CENTER OF EXCELLENCE
FOR LABOR MARKET RESEARCH
ORANGE COUNTY

ORANGE COUNTY SECTOR PROFILE:

ENERGY, CONSTRUCTION, & UTILITIES

2024

ORANGE COUNTY REGIONAL CONSORTIUM | WORKFORCE DEVELOPMENT ALLIANCE

California Community Colleges

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INTRODUCTION

This report is the fifth in a series of 12 sector profiles that aim to provide a comprehensive analysis of Orange County's occupational landscape. This series dives into each of the 12 community college sectors, offering historical and projected occupational insights while building upon foundational research established through the Orange County Labor Market Overview.[2] This sector profile focuses on Energy, Construction, and Utilities, which the Orange County Region has ranked fifth out of the 12 sectors based on the Orange County Labor Market Overview and corresponding region-wide survey of community colleges and key partners.

The Energy, Construction, and Utilities sector is a vital part of the economy, responsible for building and maintaining critical infrastructure. It includes a broad spectrum of occupations, from *Maintenance and Repair Workers, General (49-9071)*#* and *Roofers (47-2181)** who assist skilled tradespeople, to *Construction Managers (11-9021)^#* and *Civil Engineers (17-2051)^#* who lead complex projects. The sector is characterized by a mix of manual and technical roles, with below-middle-skill positions such as *Cement Masons and Concrete Finishers (47-2051)** as well as *Septic Tank Servicers and Sewer Pipe Cleaners (47-4071)** focusing on hands-on tasks that are essential for construction and maintenance. Middle-skill occupations include roles like *Electricians (47-2111)#* and *Sheet Metal Workers (47-2211)*, which combine practical skills with technical knowledge to meet the demands of modern construction and energy systems. Above-middle-skill occupations like *Architectural and Engineering Managers (11-9041)^, Environmental Scientists and Specialists, Including Health (19-2041)^, Nuclear Engineers (17-2161)^, and Geoscientists, Except Hydrologists and Geographers (19-2042)^* play a crucial role in ensuring the safety, sustainability, and innovation of energy and utility services. This blend of roles highlights the sector's reliance on both manual labor and advanced technical expertise to support industries ranging from residential construction to energy production and distribution. This sector is essential not only for its direct impact on infrastructure but also for its contributions to environmental protection and energy efficiency, which are increasingly important in today's world.

The Energy, Construction, and Utilities sector is comprised of 113 occupations, 35 of which were highlighted in the Orange County Labor Market Overview. These 113 occupations account for 14% of the total number of occupations in the federal Bureau of Labor Statistics (BLS) Standard Occupational Classification (SOC) system and 10% (10) are on the U.S. News & World Report's 100 Best Jobs of 2024 list.[3]

Occupations are denoted throughout this report in italics, with their corresponding SOC code in parentheses, with below middle-skill occupations denoted with an *, and above middle-skill occupations denoted with a ^ and occupations that are on the U.S. News & World Report's 2024 100 Best Jobs list denoted by #, such as, *Architects, Except Landscape and Naval (17-1011)^#*.

By examining key aspects such as occupational trends, major employers, skills, program completions, and opportunities, the OC COE seeks to highlight underlying dynamics and intricacies shaping the Energy, Construction, and Utilities sector in Orange County. Community colleges and regional stakeholders can use this information for strategic planning and data-informed decision making to address workforce needs in this sector.

ENERGY, CONSTRUCTION, AND UTILITIES OCCUPATIONAL DATA ANALYSIS

Orange County's Occupational Landscape

The Energy, Construction, and Utilities sector is comprised of 113 occupations that accounted for 143,448 jobs in 2022, representing 8% of all jobs in Orange County. These jobs are expected to grow by 6% through 2027, resulting in 15,488 projected annual openings.

Energy, Construction, and Utilities Sector Key Facts

143,448
Number of Jobs in 2022

7,905
5-Year Change through 2027

6%
5-Year Percent Change

15,488
Annual Openings

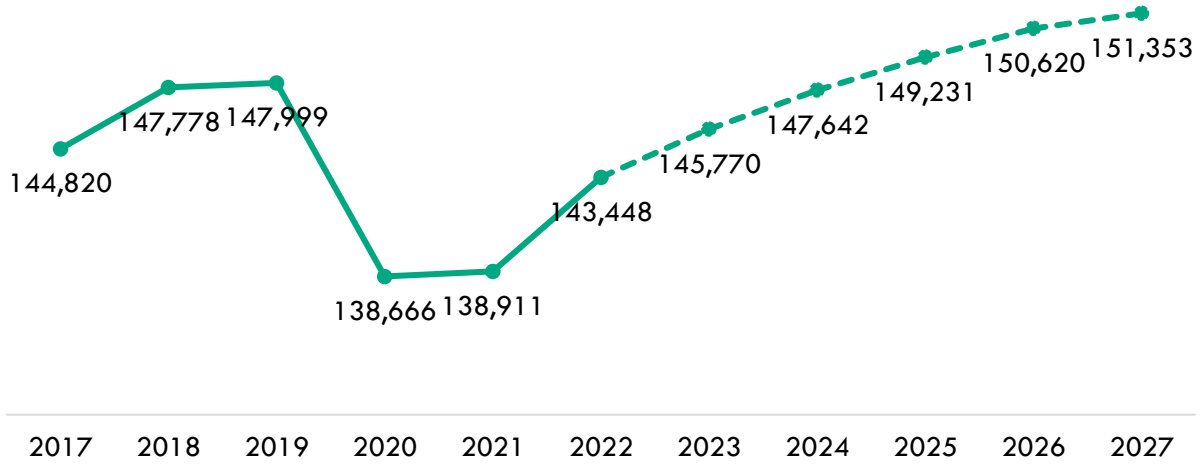
11,247
Establishments

$14.04 - $66.74
Occupational Entry-Level Wage Range

Historical and Projected Employment

Over a 10-year period, from 2017 projected through 2027, Energy, Construction, and Utilities jobs have been and are projected to continue steadily rising at a consistent pace, except in 2020 due to the COVID-19 pandemic-related economic downturn (Exhibit 1).

Exhibit 1: Historical and Projected Energy, Construction, and Utilities Employment in Orange County (2017-2027)



The 113 occupations in the Energy, Construction, and Utilities sector include 11 above middle-skill, 55 middle-skill, and 47 below middle-skill occupations (Exhibit 2). In 2022, the 55 middle-skill occupations accounted for 67,061 jobs, constituting 47% of the total Energy, Construction, and Utilities workforce in Orange County; followed by 47 below middle-skill occupations with 55,682 jobs, representing 39% of the total workforce (Exhibit 3).

Exhibit 2: Skill-Level for Energy, Construction, and Utilities Occupations

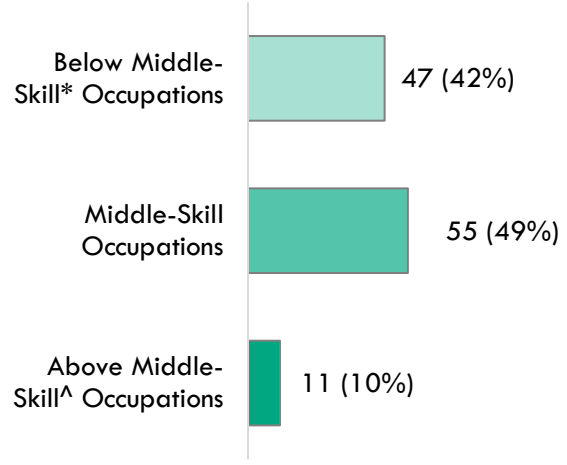
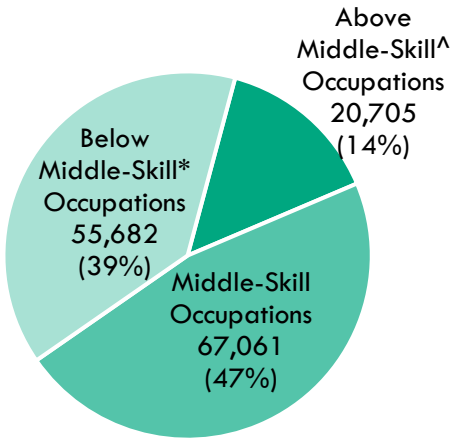


Exhibit 3: Breakdown of 2022 Jobs for Energy, Construction, and Utilities Occupations by Skill-Level



*Note: Throughout this report, Below Middle-Skill Occupations are denoted with an * and Above Middle-Skill Occupations are denoted with a ^.*

Trends In Occupational Demand

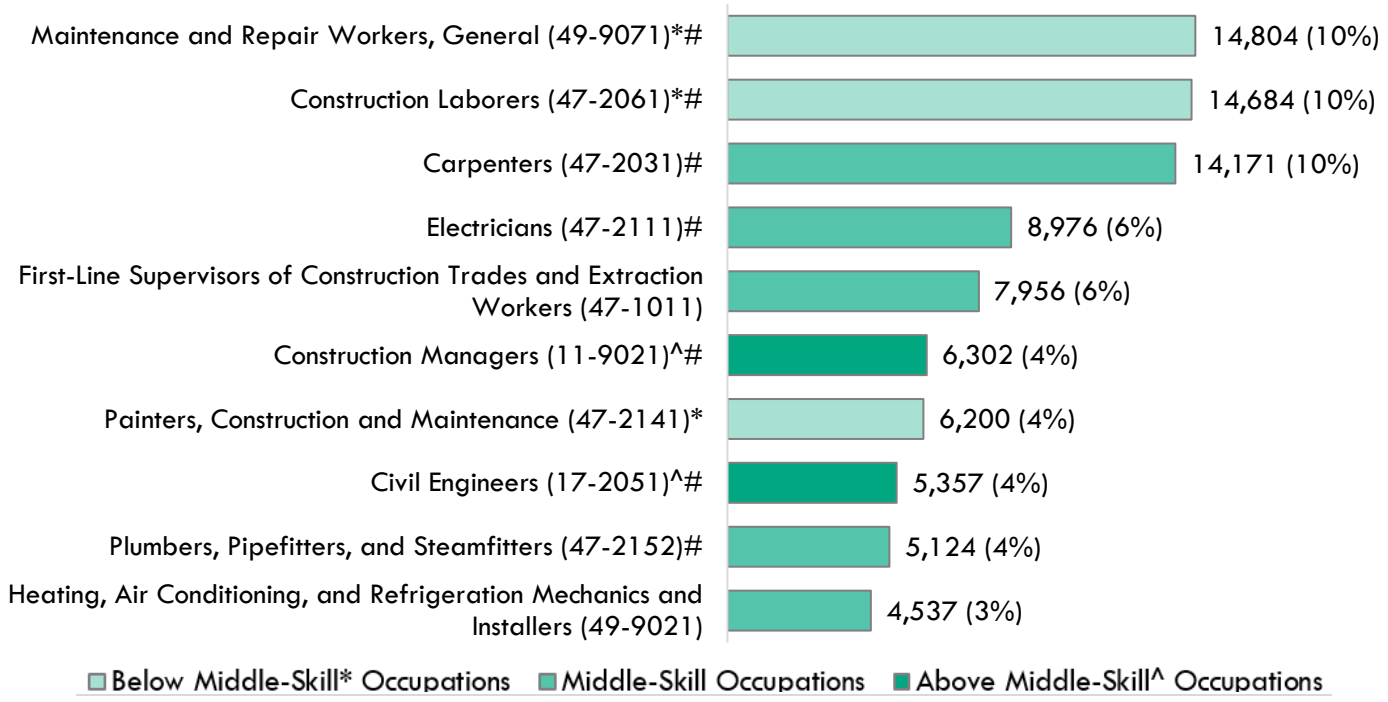
The sector has faced significant challenges in 2024, including persistent labor shortages and an aging skilled workforce, as well as continued supply chain disruptions, with lead times for materials still significantly longer than pre-pandemic levels. Despite these challenges, positive trends are emerging, such as increased demand for outdoor spaces resulting in new construction, the adoption of AI and robotics in construction processes which has improved efficiency and project management, and a growing focus on innovative materials such as self-healing concrete and utilizing 3D printing, as well as sustainable practices with more companies adopting green building materials and renewable energy solutions like solar power. Modular and prefabricated construction methods are also on the rise, offering cost-effective and environmentally friendly alternatives for building. Despite rising labor costs, there is a notable increase in female participation within the industry, with women now owning 13% of construction firms and comprising 14% of the workforce. Major projects, such as California's $88 billion high-speed railway, highlight ongoing investment in large-scale developments.[4] Additionally, a series of state mandates will require carbon-free energy while also putting more electric cars on roads and electric appliances in homes. California, under state law, must run on 60% renewable energy by 2030, ramping up to 100% by 2045.[5]

Regionally, the 113 occupations in this sector accounted for nearly 145,000 jobs in 2022 and are estimated to have over 15,000 annual openings through 2027. Jobs in this sector are projected to grow at a slightly slower rate compared to all occupations in Orange County through 2027 and one-fifth (20%) of these occupations have entry-level wages above than the MIT Living Wage for Orange County of $30.48.[6] Nearly half (47%) of Energy, Construction, and Utilities jobs are for middle-skill occupations while nearly 40% are for below middle-skill occupations.

Jobs

Jobs equate to the number of people currently in an occupation as opposed to unmet demand, which refers to the number of people still needed in an occupation. Comprising 10% of all jobs in the Energy, Construction, and Utilities sector, *Maintenance and Repair Workers, General (49-9071)*#*, a below middle-skill occupation, ranks first with the most jobs (14,804), followed by *Construction Laborers (47-2061)*#*, another below middle-skill occupation (14,684), and *Carpenters (47-2031)#*, a middle-skill occupation (14,171). All top 10 Energy, Construction, and Utilities jobs, 2022 are shown in Exhibit 4.

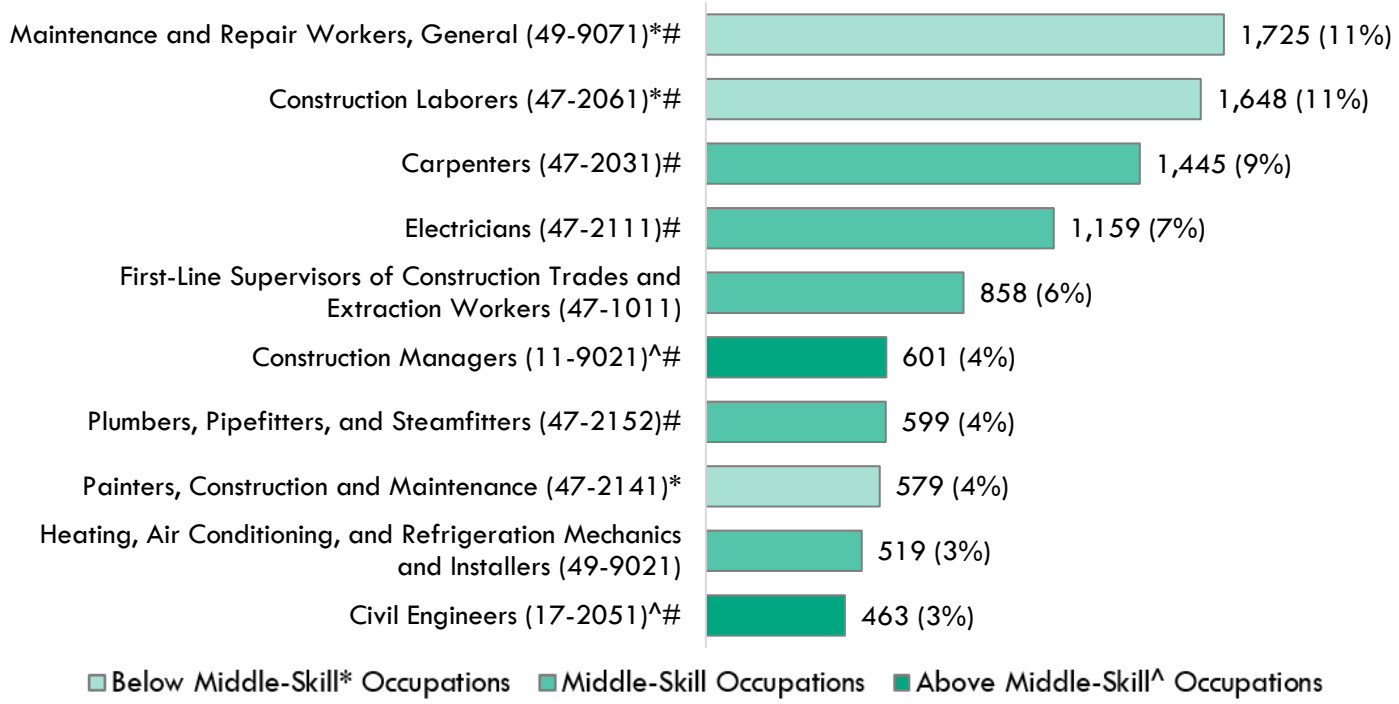
Exhibit 4: Top 10 Energy, Construction, and Utilities Jobs, 2022



Annual Openings

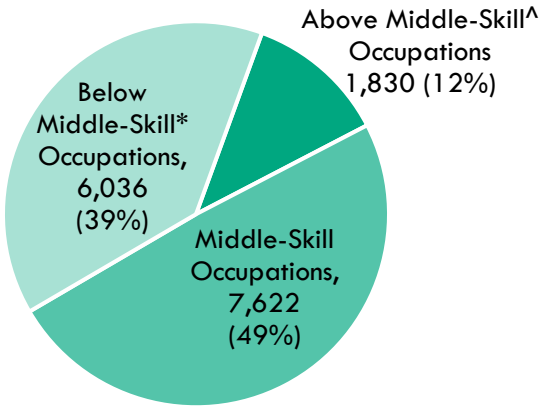
There are 15,488 Energy, Construction, and Utilities annual openings, also known as "demand" or "unmet demand", in Orange County. *Maintenance and Repair Workers, General (49-9071)*#* and *Construction Laborers (47-2061)*#* account for the largest percentage of Energy, Construction, and Utilities annual openings (11% each), with *Civil Engineers (17-2051)^#* (3%) rounding out Energy, Construction, and Utilities' top 10 annual openings, as shown in Exhibit 5.

Exhibit 5: Top 10 Annual Openings by Energy, Construction, and Utilities Occupations



Middle-skill occupations comprise 49% of all annual openings in the Energy, Construction, and Utilities sector followed by below middle-skill occupations (39%). Exhibit 6 shows the annual openings by skill-level.

Exhibit 6: Distribution of All Energy, Construction, and Utilities Annual Openings by Skill-Level

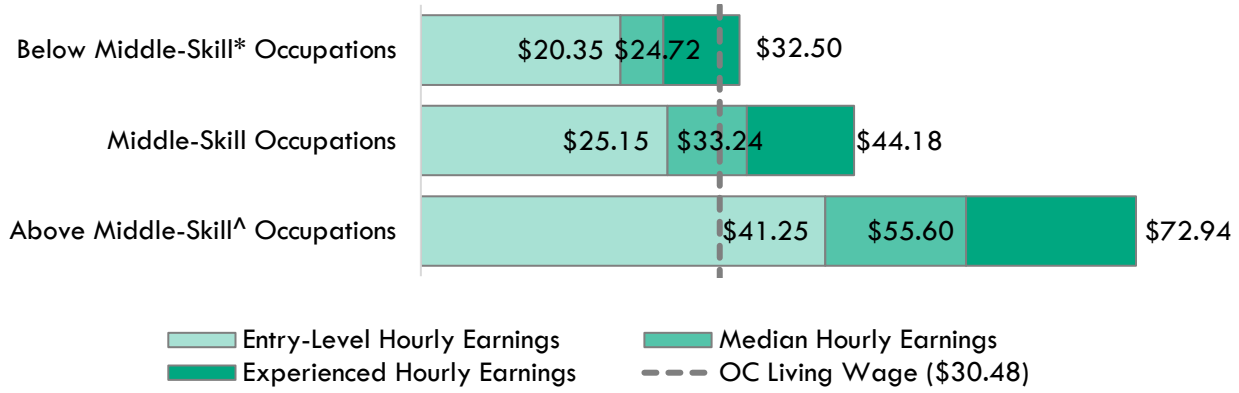


Earnings

In Orange County, the MIT Living Wage for one adult is $30.48 per hour, which is the floor benchmark for wages in the county. Of the 113 occupations in this sector, one-fifth (23) have entry-level wages above Orange County's living wage. Entry-level wages across all 113 Energy, Construction, and Utilities occupations range from $14.04 to $66.74 per hour, with *Woodworkers, All Other (51-7099)* and *Architectural and Engineering Managers (11-9041)*^ at the lower- and upper-end of this range, respectively.

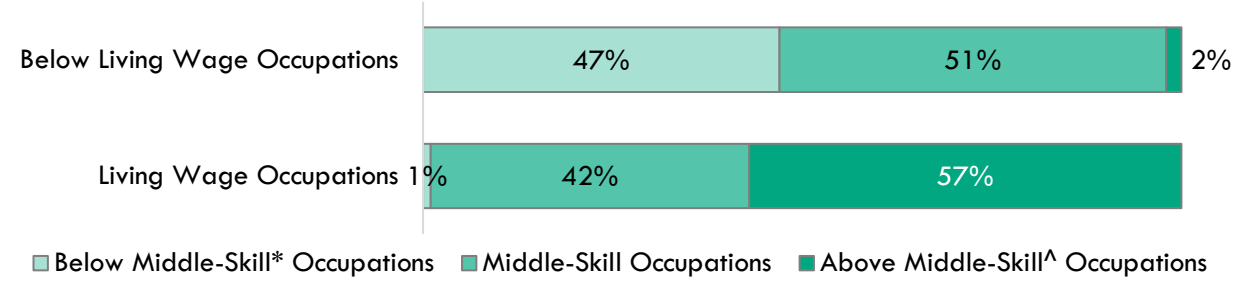
To better understand Energy, Construction, and Utilities sector wages in Orange County, wages are weighted by the number of 2022 jobs. This accounts for wage variation between occupations by normalizing the data based on the number of jobs. It adjusts for situations like a large number of low-wage jobs, a small number of high-wage jobs, or any combination of the two. Exhibit 7 shows the full spectrum of weighted wages (from entry-level to experienced) by skill level for the 113 Energy, Construction, and Utilities occupations, ranging from below-middle-skill entry-level wages of $20.35 to above middle-skill experienced wages of $72.94.

Exhibit 7: Energy, Construction, and Utilities Occupational Wages by Skill Level, Weighted by 2022 Jobs



Notably, only 17% of the annual job openings in this sector have entry-level wages above the living wage; 42% are for middle-skill occupations, 57% are for above middle-skill occupations, and only 1% are for below middle-skill occupations, as shown in Exhibit 8.

Exhibit 8: Comparison of Living Wages by Energy, Construction, and Utilities Annual Openings and Skill Level

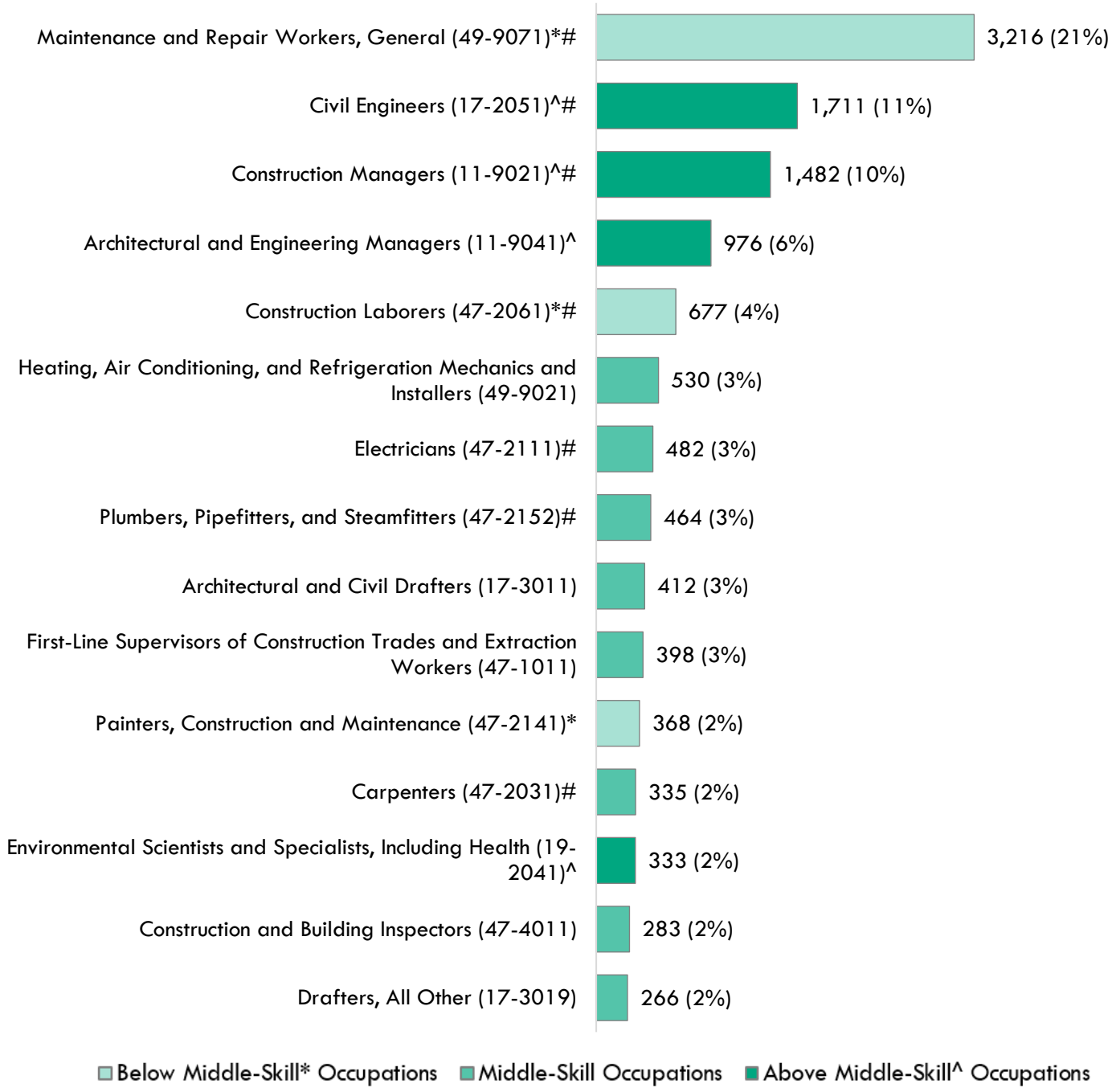


JOB POSTINGS INFORMATION

Job Postings in Orange County

Over the past 12 months (August 2023 – July 2024), there were 15,200 employer job postings within Orange County for all Energy, Construction, and Utilities occupations. Exhibit 9 shows the 15 occupations with the highest number of job postings, which represents approximately 79% of all job postings within the sector. Most notably, *Maintenance and Repair Workers, General (49-9071)*#* comprise over a fifth (21%) of the job postings.

Exhibit 9: Top 15 Energy, Construction, and Utilities Occupations by Number of Job Postings



Top Employers

Orange County's Energy, Construction, and Utilities employers are very diverse, as shown in Exhibit 10. Employers with postings for below middle-skill occupations, such as ManpowerGroup, JWilliams Staffing, and PeopleReady, are staffing agencies, which typically provide a wide range of temporary job placements, often at lower skill levels. Employers with postings for middle-skill occupations include a mix of staffing agencies, educational institutions, and large corporations, such as Aerotek, University of California, and Disney. These jobs typically require more specialized skills, vocational training, apprenticeship, and/or an associate degree. Employers in the above middle-skill category offer jobs that demand higher levels of expertise, often requiring advanced degrees, extensive experience, and/or professional certifications. These jobs include managerial positions, specialized technical jobs, and professional services; employers include AECOM and Boeing. Actalent is the only employer that appears in the middle and above-middle categories, offering a wide range of job opportunities. No employer appears in all three categories.

Exhibit 10: Top 10 Energy, Construction, and Utilities Regional Employers with the Most Job Postings by Skill Level

Below Middle-Skill*	Middle-Skill	Above Middle-Skill^
1. Aerotek	1. Aerotek	1. AECOM
2. Greystar	2. Disney	2. GPAC
3. Disney	3. Actalent	3. WSP Global
4. ManpowerGroup	4. GPAC	4. Supernal
5. JWilliams Staffing	5. Atkinson Construction	5. Actalent
6. PeopleReady	6. EMCOR Group	6. JLM Strategic Talent Partners
7. AvalonBay Communities	7. Michaels	7. CyberCoders
8. Marriott International	8. University of California	8. Jacobs Engineering Group
9. University of California	9. Johnson Controls	9. Boeing
10. Hensel Phelps Construction Company	10. Service Champions	10. HDR

Top Job Titles

Below middle-skill job titles predominantly encompass roles requiring manual skills, such as General Laborers, Handymen, and Painters, suggesting a focus on as-needed gigs that fluctuate each season. Middle-skill job titles consist of roles that require technical expertise but may not necessarily demand advanced degrees, including Electricians, Plumbers, and HVAC Technicians, reflecting a need for specialized knowledge and problem-solving abilities. Above middle-skill job titles incorporate professions with a higher degree of technical complexity and require advanced education or specialized training, such as Construction Project Managers, Civil Engineers, and Structural Engineers, indicating a demand for advanced technical skills and analytical capabilities. Job titles by skill level are shown in Exhibit 11.

Exhibit 11: Top Energy, Construction, and Utilities Job Titles in Orange County by Skill Level

Below Middle-Skill *	Middle-Skill	Above Middle-Skill^
1. Maintenance Technicians	1. Carpenters	1. Construction Project Managers
2. General Laborers	2. Electricians	2. Civil Engineers
3. Field Service Technicians	3. Plumbers	3. Construction Managers
4. Maintenance Mechanics	4. Architectural Designers	4. Construction Superintendents
5. Apartment Maintenance Technicians	5. HVAC Technicians	5. Superintendents
6. Handymen	6. Plumbing Technicians	6. Structural Engineers
7. Painters	7. Low Voltage Technicians	7. Principal Engineers
8. Construction Laborers	8. Operating Engineers	8. Engineering Managers
9. Hotel Maintenance Engineers	9. Environmental Technicians	9. Project Engineers
10. Facilities Maintenance Technicians	10. Designers	10. Civil Project Engineers

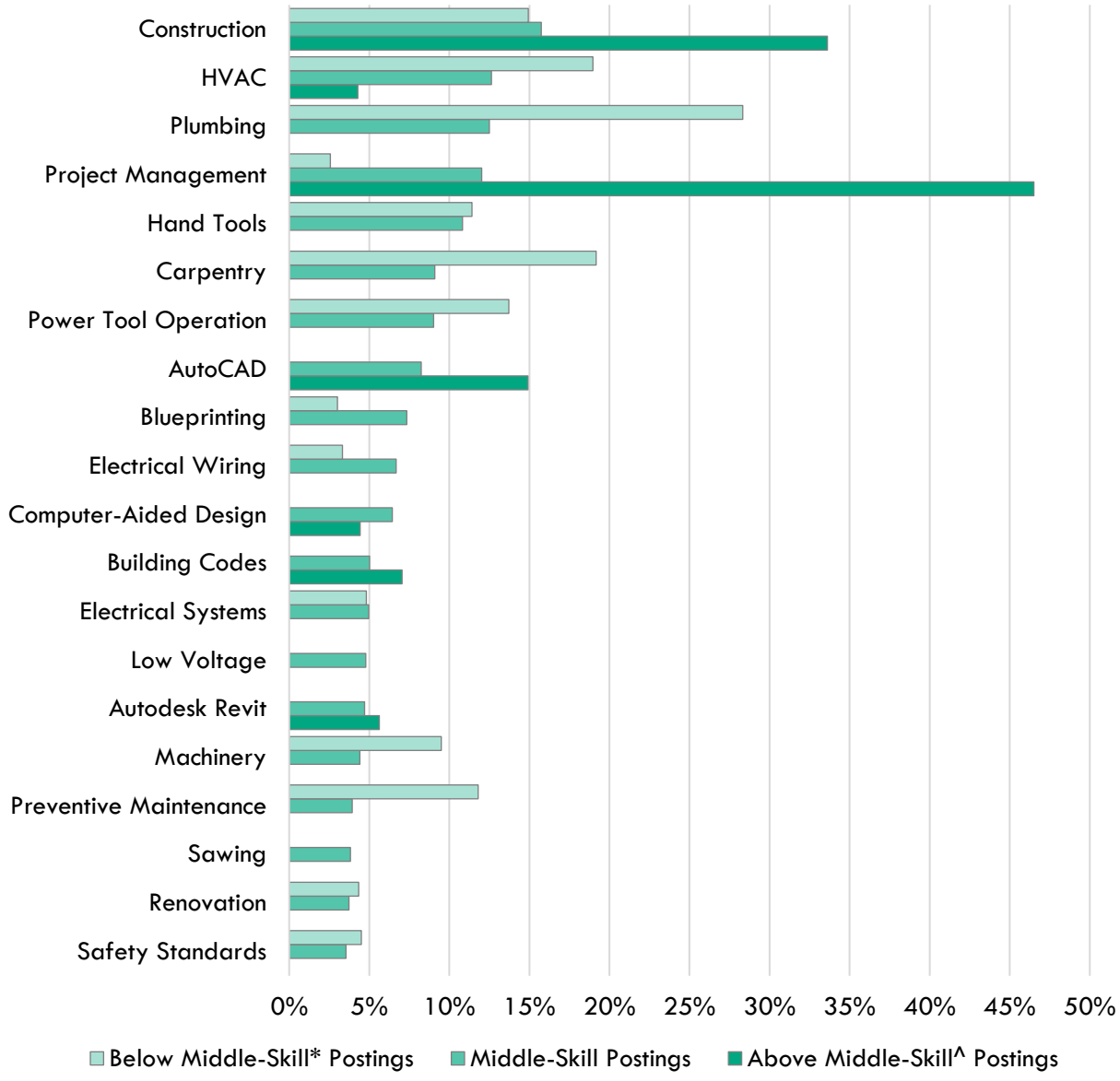
Skills in Job Postings

There are three types of skills listed in job postings: specialized ("technical" or "hard"), common ("soft" or "human"), and computer skills.

Top Specialized Skills

Among the 20 specialized skills listed, only three (3) are common across all three occupational skill levels: construction, HVAC, and project management. Coincidentally, project management (47%) and construction (34%) are the highest requested skills in above middle-skill postings, indicating their significance in jobs requiring advanced expertise, such as *Construction Managers (11-9021)^#* and *Civil Engineers (17-2051)^#*. Conversely, skills like blueprinting (7%), electrical wiring (7%), computer-aided design (6%) are prevalent in middle-skill occupations, such as *Electricians (47-2111)#* and *Architectural and Civil Drafters (17-3011)*. Notably, the below middle-skill postings category shows relatively higher percentage for plumbing (28%), carpentry (19%), and HVAC (19%), as shown in Exhibit 12.

Exhibit 12: Top 20 Specialized Skills in Energy, Construction, and Utilities Occupations



Top Common Skills

Among the top 10 common skills listed in Exhibit 13, communication skills are the most frequently demanded overall, peaking at 44% in above middle-skill postings, 32% in middle-skill postings, and 30% in below middle-skill postings. Customer service is more highly requested for below middle-skill (22%) and middle-skill postings (17%) than in only above middle-skill postings (12%). Also notable, is troubleshooting (problem solving) which is requested in 22% of below middle-skill and 19% of middle-skill postings, but not listed in above middle-skill postings. Above middle-skill postings rank communication (44%), management (37%), and operations (21%) as the most requested common skills.

Exhibit 13: Top 10 Common Skills in Energy, Construction, and Utilities Occupations

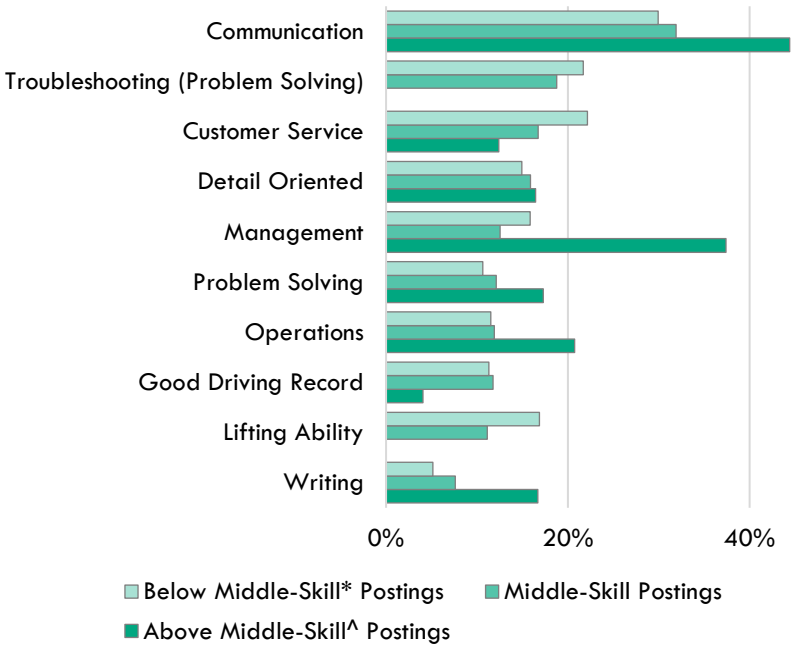
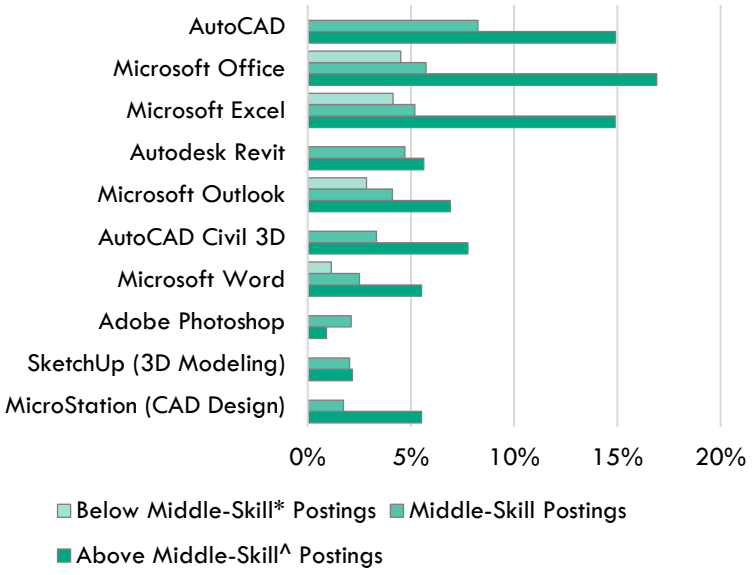


Exhibit 14: Top 10 Computer Skills in Energy, Construction, and Utilities Occupations



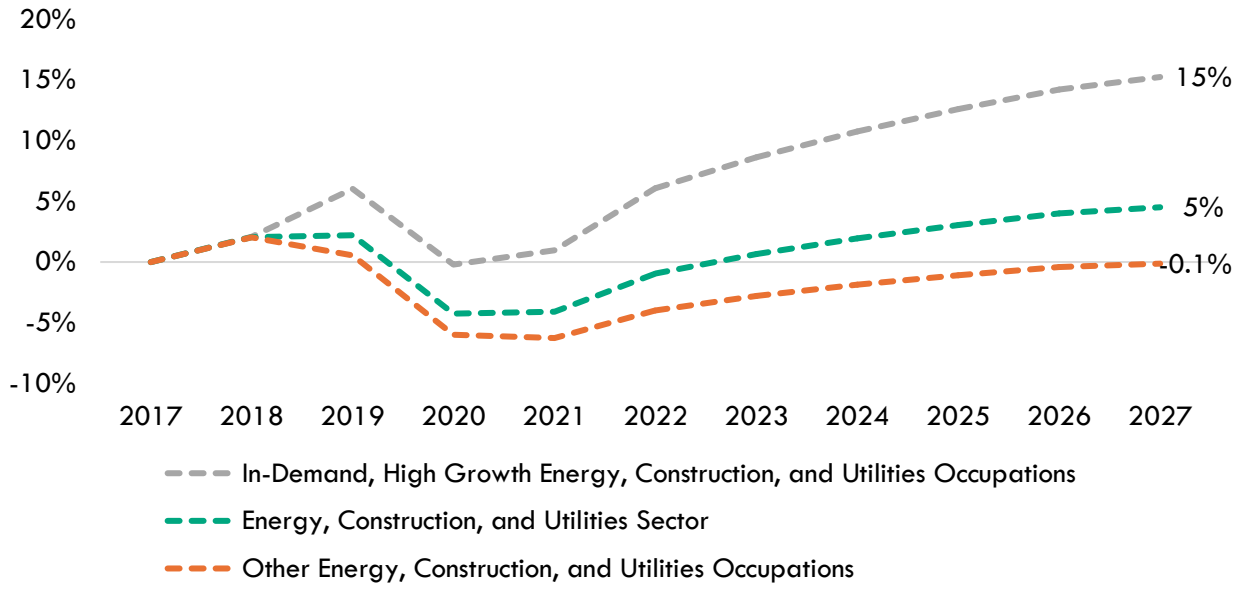
Top Computer Skills

Computer skills are not requested nearly as often as those in the other skills categories within the Energy, Construction, and Utilities sector. However, in general, they are most frequently requested in above middle-skill job postings. Microsoft Office is mentioned the most often with 17% of above middle-skill postings, 6% of middle-skill postings, and 5% of below middle-skill postings requesting it. Notably, AutoCAD is the highest in above middle-skill postings (15%), compared to 8% in middle-skill postings and none (0%) in below middle-skill postings. Adobe Photoshop is slightly higher in middle-skill (2%), compared to 1% of above middle-skill and 0% of below middle-skill postings. The top 10 computer skills are shown in Exhibit 14.

KEY OCCUPATIONS DRIVING EMPLOYMENT

There are eight Energy, Construction, and Utilities occupations, 7% of the total 113 occupations in the sector, that have a significant number of jobs and annual openings and are projected to have high growth through 2027. These eight occupations are anticipated to drive employment with a projected 15% increase from 2017 to 2027; during the same period, employment for all other occupations in the Energy, Construction, and Utilities sector is projected to remain flat, as shown in Exhibit 13.

Exhibit 13: Energy, Construction, and Utilities Development Employment Change, 2017-2027

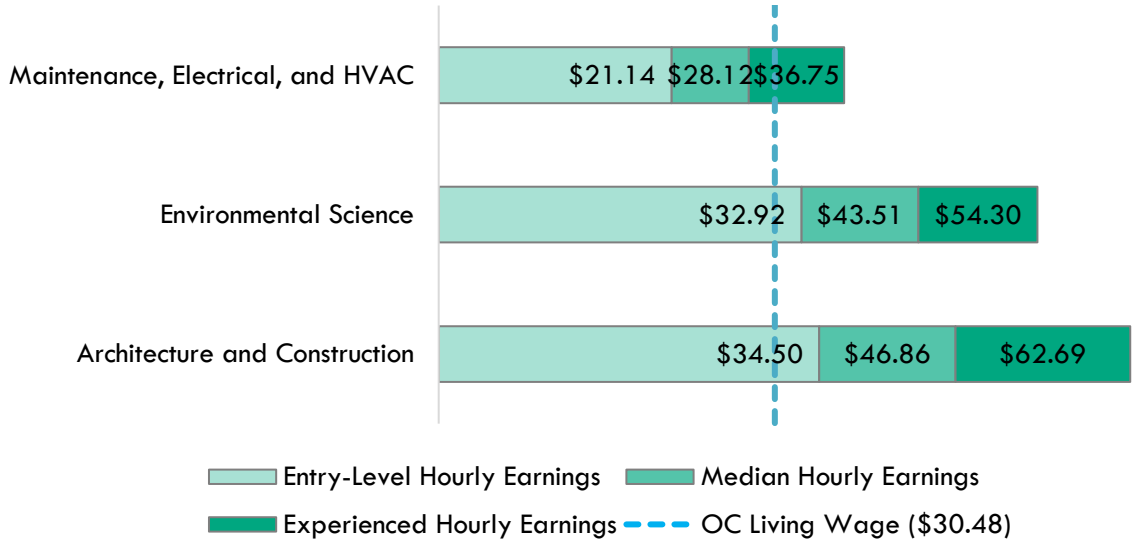


Key occupations driving employment in the Energy, Construction, and Utilities Sector can be grouped into three broad categories:

Architecture and Construction	• *Construction Managers (11-9021)^#* • *Architects, Except Landscape and Naval (17-1011)^#* • *Civil Engineers (17-2051)^#* • *Roofers (47-2181)*
Environmental Science	• *Environmental Scientists and Specialists, Including Health (19-2041)^*
Maintenance, Electrical, and HVAC	• *Electricians (47-2111)^#* • *Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)* • *Maintenance and Repair Workers, General (49-9071)*#*

Wages for these high-growth occupations vary greatly for each group, with the Maintenance, Electrical, and HVAC group having the lowest entry-level hourly wages ($21.14) and Architecture and Construction group having the highest ($34.50). Exhibit 14 shows the wage range for these three groups.

Exhibit 14: Wages by Key Energy, Construction, and Utilities Occupation Group, Weighted by 2022 Jobs



Though these three key occupation groups comprise only 7% of the total occupations, they accounted for 53% of the Energy, Construction, and Utilities sector's online job postings over the past 12 months, as shown in Exhibit 15.

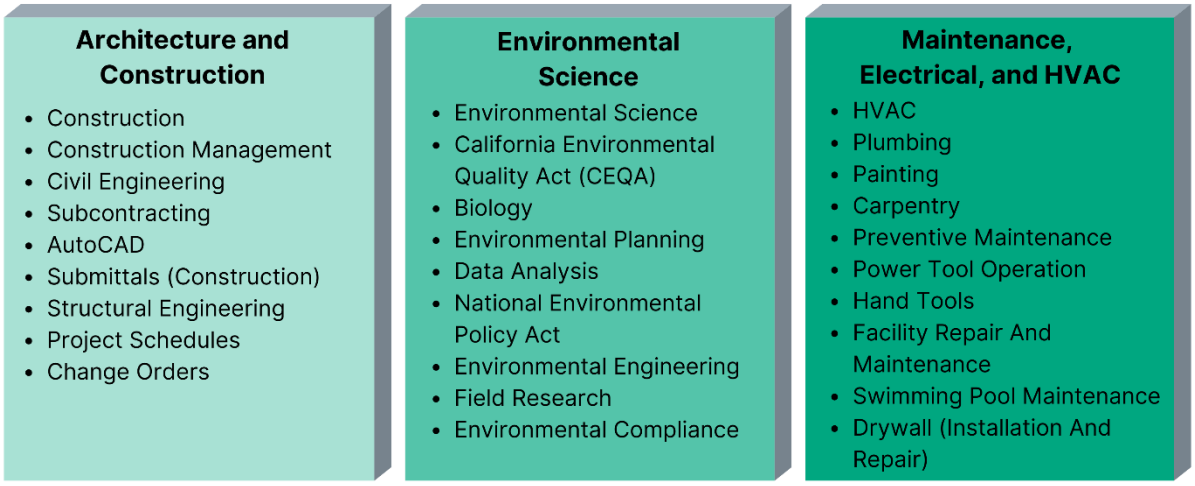
Exhibit 15: Number of Job Postings by Key Energy, Construction, and Utilities Occupation Group

Key Occupation Group	Number of Postings	% of Total Energy, Construction, and Utilities Postings
Architecture and Construction	3,508	17%
Environmental Science	335	2%
Maintenance, Electrical, and HVAC	4,228	21%
Total	**8,071**	**81%**

The skills requested by employers in online job postings for these occupations vary significantly. When considering the top 10 skills for each group, only one skill – project management – overlaps for at least two groups (Architecture and Construction and Environmental Science). There are numerous unique skills requested in online job postings for these five groups, as shown in Exhibit 16.

- **Architecture and Construction** skills include project management skills, as well as knowledge of specific types of engineering.
- **Environmental Science** skills are related to knowledge of various science fields, as well as federal and state environmental policies to ensure compliance.
- **Maintenance, Electrical, and HVAC** skills include a variety of skilled trades to conduct maintenance and repair.

.Exhibit 16: Energy, Construction, and Utilities Key Occupations Unique Skills Analysis



The following sections highlight trends, specific occupations, and examine emerging topics and areas for each of the three groups of key occupations driving employment in the Energy, Construction, and Utilities sector.

Architecture and Construction

The Architecture and Construction group of key occupations includes four occupations related to the design and construction of buildings and infrastructure. The four occupations in this group are *Construction Managers (11-9021)^#*, *Architects, Except Landscape and Naval (17-1011)^#*, *Civil Engineers (17-2051)^#*, and *Roofers (47-2181)**. Notably all occupations except *Roofers (47-2181)** are above middle-skill and on the U.S. News & World Report's Best Jobs list.

Housing Construction

California continues to face a housing crisis. Over the last 10 years throughout the state, "housing production averaged fewer than 80,000 new homes each year, and ongoing production continues to fall far below the projected need of 180,000 additional homes annually."[7] California's 2022 Statewide Housing Plan calls for more than 2.5 million homes through 2030, which is "more than double the housing planned for in the last eight-year cycle."[8]

These ambitious goals will create more opportunities for housing construction, but challenges remain. The cost of construction materials and rising interest rates have driven the cost of construction throughout the state. Between January 2021 and January 2024, "construction costs in California have increased by approximately 36.5%."[9]

Local politics also present a challenge. As part of the Southern California Association of Government's Regional Housing Needs Assessment, Orange County is required to identify areas with adequate zoning to build over 10,000 housing units. Just under half of those units are required to be for extremely low (income less than $43,050 for a family of four), very low (less than $71,750), or low income households (income less than $114,800).[10] However, Orange County is not required to actually develop these housing units.[11] As of September 2023, "the county hasn't built any affordable units, and has built just over 300 more units that are classified by the state as 'above moderate income.'" The Orange County Board of Supervisors continues to debate where to build new housing and how to ensure adequate housing is built for very low, low, moderate, and above moderate-income populations.[12]

Infrastructure Investment

Significant investment in infrastructure at the federal and state level has created numerous ongoing projects to improve California and Orange County's roads, bridges, bikeways, flood control, and more. Federally, the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), authorizes $1.2 trillion for transportation and infrastructure spending and is projected to add 1.5 million jobs per year throughout the country.[13][14] At the state level, Senate Bill 1 (SB 1), commonly known as the Road Repair and Accountability Act of 2017, "invests $5.4 billion annually to fix roads, freeways, and bridges in communities across California."[15] In August 2024, 14 transportation and infrastructure projects in Orange County were approved by the California Transportation Commission, all of which were funded either by the IIJA, SB 1, or a combination of the two. Because these projects were announced so recently, anticipated start and completion dates are not yet available. Exhibit 17 shows the five projects with the largest funding.

Exhibit 17: Major Transportation and Infrastructure Projects in Orange County[16]

$120.3 Million for State Route 55 Improvements	• $13.8 million in SB 1 and $106.5 million in IIJA funding • Extend pavement service life and improve ride quality by rehabilitating pavement, landscaping, drainage and bridge railing in the cities of Newport Beach, Costa Mesa, Santa Ana, Tustin, Orange and Anaheim.
$55.9 Million for Interstate 405 (I-405) Improvements	• $4.7 million in SB 1 and $51.3 million in IIJA funding • Rehabilitate pavement and landscaping and install a Weigh-In-Motion system on I-405 in the cities of Huntington Beach, Westminster, Garden Grove and Seal Beach.
$51.6 Million for State Route 91 Improvements	• $5.9 million in SB 1 and $45.7 million in IIJA funding • Rehabilitate pavement and culverts on SR-91 in the cities of La Palma, Buena Park, Anaheim and Fullerton.
$40.5 Million for State Route 22 Improvements	• $36.4 million in IIJA funding • Install safety lighting, and upgrade the median barrier, drainage systems and signage on SR-22 in the cities of Garden Grove, Westminster and Orange.
$36.2 Million for State Route 91 Improvements	• $4.2 million in SB 1 and $32 million in IIJA funding • Rehabilitate pavement and culverts on SR-91 in Anaheim. This project will also upgrade lighting, make highway worker safety improvements, and enhance Transportation Management System elements.

Environmental Science

There is one above middle-skill occupation – *Environmental Scientists and Specialists, Including Health (19-2041)^* – in the Environmental Science key occupation group.

Climate Change

The challenges presented by climate change are multifaceted and include, but are not limited to, wildfire management, water resources management, emission reduction, ecosystem conservation and restoration, coastal management, drought management, and more. Multiple pieces of legislation, as mentioned in the *Public Policy and Funding Opportunities* section of this report, require California to reduce greenhouse gas emissions and move to renewable energy sources and *Environmental Scientists and Specialists, Including Health (19-2041)^* are integral to developing strategies to meet California's ambitious climate goals.

As of August 2024, "Orange County remains the most populous county in California without a Climate Action Plan aimed at curbing greenhouse gas emissions."[17] However, a draft Climate Action Plan was published the same month, and includes an emissions inventory, forecast, and reduction targets, as well as an emission reduction action plan. The draft Climate Action Plan also highlights *Environmental Scientists and Specialists, Including Health (19-2041)^* in its section on Green Jobs and notes that there will be "future growth in the energy and environmental green technologies field."[18]

Maintenance, Electrical, and HVAC

The Maintenance, Electrical, and HVAC group of key occupations includes three occupations related to the design and construction of buildings and infrastructure. The four occupations in this group are *Electricians (47-2111)^#, Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021),* and *Maintenance and Repair Workers, General (49-9071)*#*.

Decarbonization and Electrification

In 2022, the California Air Resources Board (CARB) released a climate action plan to cut air pollution, reduce greenhouse gas emissions and fossil-fuel consumption, and achieve carbon neutrality by 2045.[19] To achieve these goals, fossil-fuel energy generation will need to be replaced with renewable electricity. California has already started phasing out fossil-fuel appliances. Beginning in 2030, the sale of new gas furnaces and water heaters will be banned and "homes will be required to install zero-emissions alternatives, like electric heaters."[20] Similarly, the Advanced Clean Cars II program "lays out California's legally binding path to achieving 100% zero-emission vehicle (ZEV) sales in 2035."[21] As fossil-fuel generated power is phased out, electricity demand is projected to increase and "the state needs to expedite the construction of new solar and wind infrastructure, improve existing power lines and build battery storage capacity."[22]

These advances could create new demand for electrical workers, solar panel installers, wind turbine technicians, and more, throughout the state. Specifically, more *Electricians (47-2111)^#* may be needed to replace residential electrical panels, particularly those that are older and cannot handle larger electrical loads.

Energy Efficiency and Building Automation

Currently, the "cost of electricity is higher than the cost of gas per unit of energy, [but] modern electric technology (e.g., induction cooktops and heat pumps) is much more efficient and could lower overall utility bills."[23] To achieve carbon neutrality, residential and commercial buildings need to be more efficient and California aims to have "3 million climate-ready and climate-friendly homes by 2030 and 7 million by 2035, supplemented by 6 million heat pumps by 2030."[24] This goal can be achieved through a combination of new home construction and upgrading existing homes. These efforts could create more opportunities for *Heating, Air Conditioning, and Refrigeration Mechanics and Installers (49-9021)* to install heat pumps.

There may also be additional opportunities for jobs related to building automation, which involves using "sensors and controls to monitor and adjust a building's three types of utilities: electricity, heating and air-conditioning, and water and sewer."[25] Though older homes may require electric panel upgrades, smart panels (which are a form of building automation) could also address electricity demand and efficiency concerns thereby possibly mitigating the need to upgrade electrical panels. According to a study from the UCLA Institute of the Environment & Sustainability, "strategic load management techniques, like using smart panels or restricting the use of high-power appliances at the same time, to optimize electricity use within the existing panel capacity…can significantly reduce the need for panel upgrades."[26]

Additional Energy, Construction, and Utilities Sector Trends

Green Jobs

Exhibit 18 show's O*NET definitions of the Green Economy and Green Jobs. Notably, the Green Economy and its related activities impact how work is conducted for various occupations. Rather than a job being labeled "green" or not, it is better to understand the "greening" of existing jobs. Notably, 35% (40) of the 113 Energy, Construction, and Utilities occupations are considered Green Jobs by O*NET.

Exhibit 18: Green Economy and Green Jobs Definitions, O*NET[27]

Green Economy

- Encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy

Green Jobs

- The "greening" of occupations refers to the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements

A report from the Brookings Institute notes that "hiring and training more workers in the green transition to a cleaner, more resilient economy represents a huge challenge, but also a huge opportunity." And that "millions of additional workers will likely be needed in the years to come."[28] Orange County's draft Climate Action Plan, published in August 2024, notes that "green technology presents exciting opportunities. Orange County holds a unique position, boasting a 50% higher concentration in green technology employment compared to the state of California." Furthermore, "according to the Orange County Workforce Development Board, Orange County is particularly strong in the green transportation cluster and more concentrated in employment in this industry sector relative to the state.[29]

Green Jobs represent 78% of the total Energy, Construction, and Utilities jobs in Orange County. Additionally, entry-level, median, and experienced level wages for Green Jobs are higher than those for non-Green Jobs. These Green Jobs will play a critical role as California and Orange County continues to decarbonize and reduce its reliance on fossil-fuels. Exhibit 19 compares labor market demand data for Non-Green Jobs and Green Jobs in Orange County.

Exhibit 19: Non-Green vs. Green Jobs in Orange County, 2022-2027

Job Type	2022 Jobs	2027 Jobs	2022 - 2027 Change	2022 - 2027 % Change	Annual Openings	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
Non-Green	32,168	33,063	879	3%	3,359	$22.98	$28.64	$36.48
Green	111,280	118,290	7,011	6%	12,129	$26.38	$34.47	$45.91

ENERGY, CONSTRUCTION, AND UTILITIES SUPPLY

Orange County's educational institutions provide programs tailored to equip students with skills suited for different levels of occupations within the Energy, Construction, and Utilities sector. The following visuals outline the number of awards conferred by both community colleges and non-community colleges, program observations from COCI[30], as well as the regional programs and institutions that have conferred the most awards.

869

community college awards

2,885

non-community college awards

3,754

total awards conferred

COCI Observations

- There are 128 unique Energy, Contruction and Utilities programs offered by Orange County community colleges.
- Most programs (54%) are for Certificates of Achievement, followed by Associate degrees (38%) and noncredit awards (6%).
- Santiago Canyon offers the most Energy, Construction and Utilities programs (47), followed by Orange Coast (27) and Fullerton (13).
- The plurality of Enery, Construction and Utilities programs are listed under the 0201.00 Architecture and Architectural Technology and 0952.20 Electrical TOP codes (13% each), followed by 0952.00 Construction Crafts Technology (11%) and 0946.00 Environmental Control Technology (10%).

Top Program Awards

Community College:
Water and Wastewater Technology: 233
Environmental Control Technology (HVAC): 175
Electrical: 79
Construction Crafts Technology: 78
Architecture and Architectural Technology: 64

Non-Community College:
Mechanical Engineering: 540
Computer Engineering, General: 323
Civil Engineering, General: 310
Electrical and Electronics Engineering: 283
Electrician: 265

Most Awards

Community College:
Santiago Canyon: 402
Cypress: 143
Orange Coast: 126
Santa Ana: 84
Fullerton: 49

Non-Community College:
University of California-Irvine: 1,564
California State University-Fullerton: 741
Southern California Institute of Technology: 297
UEI College-Garden Grove: 129
Brownson Technical School: 105

Community College Student Outcomes

Orange County community college students account for 18% of all Energy, Construction, and Utilities community college students in California. The visuals below show the Strong Workforce Program (SWP) metrics for the Energy, Construction, and Utilities sector in Orange County.[31]

9,253
SWP Students (2021-22)

555
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status (2021-22)

239
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)

$63,092
Median Annual Earnings for SWP Exiting Students (2020-21)

SWP Students Who Earned 9 or More Career Education Units in the District in a single Year (2021-22)

SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course (2021-22)

SWP Students with a Job Closely Related to Their Field of Study (2019-20)

Median Change (Gain) in Earnings for SWP Exiting Students (2020-21)

SWP Exiting Students Who Attained the Living Wage (2020-21)

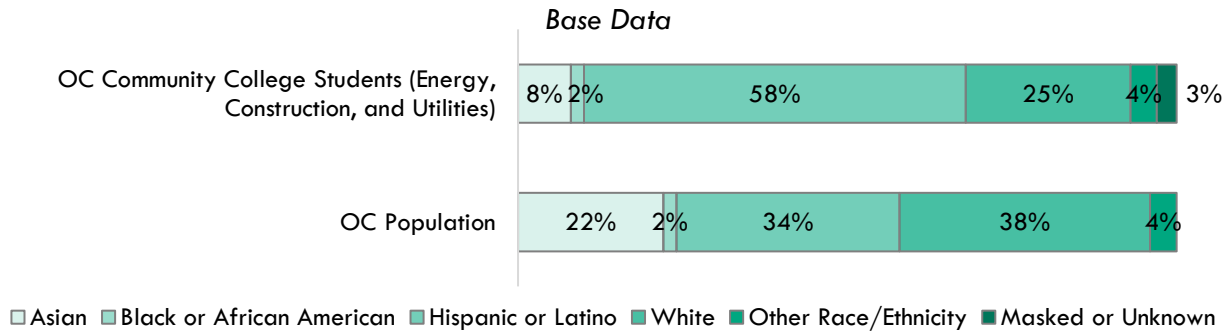
DEMOGRAPHICS

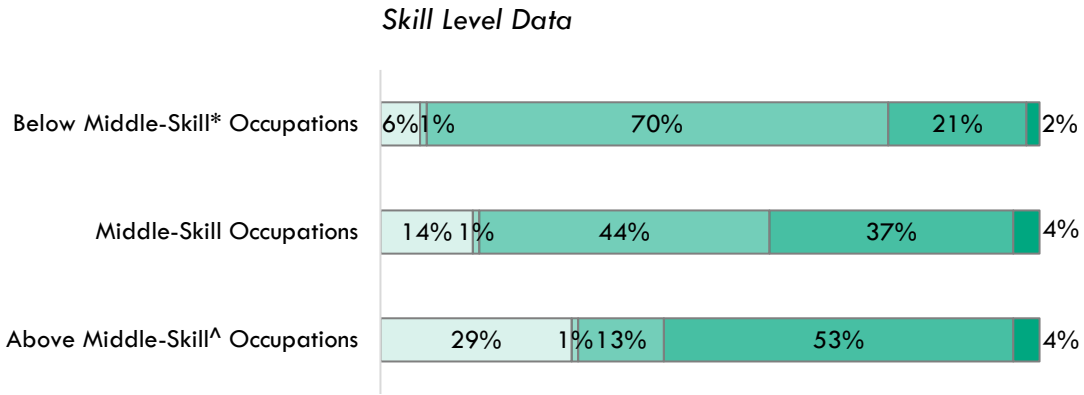
Ethnicity

Exhibit 20 shows the ethnicity of Orange County community college students enrolled in Energy, Construction, and Utilities programs compared to the overall Orange County population and the three skill-level occupational groups. Notably, 58% of Energy, Construction, and Utilities students are Hispanic or Latino, which is higher than the population (34%), and significantly higher than workers in above middle-skill occupations (13%). Conversely, 53% of workers in these above middle-skill occupations are white, which is higher than the population (38%), and more than double community college Energy, Construction, and Utilities students (25%).

Nearly three-fourths (70%) of workers in below middle-skill occupations are Hispanic or Latino; nearly half (44%) of workers in middle-skill occupations are Hispanic or Latino.

Exhibit 20: Energy, Construction, and Utilities Sector Demographics by Ethnicity

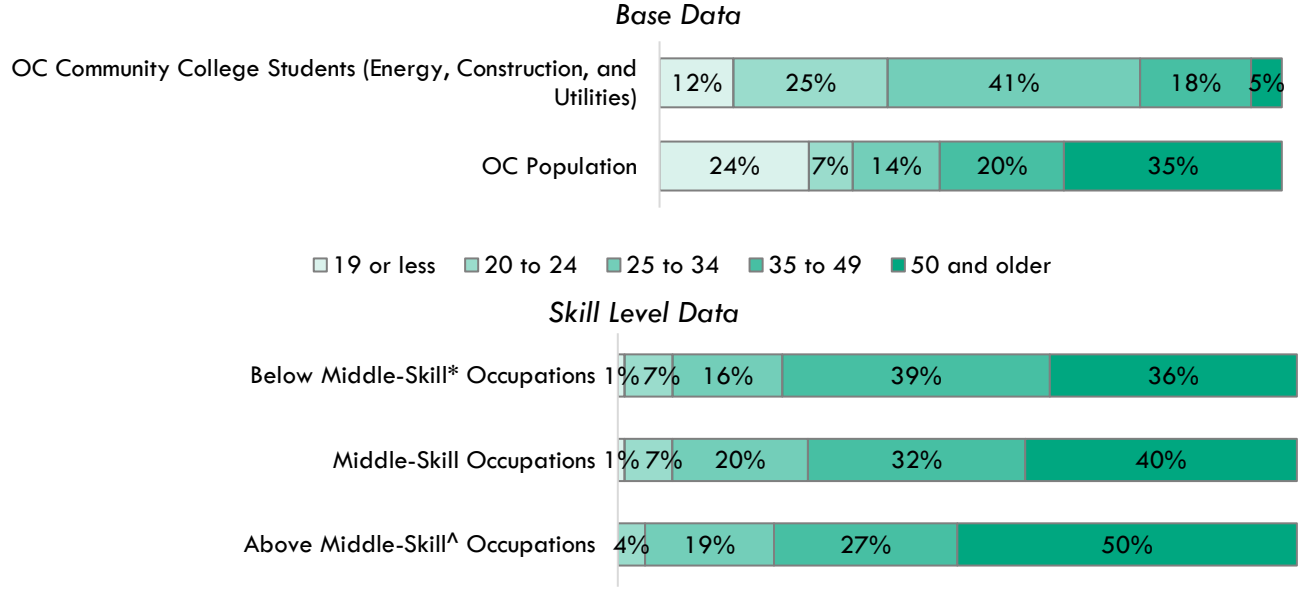




Age Group

Exhibit 21 shows the age of Orange County community college students enrolled in Energy, Construction, and Utilities programs compared to the overall Orange County population and the three skill-level occupational groups. At least 70% of workers in each of the three skill level occupations are 35 and older, which is higher than the population (55%) and community college Energy, Construction, and Utilities students (23%). Notably, half of above middle-skill (50%) workers are 50 and older.

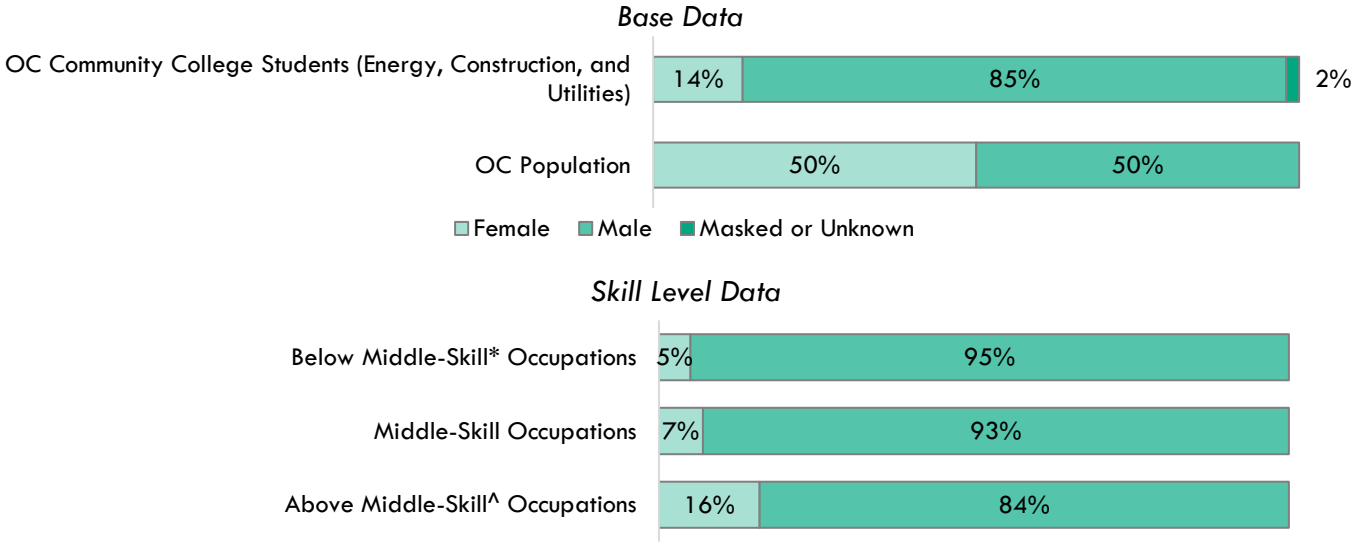
Exhibit 21: Energy, Construction, and Utilities Sector Demographics by Age Group



Sex

Exhibit 22 shows the sex of Orange County community college students enrolled in Energy, Construction, and Utilities programs compared to the overall Orange County population and the three skill-level occupational groups. Though the population is split evenly, 85% of Energy, Construction, and Utilities students and between 84% and 95% of workers in these occupations are men.

Exhibit 22: Energy, Construction, and Utilities Sector Demographics by Sex



PUBLIC POLICY AND FUNDING OPPORTUNITIES

Green and Infrastructure Policy

Federal energy regulations span decades; however, recent policies have been enacted to more specifically address energy production, national energy security, and clean energy issues. The Energy Policy Act of 2005 focuses on energy production from coal, hydrogen, electricity, hydropower, and geothermal sources, as well as climate change technology.[32] The Energy Independence and Security Act of 2007 aims to increase clean and renewable fuel production, encourage research and use of greenhouse gas (GHG) storage and capture techniques, and advance U.S. energy security and independence.[33]

The California legislature has also taken significant steps to reduce GHG emissions and address clean energy production. Senate Bill (SB) 350, commonly known as the Clean Energy and Pollution Reduction Act of 2015, set clean air and energy objectives, including the reduction of "GHG to 40% below 1990 levels by 2030 and to 80% below 1990 levels by 2050".[34] The 100 Percent Clean Energy Act of 2018 (SB 100) requires that "renewable energy and zero-carbon resources supply 100% of electric retail sales to end-use customers by 2045."[35]

On September 16, 2022, Governor Newsom signed a package of legislative measures addressing energy and GHG emissions, including the Clean Energy, Jobs, and Affordability Act of 2022 (SB 1020) and the California Climate Crisis Act (Assembly Bill [AB] 1279). SB 1020 builds upon SB 100 by providing interim targets for reducing GHG emissions.[36] AB 1279 requires the state to reach net zero GHG emissions as soon as possible or by 2045 at the latest.

Some of the specific actions to achieve these goals, and their potential impacts on labor market demand, are further discussed in the Key Occupations Driving Employment section of this Sector Profile.

Public Law No.: 109-58	**Energy Policy Act of 2005**	
Federal	Enacted: 2005	Est. Completion: N/A
• Focus on energy production, including climate change technology		
Public Law No.: 110-140	**Energy Independence and Security Act of 2007**	
Federal	Enacted: 2007	Est. Completion: N/A
• Focus on energy production, energy security, and GHG emission reduction		
Senate Bill 350	**Clean Energy and Pollution Reduction Act of 2015**	
State	Enacted: 2015	Est. Completion: 2030 & 2050
• Reduce GHG emissions by 40% and 80% below 1990-levels by 2030 and 2050, respectively		
Senate Bill 1	**Road Repair and Accountability Act of 2017**	
State	Enacted: 2017	Est. Completion: N/A
• Invest billions of dollars into state transit infrastructure		
Senate Bill 100	**100 Percent Clean Energy Act of 2018**	
State	Enacted: 2018	Est. Completion: 2045
• Requires zero-carbon and renewable resources supply all electric retail sales by 2045		
Public Law No.: 117-58	**Infrastructure Investment and Jobs Act or Bipartisan Infrastructure Act**	
Federal	Enacted: 2021	Est. Completion: 2026
• Provides $1.2 trillion dollars in funding for infrastructure across the U.S.		
Senate Bill 1020	**Clean Energy, Jobs, and Affordability Act of 2022**	
State	Enacted: 2022	Est. Completion: 2035 & 2040
• Provides interim objectives to achieve Senate Bill 100 goals		
Assembly Bill 1279	**California Climate Crisis Act**	
State	Enacted: 2022	Est. Completion: 2045
• Reduce GHG emissions by 85% relative to 1990 levels		

Other Federal Laws and Regulations

Policies in the Energy, Construction, and Utilities sector cover a range of areas. They include regulations on how energy is managed, transported, and utilized, as well as rules designed to protect workers' rights and ensure their safety and well-being in the workplace, including construction sites and other hazardous environments. At the federal level, the Occupational Safety and Health Act of 1970 established the Occupational Safety and Health Administration (OSHA), which has established and continues to institute standards protecting workers from workplace injuries and exposure to various illness-leading toxins.[37]

The Davis-Bacon Act (DBA), last amended in 2013, requires awardees of federal funds to pay project construction workers, at minimum, the prevailing wage while maintaining weekly tracking and semiannual reporting practices to guarantee compliance.[38] The Infrastructure Investment and Jobs Act (IIJA) of 2021, also known as the Bipartisan Infrastructure Law (BIL), authorizes billions of dollars to be allocated towards a diverse portfolio of infrastructure projects, including those in transit, broadband expansion, and clean energy.[39] Any construction, repairment, or alteration projects fully or partially funded through the IIJA must comply with the DBA.[40],[41]

Other State Laws and Regulations

The state has also taken legislative measures to address the increasing costs of utilities. AB 205, signed into law in 2022, mandated the California Public Utilities Commission (CPUC) create fixed charges, so that lower-income households will bear lower expenses relative to their higher-income counterparts.[42] Consequently, as of May of this year, the CPUC has decreased the cost of electricity for state residents, cut electricity bills for lower income individuals and persons in areas largely affected by extreme weather, and quickened the transition towards clean energy.[43] Additionally, the CPUC plans to implement a new billing structure modifying how large investor-owned utilities charge residential clients for existing infrastructure-related expenses; this change will take effect in late 2025 or early 2026 and is expected to lower electricity costs for residential customers.[44]

Funding Opportunities

Several federal and state financial initiatives are available for further investment in the Energy, Construction and Utilities sector. While not an exhaustive list, the following provides a sample of available sector-specific funding opportunities:

- **YouthBuild:** Grant awardees provide pre-apprenticeship services for individuals 16 to 24 and train them for quality jobs in various sectors, including infrastructure. Grant applicants "must include construction skills training and may include occupational skills training in other in-demand industries."[45] Applications for this funding opportunity are due by September 16, 2024, and awards range from $700,000 to $1,500,000.
- **Charging and Fueling Infrastructure (CFI) Discretionary Grant Program:** Established through the Bipartisan Infrastructure Law, this program provides funding for projects aimed at "deploy[ing] publicly accessible electric vehicle charging and alternative fueling infrastructure in the places

people live and work – urban and rural alike – in addition to along designated Alternative Fuel Corridors (AFCs)."[46] The deadline for Round 2 of this program has been extended to September 11, 2024.

- **Infrastructure State Revolving Fund (ISRF) Program:** Available through the California Infrastructure and Economic Development Bank, also known as IBank,, this program offers "low-cost, direct loans to local governments and nonprofits sponsored by public agencies for a wide variety of public infrastructure and economic expansion programs (excluding housing) that improve and sustain communities, helping individuals and families thrive."[47]
- **Bringing Rapid Innovation Development to Green Energy (BRIDGE) 2024:** This opportunity provides funding for a variety of projects, including those in energy efficiency and energy storage, that allow for effective entrepreneurship in clean energy across the state.[48] The application deadline for this program is November 22, 2024.

APPENDIX A: METHODOLOGY

Traditional Labor Market Data Methodology

The COE analyzed traditional labor market demand information, which includes job counts, projections, wages, typical education requirements, for the Energy, Construction, and Utilities sector. Traditional labor market demand data was sourced from Lightcast (Datarun 2023.4), a labor market analytics firm that aggregates data from public statistical agencies including the Bureau of Labor Statistics, Census Bureau, and the California Employment Development Department. Living wage data was sourced from the Insight Center California Family Needs Calculator.[49] The traditional labor market demand data analyzed in this report includes:

- **2022 Jobs:** the number of jobs by industry and occupation in 2022.
- **2027 Jobs:** the projected number of jobs by industry and occupation in 2027. Projections are based on the assumption that past trends will continue into the future, including the assumption that the economy, during the projection period, will be at approximately full employment. Projections do not consider potential recessions or labor shocks, such as natural disasters or pandemics, and are intended to capture structural change in the economy over time.
- **Change:** the projected change in the number of jobs, expressed as an actual number and a percentage.
- **Average Annual Openings (Demand):** the projected number of annual job openings. This figure is the sum of job growth and replacement jobs. Job growth is the result of job creation while replacement jobs are the result of retirements and workers leaving the filled, creating the need to hire a replacement.
- **Hourly Wages:**
    - **Entry-level (25th percentile):** the typical entry-level wages for an occupation; 25% of workers earn less than this amount and 75% earn more.
    - **Median:** the median wages for an occupation; 50% of workers earn less than this amount and 50% earn more.
    - **Experienced (75th percentile):** the typical experienced-level wages for an occupation; 75% of workers earn less than this amount and 25% earn more.
- **Typical Entry-Level Education:** represents the typical education level needed to enter an occupation.
- **Educational Attainment:** the percentage of workers employed in an occupation by their highest level of education attained.

Demographic data for the Orange County population comes from the Census Bureau's American Community Survey (5-Year Estimates, 2018-2022). Demographic data for occupations was sourced via IPUMS USA and student demographic data was sourced from the LaunchBoard Community College Pipeline (2020-21 Academic Year).[50][51]

The COE also analyzed labor market supply data that is calculated using the number of awards conferred in related training programs at community college and non-community college institutions over the past three years of available data. Community college data is sourced from the California Community College Chancellor's Office Data Mart[52] and includes the years 2020-2023; non-community college data is sourced from the Integrated Postsecondary Education Data System and includes the years 2019-2022.[53]

Job Postings Analysis Methodology

In addition to traditional labor market information, the COE analyzed real-time labor market information using online job postings data sourced from Lightcast (Datarun 2024.2). The job postings data in this report covers the last 12 months of available data (August 2023 – July 2024). This data is derived from online job postings that are parsed and classified into industry and occupational groups using natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. Online job postings do not equate to labor market demand or replace traditional labor market data. They should only be considered a supplement to traditional LMI.

APPENDIX B: SECTOR OCCUPATIONS

SOC	Occupation
43-5041	Meter Readers, Utilities*
47-2041	Carpet Installers*
47-2042	Floor Layers, Except Carpet, Wood, and Hard Tiles*
47-2043	Floor Sanders and Finishers*
47-2044	Tile and Stone Setters*
47-2051	Cement Masons and Concrete Finishers*
47-2061	Construction Laborers*#
47-2081	Drywall and Ceiling Tile Installers*
47-2082	Tapers*
47-2131	Insulation Workers, Floor, Ceiling, and Wall*
47-2141	Painters, Construction and Maintenance*
47-2142	Paperhangers*
47-2151	Pipelayers*
47-2161	Plasterers and Stucco Masons*
47-2181	Roofers*
47-3011	Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters*
47-3012	Helpers--Carpenters*
47-3013	Helpers--Electricians*
47-3014	Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons*
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters*
47-3016	Helpers--Roofers*
47-3019	Helpers, Construction Trades, All Other*
47-4031	Fence Erectors*
47-4051	Highway Maintenance Workers*
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners*
47-4098	Miscellaneous Construction and Related Workers*
47-5011	Derrick Operators, Oil and Gas*
47-5012	Rotary Drill Operators, Oil and Gas*
47-5013	Service Unit Operators, Oil and Gas*
47-5022	Excavating and Loading Machine and Dragline Operators, Surface Mining*
47-5041	Continuous Mining Machine Operators*
47-5043	Roof Bolters, Mining*
47-5044	Loading and Moving Machine Operators, Underground Mining*
47-5049	Underground Mining Machine Operators, All Other*
47-5051	Rock Splitters, Quarry*
47-5071	Roustabouts, Oil and Gas*
47-5081	Helpers--Extraction Workers*
47-5099	Extraction Workers, All Other*
49-9071	Maintenance and Repair Workers, General*#

SOC	Occupation
49-9095	Manufactured Building and Mobile Home Installers*
51-4061	Model Makers, Metal and Plastic*
51-4062	Patternmakers, Metal and Plastic*
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers*
51-8099	Plant and System Operators, All Other*
53-7031	Dredge Operators*
53-7071	Gas Compressor and Gas Pumping Station Operators*
53-7073	Wellhead Pumpers*
17-3011	Architectural and Civil Drafters
17-3019	Drafters, All Other
17-3022	Civil Engineering Technologists and Technicians
17-3025	Environmental Engineering Technologists and Technicians
17-3031	Surveying and Mapping Technicians
19-4042	Environmental Science and Protection Technicians, Including Health
19-4043	Geological Technicians, Except Hydrologic Technicians
19-4044	Hydrologic Technicians
19-4051	Nuclear Technicians
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers
47-2011	Boilermakers
47-2021	Brickmasons and Blockmasons
47-2022	Stonemasons
47-2031	Carpenters#
47-2053	Terrazzo Workers and Finishers
47-2071	Paving, Surfacing, and Tamping Equipment Operators
47-2072	Pile Driver Operators
47-2073	Operating Engineers and Other Construction Equipment Operators
47-2111	Electricians#
47-2121	Glaziers
47-2132	Insulation Workers, Mechanical
47-2152	Plumbers, Pipefitters, and Steamfitters#
47-2171	Reinforcing Iron and Rebar Workers
47-2211	Sheet Metal Workers
47-2221	Structural Iron and Steel Workers
47-2231	Solar Photovoltaic Installers#
47-4011	Construction and Building Inspectors
47-4021	Elevator and Escalator Installers and Repairers
47-4061	Rail-Track Laying and Maintenance Equipment Operators

SOC	Occupation
47-5023	Earth Drillers, Except Oil and Gas
47-5032	Explosives Workers, Ordnance Handling Experts, and Blasters
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairers
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay
49-2097	Audiovisual Equipment Installers and Repairers
49-2098	Security and Fire Alarm Systems Installers
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers
49-9045	Refractory Materials Repairers, Except Brickmasons
49-9051	Electrical Power-Line Installers and Repairers
49-9052	Telecommunications Line Installers and Repairers
49-9081	Wind Turbine Service Technicians#
49-9092	Commercial Divers
49-9099	Installation, Maintenance, and Repair Workers, All Other
51-7011	Cabinetmakers and Bench Carpenters
51-7031	Model Makers, Wood
51-7032	Patternmakers, Wood
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing
51-7099	Woodworkers, All Other
51-8011	Nuclear Power Reactor Operators
51-8012	Power Distributors and Dispatchers
51-8013	Power Plant Operators
51-8021	Stationary Engineers and Boiler Operators
51-8031	Water and Wastewater Treatment Plant and System Operators
51-8092	Gas Plant Operators
11-9021	Construction Managers^#
11-9041	Architectural and Engineering Managers^
17-1011	Architects, Except Landscape and Naval^#
17-1012	Landscape Architects^
17-1022	Surveyors^
17-2051	Civil Engineers^#
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers^
17-2161	Nuclear Engineers^
17-2171	Petroleum Engineers^
19-2041	Environmental Scientists and Specialists, Including Health^
19-2042	Geoscientists, Except Hydrologists and Geographers^

Below Middle-Skill* Occupations

Middle-Skill Occupations

Above Middle-Skill^ Occupations

APPENDIX C: TOP CODES

TOP Code	Program Name
0201.00	Architecture and Architectural Technology
0299.00	Other Architecture and Environmental Design
0934.40	Electrical Systems and Power Transmission
0935.00	Electro-Mechanical Technology
0946.00	Environmental Control Technology
0946.10	Energy Systems Technology
0952.00	Construction Crafts Technology
0952.10	Carpentry
0952.20	Electrical
0952.30	Plumbing, Pipefitting and Steamfitting
0952.40	Glazing
0952.50	Mill and Cabinet Work
0952.60	Masonry, Tile, Cement, Lath and Plaster
0952.70	Painting, Decorating, and Flooring
0952.80	Drywall and Insulation
0952.90	Roofing
0953.00	Drafting Technology
0953.10	Architectural Drafting
0953.20	Civil Drafting
0956.40	Sheet Metal and Structural Metal
0957.00	Civil and Construction Management Technology
0957.20	Construction Inspection
0957.30	Surveying*
0958.00	Water and Wastewater Technology
2102.10	Public Works
2206.10	Geographic Information Systems*

Note: Two (2) TOP codes, denoted above with an asterisk (*), have corresponding occupations that crosswalk to the Energy, Construction, and Utilities sector, so they and their respective supply are added to this sector profile. However, in the last Community College Chancellor's Office TOP code inventory, Surveying (TOP 0957.30) is classified as being in the Advanced Manufacturing sector and Geographic Information Systems (TOP 2206.10) is classified as being in the Information and Communication Technologies (ICT)/Digital Media sector.

APPENDIX D: END NOTES

[1] "OC Sector Profile Supplemental Appendices: Energy, Construction, and Utilities," Orange County Center of Excellence for Labor Market Research, last modified September 5, 2024, https://coeccc.net/orange-county/2024/08/oc-sector-profile-supplemental-appendices-energy-construction-and-utilities/.

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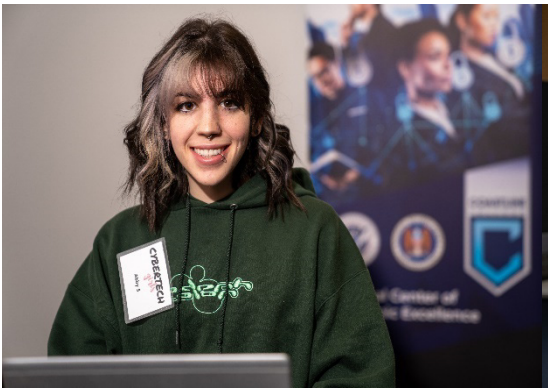

Important Disclaimers

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.

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