineering Occupations* in San Diego County<sup>22</sup>**

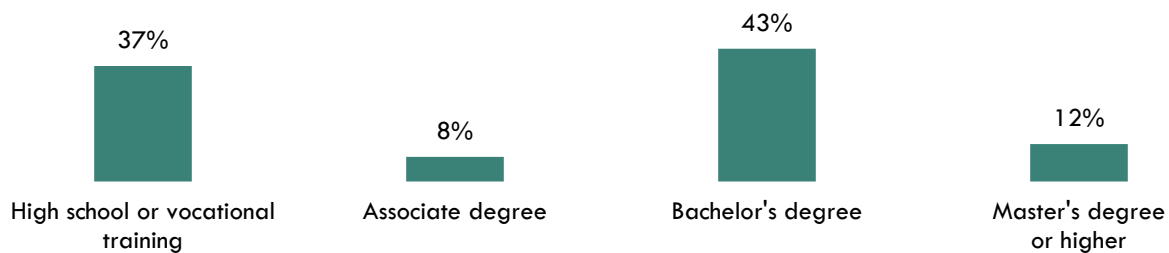


Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2015 and December 31, 2017.

<sup>21</sup> Labor Insight Jobs. Burning Glass Technologies. San Diego, CA. Full years 2010-2017.

<sup>22</sup> Bureau of Labor Statistics, Educational attainment for workers 25 years and older by detailed occupation. [bls.gov/emp/ep\\_table\\_111.htm](https://www.bls.gov/emp/ep_table_111.htm).

**Exhibit 10: Top Skills for Energy and Geo-Environmental Engineering Occupations in San Diego County<sup>23</sup>**

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> <li>• HVAC</li> <li>• Repair</li> <li>• Customer Service</li> <li>• Project Management</li> <li>• Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>• Communication Skills</li> <li>• Troubleshooting</li> <li>• Organizational Skills</li> <li>• Preventive Maintenance</li> <li>• Planning</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft Excel</li> <li>• Microsoft Word</li> <li>• Microsoft Powerpoint</li> <li>• Microsoft Project</li> <li>• Customer Relationship Management</li> </ul>

Tina Ngo Bartel, Director

John Edwards, Research Analyst

San Diego-Imperial Center of Excellence for Labor Market Research

[tngobartel@miracosta.edu](mailto:tngobartel@miracosta.edu)

[jedwards@miracosta.edu](mailto:jedwards@miracosta.edu)



**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.

<sup>23</sup> Labor Insight Jobs. Burning Glass Technologies. San Diego, CA. Full years 2010-2017.