INLAND REGIONAL ENERGY NETWORK

2024

Energy Workforce Gaps Assessment

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Executive Summary

Together Riverside and San Bernardino counties form the Inland Empire (IE), a dynamic region with significant opportunities for local businesses and residents to excel within the transformative energy sector. This workforce assessment examines the availability and accessibility of jobs and training programs within the Inland Empire, identifying gaps that hinder the ability of the current and future energy workforce to secure high-quality, sustainable employment. The report is informed by labor market and training data as well as survey responses from 385 regional stakeholders and local energy employers. This data allowed us to evaluate and recommend improvements in programming to bridge the gap between prospective workers and energy industry employers.

The assessment reviews occupational growth within the energy sector and related fields, incorporating feedback from local employers and stakeholders on the challenges they face in hiring and retaining skilled employees. It highlights the resulting training gaps that affect workforce readiness. As the energy industry transitions toward clean energy and energy demand continues to rise, career opportunities expand and intersect across emerging and competing fields. Energy-related occupations are projected to grow by an average of 20% through 2030, amplifying the need for a workforce that is equipped to meet these demands.

Given the projected availability of thousands of energy jobs, it is crucial to strengthen the regional workforce ecosystem that connects job seekers, employers, workforce organizations, and local training institutions. Employers report difficulty in finding qualified workers with the necessary certifications, experience, and technical expertise. On the other hand, job seekers face barriers to training opportunities, including high costs, limited access in certain regions, and misalignment between training offerings and industry needs. Notably, communities in the high and low deserts have limited access to relevant training and job opportunities.

The regional analysis, based on employer feedback and available training data, underscores the urgent need to enhance workforce preparedness.

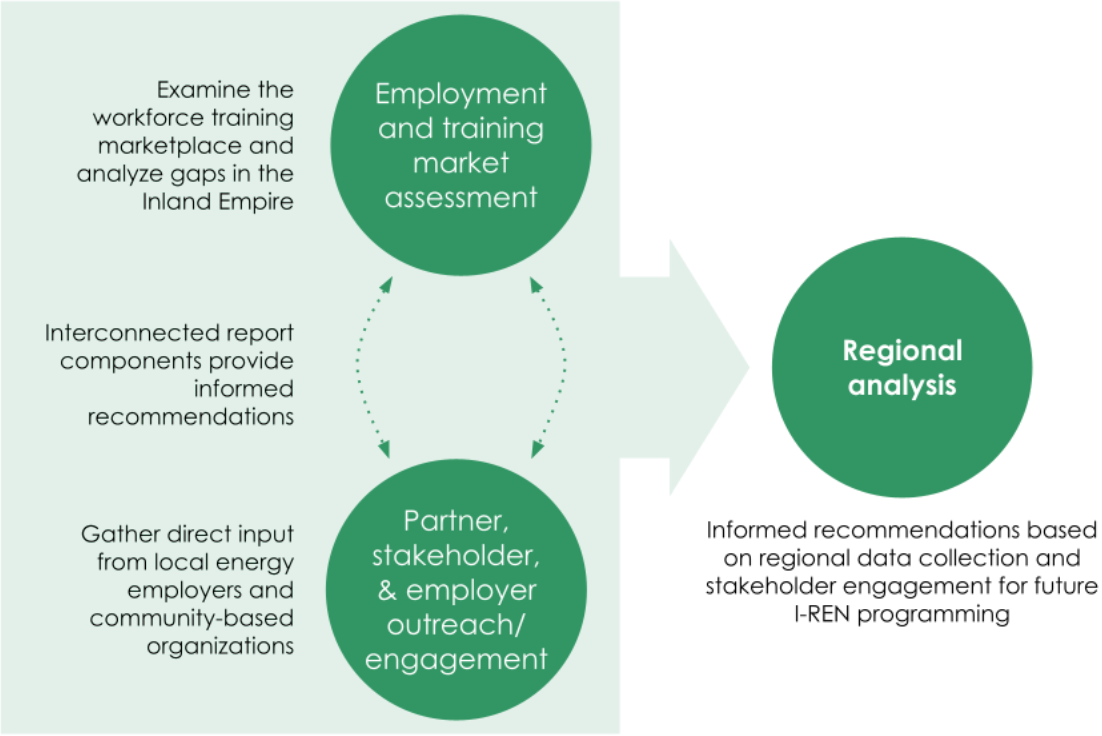
This assessment recommends the following actions to address workforce challenges:

- ✓ Connect local job seekers to established training providers and introduce third-party providers to increase training access.
- ✓ Offer support services to help employees navigate training and certification processes, improving accessibility.
- ✓ Strengthen the regional education-to-employment pipeline from K-12 through post-secondary education and into the workforce.
- ✓ Enhance collaboration between employers and workforce development organizations to continuously assess and adapt training programs to meet evolving industry needs.

Introduction

The Inland Regional Energy Network (I-REN), in partnership with The Energy Coalition (TEC), has developed a regional energy workforce assessment to understand the current energy workforce, identify gaps in training and education for energy careers in the Inland Empire, and offer recommendations to strengthen the local workforce and meet the growing demand for skilled energy workers. The methodology of this assessment focused on two main components: an employment and training market assessment and engagement and outreach with partners, stakeholders, and employers. The results of this assessment will inform the third component: a regional analysis to provide informed recommendations.

Figure 1: Components of I-REN's energy workforce gaps assessment



Methodology

SECTION SUMMARY

- The assessment combines primary and secondary data on regional energy employers and training opportunities to provide an informed analysis.
- A survey was conducted to gather input from regional employers and stakeholders, guiding

recommendations on training programs and workforce strategies.

- The data and stakeholder outreach informed the assessment to identify gaps in energy workforce training and offered solutions for future development programs.

The employment and training market analysis includes primary and secondary data on regional energy employers and available training opportunities. We compiled publicly available information on active energy-related employers and training institutions that offer pathways to energy-related career pathways.

I-REN and TEC staff engaged in partner and stakeholder outreach, focused on building strong relationships with key regional stakeholders to better understand the resources they provide. We engaged in direct conversations through local workforce roundtables, events, and informational calls to gain insights into available offerings and challenges (Appendix D).

We also conducted a survey to collect input from regional employers and stakeholders to inform the assessment's recommendations on training programs and workforce strategies.

The data collected informs the regional analysis, which examines employment opportunities and the accessibility and availability of training pathways[1] and resources in the Inland Empire, highlighting the challenges faced by energy employers, job seekers, and regional stakeholders in building and sustaining a skilled energy workforce. By combining data from the two components—market assessment and stakeholder/employer engagement—we developed an energy workforce gaps assessment that provides well-informed recommendations for future workforce development programs.

Inland Empire Regional Context

SECTION SUMMARY

- The Inland Empire is a rapidly growing region with over 4.6 million residents and expanding sectors like logistics, healthcare, technology, and clean energy.
- Energy-related occupations are expected to grow in the region by 20% by 2030, highlighting the need to invest in a skilled workforce.

[1] Training pathways are sequences of training that will lead to skill development and competency

The I-REN service territory covers Riverside and San Bernardino counties, also known as the Inland Empire, which is an expansive region spanning nearly 27,500 square miles. The Inland Empire is one of the fastest-growing areas in California, with over 4.6 million residents.[2] The region has exponentially grown in various sectors, including healthcare, transportation and warehousing, retail, and education services[3]. Considering the growth in these areas and increased funding and investments in infrastructure, thousands of jobs have become available in existing and newer industries, leading to a job boom.

The growth of the green energy sector has led to a surge in job opportunities, many of which are linked to the Inland Empire's expanding energy workforce. With rapid growth in energy-related occupations, it is crucial for local businesses and regional stakeholders to understand the workforce and training landscape to prepare for changes and support the development of a skilled workforce. To ensure the region can effectively accommodate growth, it is vital to identify gaps in training accessibility and resources for energy-related careers. With energy-related occupations projected to grow an average of 20% in the region, it is necessary to assess current workforce pathways and upskill opportunities to fill these roles successfully.[4]

The energy workforce market is universally experiencing significant changes in technological advances, job growth, the addition of new occupations, and increasing intersectionality with sustainability goals. Identifying workforce trends will allow Inland region local governments and businesses to make decisions that can sustain and increase growth and, as a result, support job creation. By understanding workforce needs, local institutions can support existing and new training programs, new occupation pathways, and a steady pipeline of workers within the energy sector.

This regional workforce assessment will assess the Inland Empire's energy workforce and training landscape and identify gaps/barriers in training and education for energy-related career pathways. The market assessment provides actionable recommendations and strategies for workforce development to strengthen the local energy workforce and meet the demand for skilled energy workers.

[2] Data from U.S. Census Bureau, San Bernardino and Riverside County Population, Census, April 1, 2020
[3] Data from the Bureau of Labor Statistics' Employment Projections by Occupation 2020-2030 Riverside-San Bernardino-Ontario, CA Metro Area
[4] Data from the Bureau of Labor Statistics' Employment Projections by Occupation 2020-2030 Riverside-San Bernardino-Ontario, CA Metro Area

Regional Energy Industry Overview

About the Inland Empire

SECTION SUMMARY

- The Inland Empire is experiencing significant shifts towards clean energy and building electrification, creating job opportunities in clean energy and energy-efficient infrastructure.
- The region's logistics sector is a key economic driver but contributes to air pollution; reducing pollution will require efforts in transportation electrification and expanding EV infrastructure.
- As the energy sector evolves, investing in workforce development is essential to ensure local workers are equipped with the skills needed for emerging energy roles, while traditional energy efficiency jobs remain critical in managing regional energy demand.

The Inland Empire, comprising Riverside and San Bernardino counties, is a rapidly growing and diverse region undergoing significant changes in its energy and industrial sectors. As the energy industry shifts toward clean energy sources and building electrification, this region is seeing increased clean energy and energy-efficient infrastructure job opportunities. These industry shifts will support the Inland Empire's growing population, help address regional energy goals, and create new opportunities in energy-related occupations. Riverside and San Bernardino counties are well-positioned to expand clean energy generation and green building while phasing out traditional fossil fuels. However, the region faces ongoing challenges related to poor air quality, largely driven by its geography and logistics industry.

The logistics sector, which includes transportation, warehousing, distribution, and manufacturing, is a vital part of the Inland Empire's economy. The region's location near major ports and freeway networks makes it a central hub for national and international trade. However, the heavy reliance on petroleum-based fuels for transportation and logistics contributes significantly to air pollution. Reducing air pollution will require a concerted effort in transportation electrification and expanding charging infrastructure. California has set ambitious goals to electrify the transportation sector, including electric vehicles (EVs) and heavy-duty trucks, to reduce greenhouse gas emissions. As the region industrializes further, it can align local industry needs with California's goal of 100% clean energy by 2045, ensuring both environmental sustainability and economic growth.

Riverside and San Bernardino counties also have abundant natural resources for clean energy development. The region benefits from abundant sunshine, making it a prime location for large-scale solar farms and residential solar installations. Riverside County is home to the San Gorgonio Pass, one of the largest wind farms in the country, and both counties have access to local rivers and reservoirs, enabling small-scale hydropower systems. These clean energy sources will continue to drive job creation in the coming years, particularly as the demand for clean energy grows.

As demand for electric vehicles (EVs) and energy-efficient appliances increases, the region will need skilled workers to install, maintain, and support the expansion of charging stations and EV infrastructure. Furthermore, large-scale electrification projects, including grid modernization and electrification of heavy-duty freight transport, are expected to significantly increase job opportunities in the region's energy sector.

While clean energy production is rising, Southern California still relies on natural gas-powered plants, especially during peak periods when clean sources cannot meet the full demand. Regional labor projections indicate a 2% decline in utility occupations such as natural gas generation, and electric transmission and distribution, reflecting the start of the region's energy transition. Though utility jobs are projected to decline slightly, traditional energy roles will remain an essential part of the energy transition.

Traditional energy efficiency jobs are essential in keeping up with regional energy demands and maintaining, enhancing, and upgrading the existing infrastructure. These roles typically focus on reducing energy consumption, improving performance, and promoting sustainable industry practices. They are critical in residential, commercial, and industrial sectors. Energy efficiency roles support the region's unique economic, environmental, and energy-related challenges and opportunities. Considering the region's hot and dry climate, energy demand is high during the summer seasons, and cooling within residential, commercial, and industrial buildings is critical. Energy efficiency roles are needed to reduce electricity consumption by installing efficient heating, ventilation, and air conditioning (HVAC) systems, insulation, and smart energy management systems to reduce power grid strain during peak energy demand. As the regional population expands, so do housing and commercial developments. As new buildings and infrastructure appear, roles in building design and retrofits minimize energy waste and lower the overall costs of energy use. The Inland Empire's diverse workforce, especially within the skilled trades, can benefit from opportunities within the energy efficiency sector that provide accessible career pathways that are stable and in high demand.

As the region adapts to changes in its economy and energy sector, it will need to invest in the workforce to ensure that local workers are equipped with the skills they need.

Recent Innovations and Opportunities

SECTION SUMMARY

- The shift toward clean energy and electrification drives significant job growth opportunities, especially for energy efficiency, energy storage, grid modernization, and transportation electrification roles.
- New technologies and changes in infrastructure address challenges in developing sufficient energy storage, improving grid reliability, and promoting sustainable energy consumption during peak energy demand.

As the region moves toward cleaner energy sources and electrification, industries must address the challenge of storing excess energy and balancing supply and demand. Large-scale battery storage systems can meet this need. Local universities and research institutions may also develop new clean energy technologies, focusing on innovations in energy storage and grid efficiency. Utilities are also expanding their programs to encourage energy efficiency in homes, businesses, and public entities. With population growth putting pressure on the power grid, demand response programs are helping manage energy consumption during peak demand periods, enhancing grid reliability.

Careers in clean energy, energy efficiency, electrification, energy storage, grid modernization, and environmental stewardship are expected to grow significantly due to the region's shift toward efficiency and cleaner energy. For instance, roles such as solar photovoltaic (PV) installers, wind turbine technicians, and hydroelectric plant operators will be essential in the installation, maintenance, and operation of clean energy systems. Positions such as battery engineers, energy grid specialists, and energy systems experts will be critical in managing energy production and distribution.

Meanwhile, the region's existing infrastructure demands professionals such as green building designers, energy auditors, and LEED (Leadership in Energy and Environmental Design) specialists who will support sustainable construction and building retrofits.

The electrification of transportation is another driver of job creation in the region. As electric vehicles (EVs) and EV infrastructure expand, there will be a growing need for EV technicians, charging infrastructure specialists, and engineers to maintain and repair the related systems.

With all these energy, building, and transportation sectors, it will be essential to invest in workforce training and upskilling, both for new roles and for evolving existing positions, to ensure local workforce needs are met.

Opportunities for Job Growth in Traditional Energy Efficiency Industries

SECTION SUMMARY

- Jobs in energy-related trades remain in high demand. Traditional roles such as electricians, HVAC technicians, and construction laborers are essential in maintaining energy infrastructure and supporting regional needs.
- Workforce development programs must sustain the energy industry by supporting essential energy efficiency roles and balancing the inclusion of emerging energy sectors.

While the energy industry is transitioning toward cleaner energy sources, there is still robust demand for jobs within traditional energy sectors in the Inland Empire. Roles in energy-related construction trades, such as electricians, heating, ventilation, and air conditioning (HVAC) technicians, and construction laborers, are still vital to meeting households' and commercial facilities' energy demands. These traditional energy efficiency jobs and trades not only maintain the region's energy infrastructure but also serve as a foundation for integrating upgrading buildings with new technologies and energy systems.

As the region's economy evolves, traditional energy roles will support the broader industrial ecosystem, ensuring energy needs are met as new technologies and infrastructure projects take shape. Because the region will continue to need skilled workers in these foundational industries, workforce development efforts should maintain the backbone of the region's energy system while transitioning into emerging sectors.

Stakeholders Contributing to the Energy Workforce Development Ecosystem

SECTION SUMMARY

- Workforce development organizations (unions, trade associations, community colleges, and training centers) are crucial in providing training, certifications, and educational opportunities for the evolving energy sector.
- Collaboration among industry stakeholders is essential for building a skilled workforce adaptable to advancements in clean energy, energy storage, grid modernization, and

electrification.

- Energy professionals must upskill to meet the demands of a transitioning economy, addressing challenges in training access, vacant positions, and retention. As older generations retire and new workers explore other career paths, stronger workforce support, and development pathways are essential to building a sustainable, skilled energy workforce.

The energy workforce ecosystem comprises a diverse range of organizations and professionals. These entities work alongside government and regulatory agencies, which shape the industry through policy, research funding, and energy initiatives. Local and state governments also regulate energy rates, oversee clean energy programs, and enforce energy efficiency measures impacting both the public and private sectors.

Workforce development organizations such as labor unions, trade associations, community colleges, and specialized training centers provide essential training programs, certifications, and educational opportunities to meet the sector's evolving needs and ensure a sustainable energy workforce. They advocate for labor standards, raise awareness of career pathways, and help workers adapt to rapid technological changes in the industry. This collaboration among workforce and energy industry key stakeholders is crucial to building a workforce that is skilled, resilient, and adaptable to technological advancements in clean energy, energy storage, grid modernization, and electrification.

Universities, research institutions, and energy start-ups drive innovation in smart grids, energy storage, and clean energy technologies, creating demand for a new generation of highly skilled workers. For instance, as these organizations create new energy storage systems and technologies to balance clean energy supply and demand, the region will need specialized technicians and engineers.

The energy sector is primarily made up of energy workers who provide energy services to businesses and local communities. Energy professionals need to stay up to date and participate in upskilling programs to fulfill increasing demands within a transitioning energy economy. Without proper workforce infrastructure, professionals in the energy workforce experience challenges accessing relevant training, open positions are left vacant, and employee retention is challenging. As previous generations of energy professionals retire, current generations seek job security, and newer generations often pursue professional pathways outside the energy sector, thus indicating the importance of providing stronger support systems for existing professionals and developing more robust pathways for building a skilled workforce.

Figure 2: Flowchart illustrating the connection between job seekers and energy employers via workforce development organizations and training institutions, all contributing to the greater energy workforce ecosystem

What is a Green Energy Job?

SECTION SUMMARY

- Identifying energy sector occupations is challenging as clean energy technologies evolve, making some roles obsolete while new, undefined roles emerge.
- The U.S. Bureau of Labor Statistics defines green jobs as, 'Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.' Common terms used to reference green jobs include energy efficiency jobs, clean energy jobs, and renewable energy jobs.[5]
- Environmental Defense Fund defines green energy jobs as 1) efficiency jobs from product design and manufacturing to equipment installation and building retrofit, 2) clean energy refers collectively to renewable energy and energy efficiency technologies and markets., and 3) Renewable energy jobs refer to jobs that support energy technology, production, and maintenance coming from renewable energy resources..[6]

The green energy workforce is complex, with overlapping industries, sectors, and jobs. Green energy jobs typically include occupations related to building electrification, electric vehicles, clean energy, and other energy efficiency-related occupations. These

[5] U.S. Bureau of Labor Statistics. (n.d.). Green careers. U.S. Department of Labor.
[6] Environmental Defense Fund and Meister Consultants Group. " Now Hiring: The Growth of America's Clean Energy & Sustainability Jobs." 2017.

roles fall into a broad range of industries, from construction and manufacturing to energy production and engineering. For example, electricians may work on green energy installation projects and conventional power systems; there is no clear way to capture this distinction between "green" and conventional work on a large scale. This overlap makes it challenging to create policies and analyze labor metrics that accurately reflect the green energy workforce.

Identifying whether an occupation fits within the energy sector is further complicated as other sectors evolve and intersect with energy. As the energy industry adapts to clean energy technologies, existing occupations may become obsolete or experience reduced demand while new roles emerge that are not yet fully defined. The definition of an "energy job" (let alone a green energy job!) shifts as technologies and standards do.

Energy-related jobs range from fossil fuel extraction to clean energy generation, but "energy-related" can be ambiguous. For instance, non-traditional energy sectors, such as software engineering for solar panel mapping, often fall under the broader technology industry and are not always included as energy jobs. Different organizations will make different decisions regarding whether to "count" roles indirectly related to the energy sector as "energy-related jobs" or to focus solely on direct energy occupations.

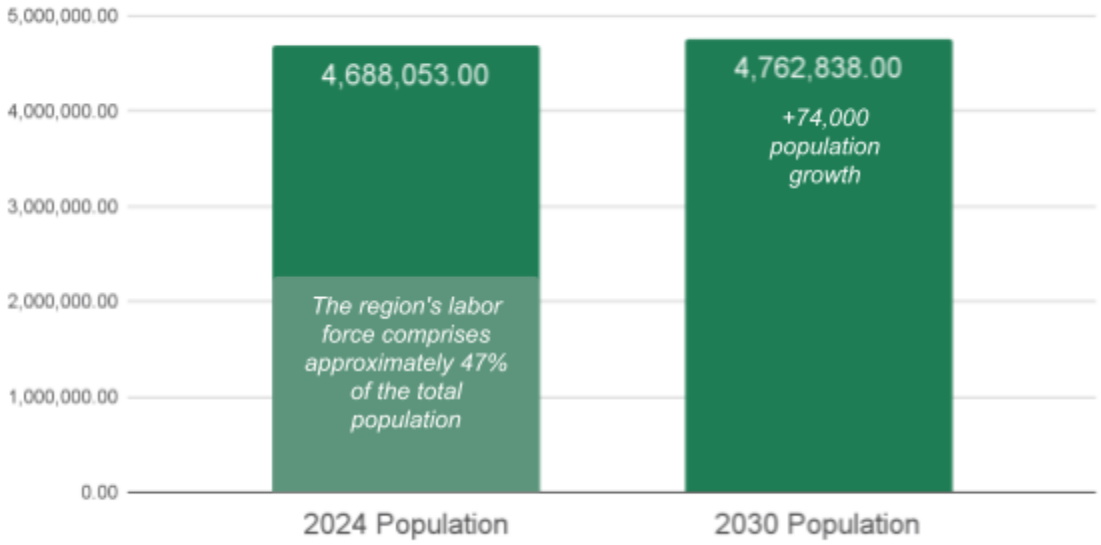
Labor Market Demographics and Metrics

SECTION SUMMARY

- The Inland Empire is projected to grow at twice the rate of Southern California, reaching a population of 4.76 million by 2030. The labor force is approximately 2.2 million (47% of the population), and the unemployment rate is 5.3% as of September 2024.
- The growing youth population (ages 16-24) presents an opportunity to engage them in energy careers through training and apprenticeships. In contrast, the increase in retirees (ages 55+) highlights the need for enhanced training, certification, and knowledge transfer to retain a skilled workforce in high-demand energy sectors
- With 54% Hispanic/Latino residents, targeted outreach and culturally relevant training programs are crucial for ensuring diverse community participation in the energy sector.
- While 83.3% of the population has at least a high school diploma, many lack higher education or professional training. This creates opportunities for entry-level energy jobs, apprenticeships, and certificate programs to bridge skills gaps. High school education can expose students to energy career pathways, fostering a talent pipeline.

The Inland Empire's workforce is critical to the region's economic resilience, particularly as it adapts to the growing demands of the energy sector. This section examines demographic factors such as age distribution, gender composition, educational attainment, and income levels. By analyzing employment trends, participation rates, and occupational profiles, we can assess the region's capacity, adaptability, inclusivity, and preparedness to support its expanding energy-related occupations to determine where workforce development initiatives can have the most impact.

Figure 3: Population and labor growth in the Inland Empire



As of 2024, the Riverside-San Bernardino Metro Area has a population of 4,688,053 residents, with the Inland Empire expected to grow at twice the rate of the rest of Southern California. By 2030, the population will increase to 4,762,838, adding more than 74,000 by 2030.[7] As of September 2024, the region's labor force comprises approximately 47% of the total population, or about 2.2 million individuals, with an average unemployment rate of 5.3%[8] (Figure 3). This population growth will increase demand for housing, healthcare, education, transportation, energy, and employment.

To meet the demands of the growing energy sector, it's essential to align the region's workforce with the skills required by emerging industries such as clean energy, energy efficiency, and electrification. By identifying trends in educational attainment, skills, and labor force participation, we can identify the workforce development efforts necessary to equip residents for sustainable, high-demand energy jobs.

[7] Data from the State of California Department of Finance report P-2C County Population by Sex and Age Group
[8] Data from U.S. Bureau of Labor Statistics on unemployment for Riverside-San Bernardino-Ontario, CA Metro Area

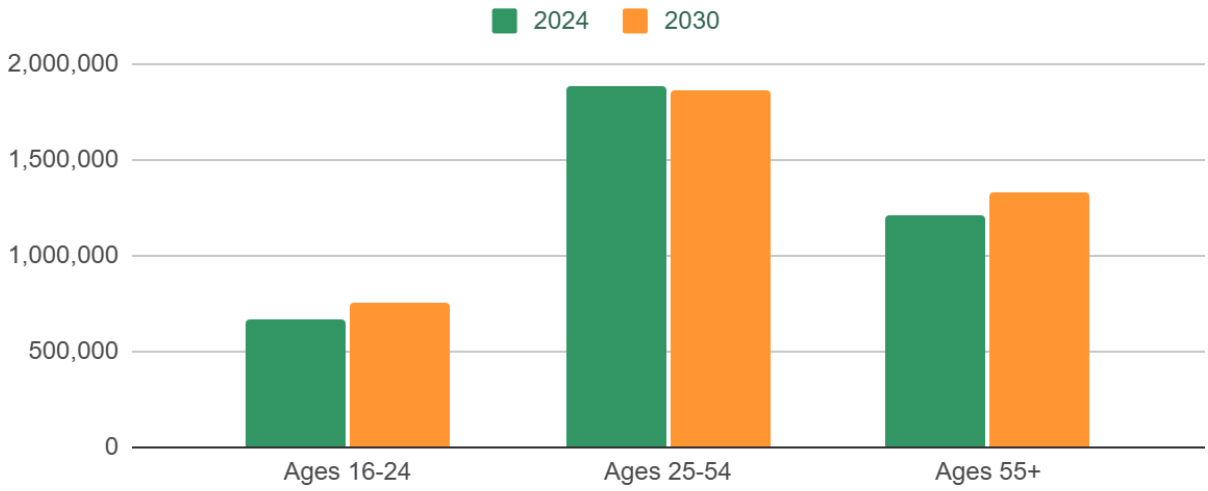
Regional Population Age Distribution

With a median age of 36, two years younger than the state's median age, the Inland Empire has a relatively youthful population, which is beneficial for sustaining the long-term energy workforce. Younger workers are entering the job market, and experienced workers are nearing retirement. The demographic data was analyzed based on the following age group breakdowns.

- Emerging Population (ages 16-24): This group represents entry-level workers entering the job market—a key demographic for the future energy workforce. Engaging this population through early career opportunities, apprenticeships, and training programs is crucial for developing the next generation of energy professionals.
- Established Working Population (ages 25-54): This group comprises the core of the region's labor force. It is largely made up of mid-career professionals and skilled workers. Many in this age range may seek upskilling or retraining opportunities, particularly as the energy sector shifts toward clean technologies and electrification.
- Retiring Workforce (ages 55+): A significant portion of the Inland Empire's workforce is approaching retirement, leading to potential gaps in institutional knowledge and technical expertise in specialized energy occupations. The aging workforce creates an urgent need for succession planning and training initiatives to ensure that the next generation of energy professionals fills these roles.

According to projections (see Figure 4), the emerging population (ages 16-24) is expected to grow through 2030. This provides a regional opportunity to engage youth in energy-related career pathways early through training programs, apprenticeships, and entry-level job opportunities. The increase in the retiring workforce (ages 55+) indicates the importance of increasing training and certification pathways and knowledge transfer initiatives for the established workforce to retain an experienced and skilled workforce, particularly in high-demand energy sectors.

Figure 4: Projected population growth by age group from 2024 -2030[9]

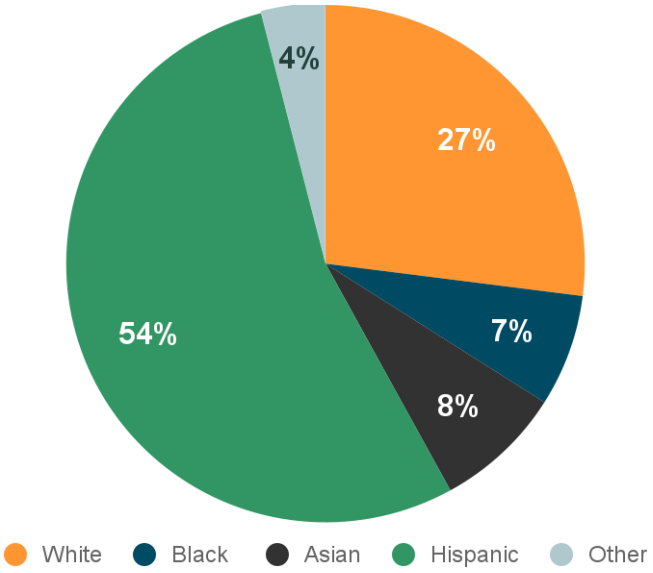


Regional Ethnicity

The Inland Empire's diverse population is one of its greatest assets, contributing a wealth of perspectives, skills, and cultural competencies that enhance its workforce. Understanding the ethnic makeup of the local labor pool is critical for developing inclusive workforce strategies that meet the unique needs of various communities. The Hispanic/Latino residents represent a substantial portion of the Inland Empire's population (54%) and workforce. Engaging the Hispanic/Latino community through targeted outreach and culturally relevant training programs can help ensure their participation in emerging energy-related fields. Workforce initiatives that emphasize cultural awareness, accessibility, and inclusivity can help overcome barriers to entry, reduce skill gaps, and foster an energy workforce that reflects the region's diversity. Additionally, linguistically-inclusive materials and training resources can strengthen pathways to employment and promote a more equitable workforce. By investing in programs that address the unique needs of the Hispanic/Latino community, the region can support its energy sector's growth and develop a skilled, inclusive workforce.

[9] Data from the State of California Department of Finance report P-2C County Population by Sex and Age Group

Figure 5: Ethnic composition of the Inland Empire population[10]

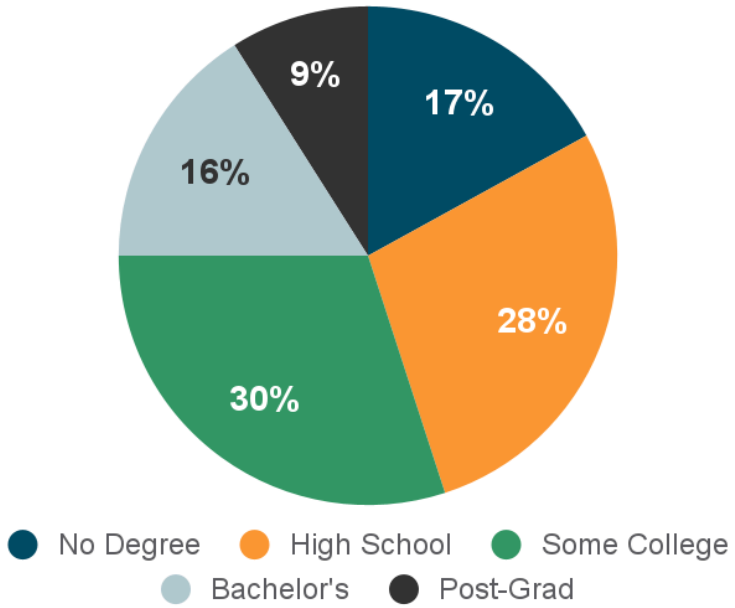


Regional Education Levels

Educational attainment is a critical factor influencing workforce readiness and adaptability, particularly in the fast-evolving energy sector. Understanding educational trends can highlight areas where workforce development initiatives are needed. This information can support regional recommendations for programs that provide training and credentials aligned with the educational requirements of workforce development strategies. It also informs recommendations related to skill requirements for high-growth energy-related industries.

[10] U.S. Census Bureau (2023). American Community Survey 1-year estimates. Retrieved from Census Reporter Profile page for Riverside-San Bernardino-Ontario, CA Metro Area

Figure 6: Population by highest level of education[11]



In the Inland Empire, 83.3% of the population has attained at least a high school diploma. A significant portion of the population does not pursue higher education or professional training, especially in lower-income and rural areas where access to educational opportunities is more limited. Many entry-level roles and apprenticeships in the energy sector only require a high school diploma or relevant experience, presenting an opportunity to bridge skill gaps with basic technical training or certificate programs. High school education institutions can support this by exposing students to pathways in energy-related occupations and trades as an alternative pathway to higher education. Additionally, workforce development programs can provide energy-related certifications, technical skills training, and hands-on learning experiences to build and provide skills necessary to be successful in the industry. Exposure to energy career pathways early on can strengthen the region's talent pipeline and equip the workforce to meet the demands of the energy sector.

[11] U.S. Census Bureau (2023). American Community Survey 1-year estimates. Retrieved from Census Reporter Profile page for Riverside-San Bernardino-Ontario, CA Metro Area

Regional Energy-Related Occupation Overview

SECTION SUMMARY

- Essential industries for workforce training and investment: High-demand energy occupations with median hourly earnings above the state's living wage threshold, particularly those with at least 15% projected growth from 2020-2030 in construction trades, engineering, installation/repair, and management.
- Notable job growth includes solar photovoltaic installers (81.3%), electricians, construction laborers, plumbers, engineers, and maintenance workers (17%-35%), along with a 25.1% increase in construction managers.
- Between 2020 and 2030, energy-related occupations are projected to see an average 25% retirement rate and 57% transfer rate of skilled workers (e.g., electricians, HVAC mechanics, plumbers, PV installers), which poses a significant challenge for maintaining a skilled energy workforce. Projections show over 75% of workers in critical energy-related roles may retire or transfer by 2030, highlighting the need for immediate recruitment and retention strategies.
- Many only require a high school diploma or equivalent, but workers often need specialized and technical knowledge, hands-on training, and certifications to be successful in these occupations. This provides an opportunity to expand training and certification programs for entry-level energy occupations, offering strong career prospects without advanced degrees.

The Inland Empire is poised to benefit from substantial growth in energy-related industries driven by California's ambitious climate goals, technological innovations, and the rising demand for sustainable energy solutions. Our assessment focuses on energy-related occupations with high workforce demand and median hourly earnings above the state's living wage threshold. These high-demand, well-paid occupations will be the focus for our recommended investments in workforce training. Understanding the workforce needs of growing sectors such as clean energy, grid modernization, construction and building upgrades, energy efficiency, electrification, and EV infrastructure is crucial to align workforce development efforts with skill shortages to support economic growth.

This analysis utilizes the Bureau of Labor Statistics' Standard Occupational Classifications (SOC) to identify growing energy-related occupations. Specifically, we examined occupations with at least 15% projected growth from 2020 to 2030. These include roles in management, construction, installation and repair, engineering, trades, and manufacturing. The identified occupational groups are as follows:

- (SOC 11-2000) Construction Trades Workers

- (SOC 17-2000) Engineering
- (SOC 17-3000) Drafters, Engineering Technicians, and Mapping Technicians
- (SOC 49-0000) Installation, Maintenance, and Repair Occupations
- (SOC 11-2000) Management Occupations

Table 1 illustrates notable job growth across these energy-related occupations. For example, solar photovoltaic installers are projected to experience the most significant growth, with employment increasing by 81.3% by 2030. Notable energy-related occupations, such as electricians, construction laborers, plumbers, engineers, and maintenance workers, are also expected to grow strongly, ranging from 17% to 35%, demonstrating the broad need for skilled labor as the region focuses on clean energy and infrastructure development. Management positions are also expected to grow, with construction managers projected to increase by 25.1%. This growth underscores the increasing complexity of energy-related construction projects, which require strong leadership and organizational skills.

Overall, the data highlights significant opportunities for job growth in clean energy, energy efficiency, and infrastructure maintenance. These projections suggest that the Inland Empire's job market is shifting to demand skilled labor in the energy and construction industry, providing more opportunities for sustainable career growth.

Table 1: Riverside-San Bernardino estimated 2020 - 2030 employment and projected employment growth by energy-related occupations.[12]

Energy-Related Occupations[13]	Employment Estimate 2020	Employment Estimate 2030	Projected Growth 2020-2030	Percentage Growth 2020-2030	Median Annual Wages
Total Energy Related-Occupations	137,270	162,120	24,850	19.36%	N/A
Total Regional Occupations in Construction Trades Workers	78,600	93,980	15,380	19.60%	
Solar Photovoltaic Installers	910	1,650	740	81.30%	$49,590
Electricians	7,210	8,820	1,610	22.30%	$63,365
Construction Laborers	16,180	19,590	3,410	21.10%	$47,310
Structural Iron and Steel Workers	1,300	1,530	230	17.70%	$64,572
Roofers	2,110	2,480	370	17.50%	$60,713
Plumbers, Pipefitters, and Steamfitters	4,080	4,790	710	17.40%	$62,024

[12] Data from the Bureau of Labor Statistics' Employment Projections by Occupation 2020-2030 Riverside-San Bernardino-Ontario, CA Metro Area

[13] This number includes all identified energy related occupations, not only the ones in high demand.

Carpenters	19,250	22,560	3,310	17.20%	$60,548
Sheet Metal Workers	1,130	1,310	180	15.90%	$59,609
Total Regional Occupations in Engineering	9,740	11,510	1,770	18.20%	
Materials Engineers	120	150	30	25.00%	$92,069
Industrial Engineers	1,040	1,280	240	23.10%	$84,775
Civil Engineers	2,920	3,590	670	22.90%	$103,402
Electrical Engineers	1,160	1,390	230	19.80%	$101,165
Total Regional Occupations in Drafters, Engineering Technicians, and Mapping Technicians	4,940	5,710	770	15.60%	
Surveying and Mapping Technicians	370	450	80	21.60%	$59,155
Architectural and Civil Drafters	940	1,130	190	20.20%	$62,626
Calibration and Engineering Technologists and Technicians, Except Drafters, All Other	730	850	120	16.40%	$53,920
Civil Engineering Technicians	640	740	100	15.60%	$70,810
Mechanical Engineering Technicians	130	150	20	15.40%	$60,357
Total Regional Occupations in Installation, Maintenance, and Repair	60,340	72,810	12,470	20.70%	
Maintenance Workers, Machinery	480	650	170	35.40%	$61,355
Industrial Machinery Mechanics	2,300	3,010	710	30.90%	$62,110
Mechanical Door Repairers	190	240	50	26.30%	$47,220
Millwrights	180	220	40	22.20%	$65,282
First-Line Supervisors of Mechanics, Installers, and Repairers	4,720	5,690	970	20.60%	$79,592
Electrical and Electronics Repairers, Commercial and Industrial Equipment	510	610	100	19.60%	$72,215
Riggers	110	130	20	18.20%	$47,323
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	5,600	6,610	1,010	18.00%	$48,284
Automotive Service Technicians and Mechanics	8,950	10,420	1,470	16.40%	$50,124

Total Regional Occupations in Management	84,750	103,770	19,020	22.40%	
Construction Managers	4,590	5,740	1,150	25.10%	$104,247
Architectural and Engineering Managers	1,360	1,620	260	19.10%	$156,251
Industrial Production Managers	1,640	1,900	260	15.90%	$100,920

Projected Retirements and Transfers

The Inland Empire's energy-related industries are on the brink of rapid expansion, driven by California's ambitious climate goals and technological advancements. However, the region faces a significant challenge: the projected average retirement of 30% of its experienced energy workforce, coupled with an average transfer rate of 70% within energy-related occupations between 2020 and 2030. Electricians, HVAC mechanics, plumbers, photovoltaic (PV) installers, riggers, millwrights, and construction laborers are critical to the region's continued growth in clean energy, energy efficiency, and infrastructure upgrades. The workforce's aging demographics, combined with a high turnover rate, intensify the need for targeted workforce development efforts to address the potential for skill shortages. Immediate and long-term training programs can help prevent disruptions in the region's energy infrastructure.

The projected employment data, particularly for energy-related occupations, reveals a concerning trend: significant numbers of experienced professionals are expected to retire or transfer out of critical roles. Table 2 highlights energy-related occupations, with a projected exit and transfer rate of more than 75% by 2030. These roles are critical to the region's energy infrastructure and require immediate action to ensure a steady pipeline of skilled professionals. Labor force exits are due to retirement or disability; occupational transfers are when workers shift careers for reasons like advancement opportunities or job satisfaction. Both labor force exits and occupational transfers contribute to workforce instability. These trends underline the importance of developing robust recruitment and retention strategies for energy-related fields. A new generation of workers must step into these vacancies to maintain momentum in energy projects, from clean energy installations to grid modernization and electrification efforts.

Table 2: Riverside-San Bernardino projected percentage of retirement, transfers, and job openings 2020 - 2030.[14]

Energy-Related Occupations	Exit Rate	Transfers Rate	Total Exit and Transfer Rate	Total Job Openings
Total Energy Related-Occupations[15]	26.20%	59.54%	85.74%	163,850
Total Regional Occupations in Construction Trades Workers	26.32%	59.95%	86.27%	96,460
Solar Photovoltaic Installers	24.85%	64.24%	89.11%	2,210
Electricians	26.42%	66.78%	93.20%	9,830
Construction Laborers	27.00%	61.66%	88.67%	20,780
Structural Iron and Steel Workers	23.53%	70.59%	94.13%	1,670
Roofers	22.98%	64.52%	87.51%	2,540
Plumbers, Pipefitters, and Steamfitters	26.93%	66.60%	93.53%	5,190
Carpenters	27.04%	57.80%	84.84%	22,450
Sheet Metal Workers	25.19%	60.31%	85.52%	1,300
Total Regional Occupations in Drafters, Engineering Technicians, and Mapping Technicians	28.55%	59.89%	88.45%	5,820
Surveying and Mapping Technicians	33.33%	80.00%	113.41%	590
Architectural and Civil Drafters	28.32%	58.41%	86.75%	1,170
Calibration and Engineering Technologists and Technicians, Except Drafters, All Other	28.24%	56.47%	84.74%	840
Civil Engineering Technicians	28.38%	56.76%	85.17%	730
Mechanical Engineering Technicians	26.67%	60.00%	86.84%	150
Total Regional Occupations in Installation, Maintenance, and Repair	28.55%	58.84%	87.39%	76,100
Maintenance Workers, Machinery	29.23%	47.69%	76.97%	670
Industrial Machinery Mechanics	27.24%	47.51%	74.76%	2,960
Millwrights	27.27%	54.55%	81.94%	220

[14] Data from the Bureau of Labor Statistics' Employment Projections by Occupation 2020-2030 Riverside-San Bernardino-Ontario, CA Metro Area

[15] This number includes all identified energy related occupations, not only the ones in high demand.

First-Line Supervisors of Mechanics, Installers, and Repairers	26.54%	54.48%	81.02%	5,580
Riggers	23.08%	69.23%	92.49%	140
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	23.60%	62.93%	86.54%	6,730
Welders, Cutters, Solderers, and Brazers	24.22%	72.88%	97.11%	5,430
Automotive Service Technicians and Mechanics	27.64%	63.05%	90.69%	10,920

Expanding apprenticeship programs, creating partnerships with community colleges, and investing in specialized certification programs can address these gaps. Outreach focusing on attracting and retaining younger workers and encouraging diversity within these critical fields are essential to building a robust, adaptable workforce. Collaboration among educational institutions, labor unions, and industry stakeholders will ensure the Inland Empire has the talent needed to fill the labor market needs.

Occupations' Education Requirements

Table 3 outlines energy-related occupations within the Inland Empire and the educational and on-the-job training requirements for each role. Understanding these requirements is crucial for designing targeted workforce development programs that help workers enter and advance in the energy sector. Notably, many high-demand energy-related jobs require a high school diploma or equivalent to entry-level education, with apprenticeship programs or significant on-the-job training essential for success. These positions include roles in the skilled trades, such as electricians, plumbers, and solar photovoltaic installers. While formal education requirements for a majority of occupations are relatively low, these occupations often require specialized and technical knowledge, hands-on training, and certifications for workers to be successful in these occupations.

There is a significant opportunity to expand training and certification programs for energy occupations that require only a high school diploma. Many entry-level energy occupations offer strong career prospects without needing advanced degrees. By building a stronger career pipeline and providing accessible, industry-recognized certifications and hands-on training, local workforce organizations and educational institutions can help job seekers gain the skills needed for these high-demand roles.

This approach can increase access to sustainable employment opportunities and support the growth of a skilled energy workforce in the region.

Table 3: Occupations' education requirements and on the job training availability

Occupational Title	On the Job Training	Entry Level Education
• Electricians • Structural Iron and Steel Workers • Plumbers, Pipefitters, and Steamfitters • Carpenters • Sheet Metal Workers • Millwrights	Apprenticeship	High school diploma or equivalent
• Maintenance Workers, Machinery • Industrial Machinery Mechanics • Electrical Power-Line Installers and Repairers • Machinists	Long-term on-the-job training	High school diploma or equivalent
• Solar Photovoltaic Installers • Roofers • Surveying and Mapping Technicians • Mechanical Door Repairers • Riggers • Welders, Cutters, Solderers, and Brazers • Construction Laborers • Automotive Service Technicians and Mechanics	Moderate or short-term on-the-job training	High school diploma or equivalent
• Electrical and Electronics Repairers, Commercial and Industrial Equipment • Heating, Air Conditioning, and Refrigeration Mechanics and Installers • Automotive Service Technicians and Mechanics	Long or short-term on-the-job training	Postsecondary non-degree award
• Architectural and Civil Drafters • Calibration and Engineering Technologists and Technicians, Except Drafters, All Other • Civil Engineering Technicians • Mechanical Engineering Technicians	None	Associate's degree
• Administrative Services and Facilities Managers • Industrial Production Managers • Construction Managers • Architectural and Engineering Managers • Materials Engineers • Industrial Engineers • Civil Engineers • Electrical Engineers • Mechanical Engineers	None	Bachelor's degree

Geographic Variations Across the Inland Region

Riverside and San Bernardino Counties have distinct regional characteristics influencing economic development, industry concentrations, and workforce readiness. While the Inland Empire is often associated with its rapidly growing warehousing and logistics sectors, there are notable variations in industry distribution between Riverside and San Bernardino counties.

Riverside County's economic drivers are primarily in healthcare, retail and logistics, and education, while San Bernardino County is more focused on logistics and transportation, manufacturing, mining, and energy. Both counties offer opportunities for energy-related employment across various industries.

In urban areas, such as Riverside, Ontario, and San Bernardino, job opportunities in sectors like professional services, education, healthcare, and logistics are more prevalent. Urban residents generally have better access to higher-paying jobs but face a higher cost of living, which can discourage lower-income workers from moving to these areas.

Rural areas often have fewer employment opportunities, with most jobs concentrated in agriculture, local government, and energy-related industries. Rural communities experience higher unemployment rates due to lower demand for workers, limited access to training, and a lack of job diversity. Additionally, rural areas often struggle to attract younger workers who may be drawn to professional opportunities in urban centers.

Ultimately, because of the geographic diversity within the Inland Empire, the region will need tailored workforce development strategies to reduce regional disparities and create a more balanced economic landscape.

Regional Energy Employer Survey

To understand the needs of the energy workforce and ensure regional training programs align with local employers' requirements, we conducted primary research through an energy employer needs assessment survey. The survey gathered direct input from energy employers in the Inland Empire to identify regionally relevant workforce challenges and needs, including hiring difficulties, employee retention, skill gaps, and training requirements. By engaging with employers in energy-related industries across Riverside and San Bernardino counties, local workforce organizations, and regional stakeholders who provide training programs or collaborate with employers to address workforce challenges, we captured real-world insights to guide our recommendations for workforce development.

The survey was launched in May 2024 and closed in November 2024, receiving 385 responses. Respondents included energy employers, workforce development organizations, and educational institutions. The survey consisted of 13 questions (see Appendix B) focused on gathering quantitative and qualitative data on the following topics:

- Employer Hiring and Retention: Challenges in hiring qualified candidates, retention issues, and required skills.
- Training and Skill Development: Gaps in regional training resources, needed certifications, and education levels for energy roles.
- Employer Support: Barriers to accessing training, in-house training capabilities, and collaboration with local stakeholders.

Survey Outreach and Engagement Methodology

SECTION SUMMARY

- Outreach targeted over 180 regional stakeholders, including employers, schools, trade schools, workforce organizations, and public sector agencies. It further targeted 9,500 energy-related employers via email, phone calls, and in-person interactions.
- Partnered with Probolsky Research to ensure geographically diverse responses and insights from employers across sectors and geographic communities.

To ensure representative survey results, the outreach and engagement methodology targeted a broad network of over 180 regional stakeholders, including employers, K-12 schools, colleges, universities, trade schools, chambers of commerce, workforce development organizations, and public sector agencies. Furthermore, by attending local workforce events, job fairs, and networking sessions, we actively engaged with stakeholders in person and raised awareness about the employer needs survey. We also distributed the survey through local partner organizations to encourage participation. We made concerted efforts to ensure broad participation by reaching out to employers directly. Our outreach included contacting over 9,500 energy-related employers through email, phone calls, and in-person event interactions. To incentivize responses, we offered Amazon gift cards as a token of appreciation for survey participation.

To ensure balanced regional representation, we partnered with Probolsky Research. Probolsky Researched supported outreach to ensure responses were geographically diverse and provided insights from employers across sectors and communities.

By engaging various stakeholders, including workforce organizations and educational institutions, we captured various perspectives on the challenges faced by different sectors and communities across the Inland Empire.

Survey Results

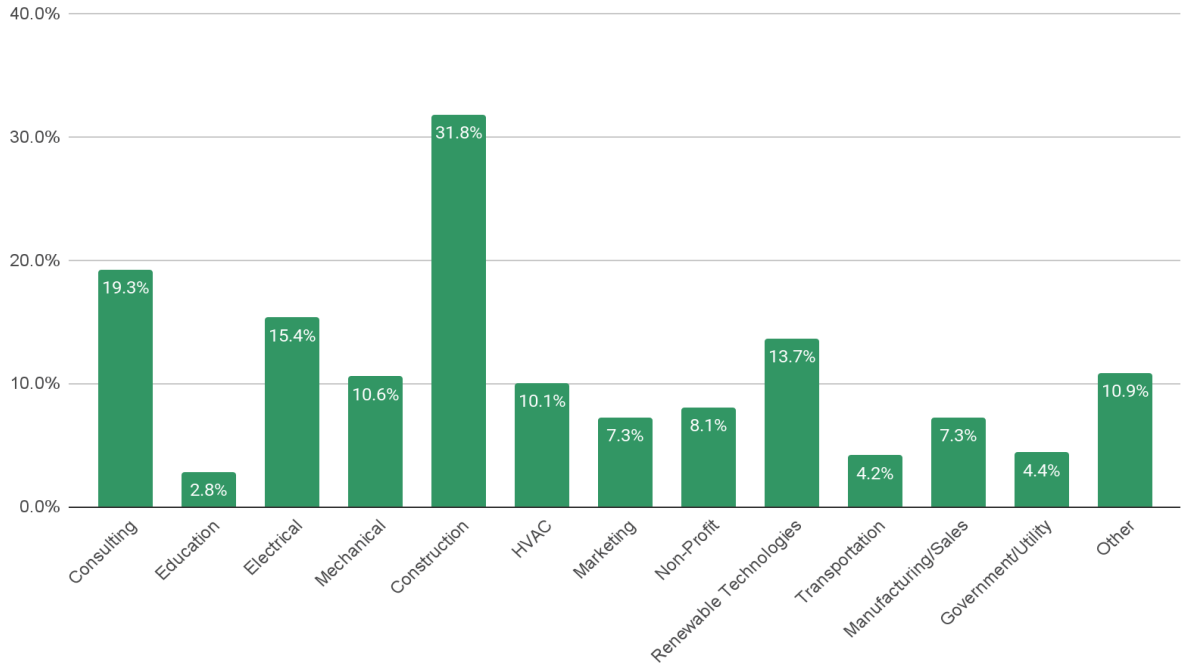
SECTION SUMMARY

- 28.9% of survey respondents were from community-based organizations (non-profits, education, local governments, consultants), while 71.1% were energy employers in the electrical, mechanical, construction, and HVAC sectors.
- Survey respondent ratios indicate that the survey represents the labor market, highlighting the construction and electrical industries in the energy sector.
- 29.6% of employers indicated they have between 1 to 5 job openings annually for energy-related positions. Overall, survey respondents' annual job availability is mostly evenly distributed among employers.

Respondent Breakdown by Organization Type and Industry

Of the 385 respondents, 28.9% were from community-based organizations (e.g., non-profits, education institutions, local governments, and consultants), while the remaining 71.1% were energy employers involved in sectors like electrical, mechanical, construction, and HVAC. The largest share of respondents (31.8%) were employers in the construction industry, followed by consulting (19.3%), electrical (15.4%), and renewable technologies (13.7%). These results align with labor market trends, where construction and electrical industries are major drivers of workforce growth in the energy sector.

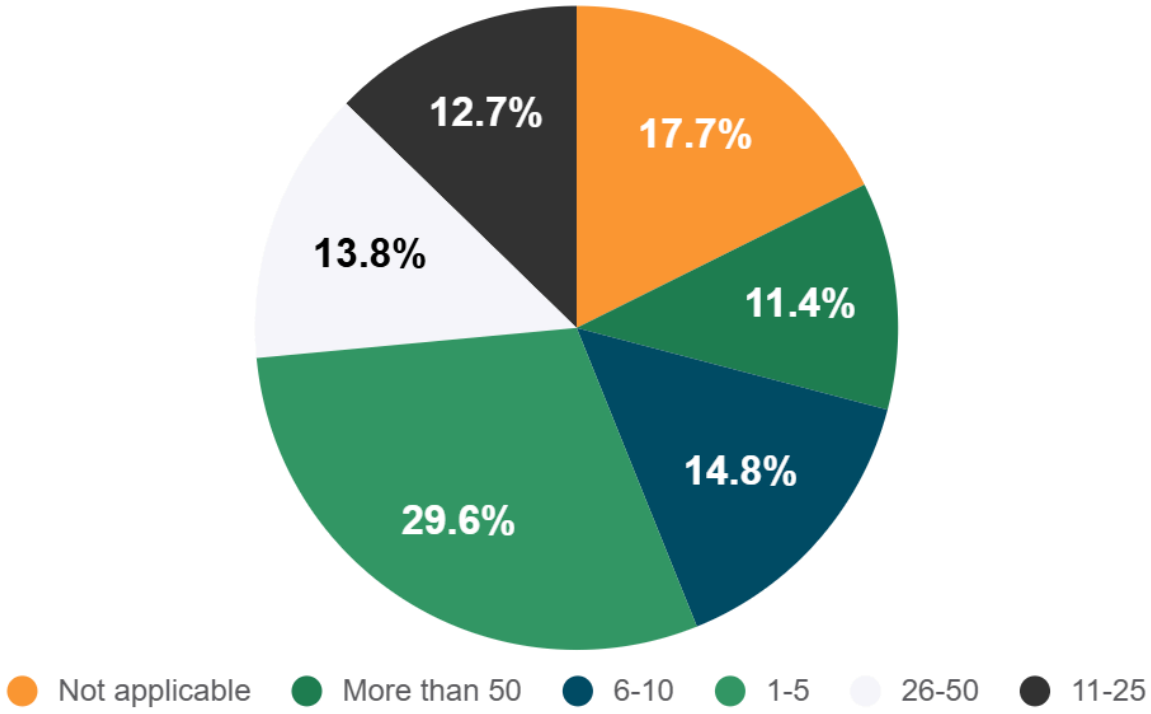
Figure 7: Percentage of survey respondents by industry



Job Availability

With regional employment projections showing significant growth in energy-related occupations, this survey aimed to assess annual job availability from employers surveyed. To ensure we have the right people with the right skills to meet employer demand, we need to understand what skills are needed, if there are enough jobs to fill, and how needs vary between different-sized businesses. 29.6% of employers surveyed indicated they have between 1 and 5 openings annually for energy-related positions. The remaining survey responses ratio indicates a nearly equal distribution of annual job availability (Figure 7). This data fits the regional employer data and generally suggests that many employers are hiring for energy-related positions but in smaller numbers.

Figure 8: Annually available energy-related positions per employer



Employer Hiring and Retention

SECTION SUMMARY

- Survey respondents highlighted several obstacles they face when recruiting for energy roles, with the most significant barriers centered around the availability of qualified applicants, a lack of relevant industry experience, and inadequate training or certifications among potential hires.
- 79.5% of respondents identified retention challenges as a key barrier to maintaining a stable workforce. Contributing factors to high turnover rates include financial and career growth opportunities, employee qualifications, a competitive labor market, and regional retirements.
- Survey respondents value a combination of foundational education, specialized certifications, and practical work experience for energy sector roles. 49.6% of employers require a high school diploma for entry-level positions, highlighting the importance of foundational education.
- Survey respondents indicated that job applicants and employees lack technical, workplace, and interpersonal skills equally, and it is important to address workforce gaps in the region's energy sector.

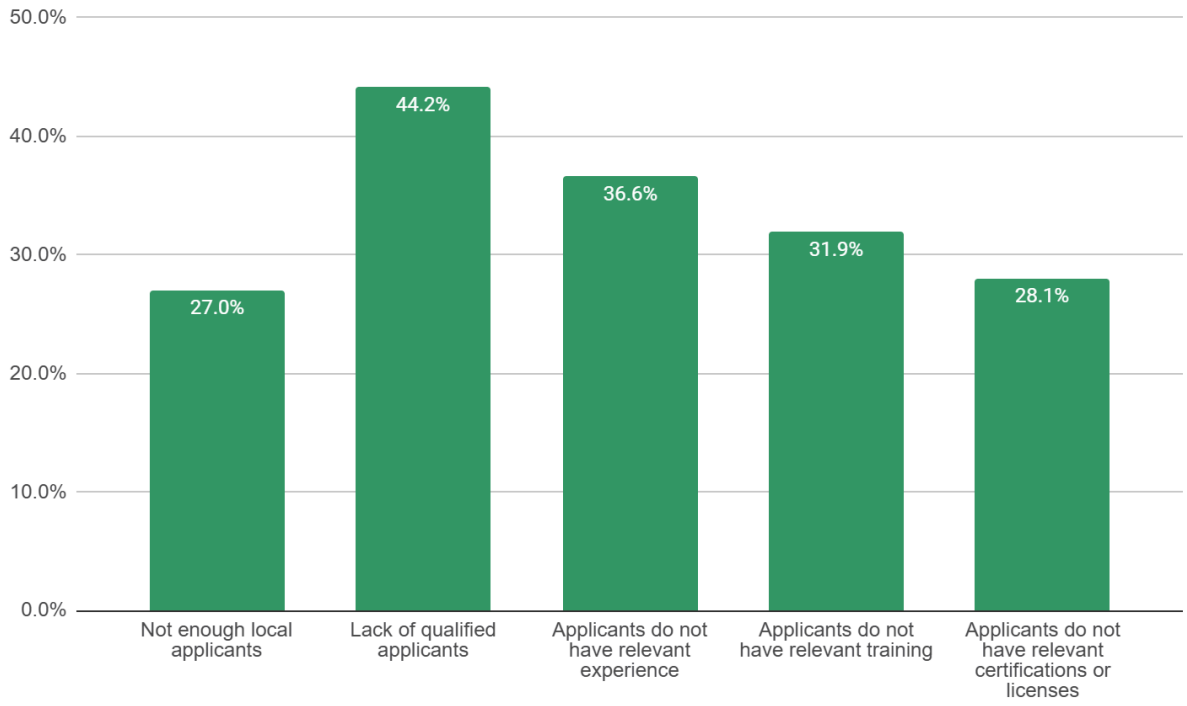
Hiring Challenges

Hiring challenges in the energy sector are shaped by industry demands, geographic differences, skill requirements, and local labor market conditions.

> "Survey respondents highlighted several obstacles they face when recruiting for energy roles, with the most significant barriers centered around the availability of qualified applicants, a lack of relevant industry experience, and inadequate training or certifications among potential hires" *(Figure 8)*

This finding indicates a need for training programs and greater alignment between industry needs and educational offerings to bridge these gaps.

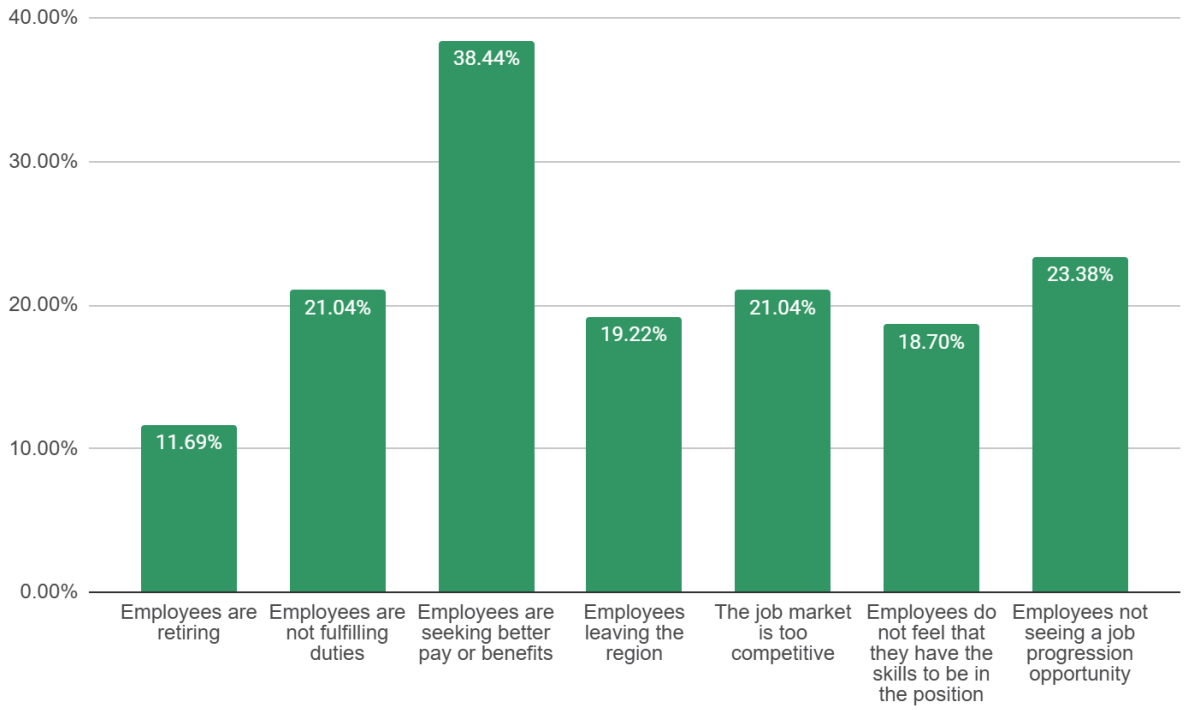
Figure 9: Challenges faced by energy employers when hiring employees



Factors Affecting Employee Retention

Employee retention is a significant concern for survey respondents in the Inland Empire, with 79.5% of respondents identified retention challenges as a key barrier to maintaining a stable and skilled workforce. The survey findings revealed several underlying factors contributing to high turnover rates within the energy sector in four distinct categories: 1) financial and career growth, 2) employee qualifications, 3) a competitive labor market, and 4) retirements in the region (Figure 10).

Figure 10: Employers analyze challenges with employee retention



Financial and Career Growth Opportunities

The most significant driver of employee turnover, according to 38.4% of survey respondents, is employees seeking better pay or benefits, and the second highest, at 23.4%, is the lack of job progression opportunities. Employees in the energy sector may feel that their growth potential within a company is limited if there are few opportunities for advancement or skill development. This aligns with broader economic trends in the Inland Empire, where rising living costs, particularly housing, put pressure on workers' financial stability. Survey respondents indicated that the lack of competitive wages and benefits packages compared to neighboring regions or industries contributes to employees seeking opportunities with more attractive compensation.

Employee Qualifications

21% percent of respondents highlighted that employees are not fulfilling their duties as expected, leading to retention issues. They cited insufficient training, lack of experience, and job dissatisfaction contributing to this issue. Additionally, 18.7% of employers reported retention issues due to workers not feeling adequately equipped to meet the responsibilities of their roles, causing them to struggle with performance expectations, leading to dissatisfaction and turnover. This reflects a skills gap in the

local workforce, where incoming workers may need the technical competencies or certifications for energy-related positions. Together, these responses highlight the critical need for training programs and ongoing skill development to prepare employees better to meet the demands of energy sector careers.

Competitive Labor Market

A competitive labor market and regional mobility also influence employee retention in the Inland Empire's energy sector. Approximately 21% of survey respondents indicated that the region's competitive job market is challenging. Local employers compete for skilled workers with larger coastal markets that can offer higher wages, better benefits, or more career growth opportunities. Additionally, 19.2% of respondents reported that employees leave the region for better job prospects or more affordable living options, further complicating retention efforts. Competition for talent and regional migration trends create a challenging landscape for employers, who must compete with other industries and regions with more attractive economic conditions.

Retirement

While less of a contributing factor than the others outlined above, 11.7% of respondents indicated employee retirement as a factor that creates employee retention challenges. The projected employment and demographic data indicate an aging workforce and a steady increase in retirements in the energy sector. As experienced workers exit the workforce, employers must fill these positions with qualified replacements. Survey respondents indicated that incoming workers who fill these roles often lack sufficient experience and training and struggle to meet performance expectations, leading to higher turnover rates and disruption in operational efficiency.

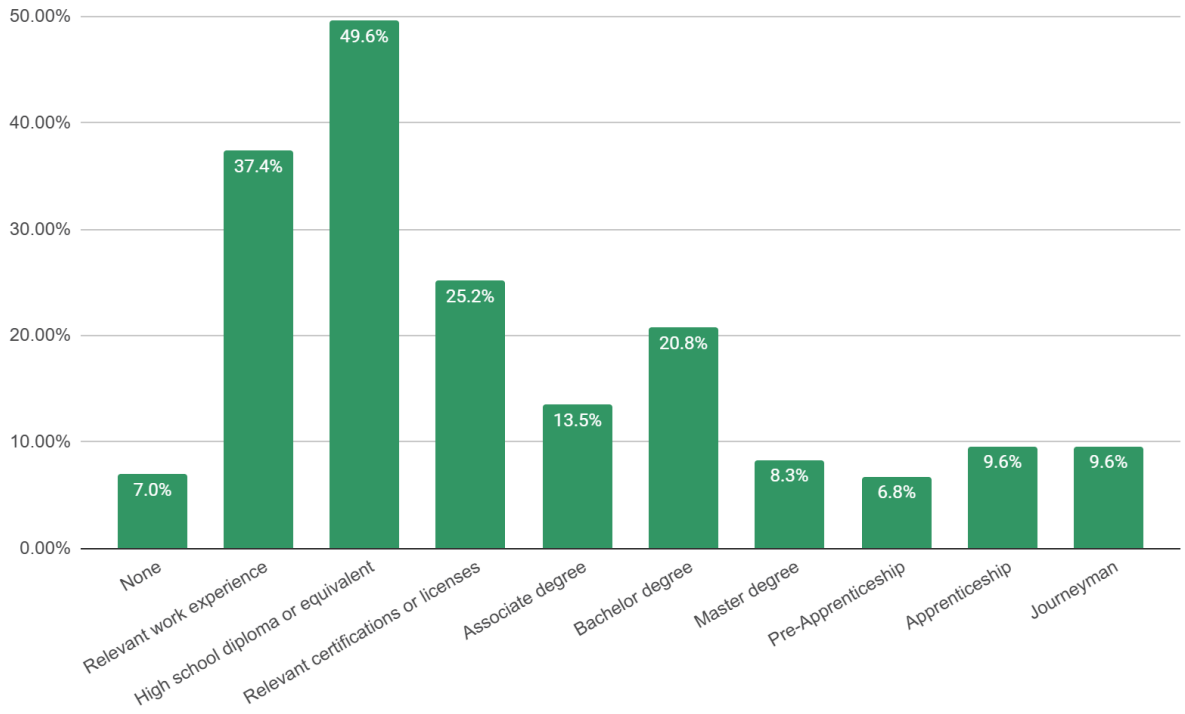
Minimum Education Requirements When Hiring

Based on the survey responses, employers value a blend of foundational education, specialized certifications, and practical work experience when evaluating candidates for energy sector roles (Figure 11). Nearly half of employers (49.6%) consider a high school diploma or equivalent a minimum requirement for entry-level roles. This highlights the need for foundational education while underscoring the importance of additional training beyond high school. The second most common minimum education requirement (37.4%) was relevant work experience, underscoring the value of practical, on-the-job training. This finding suggests that employers prioritize candidates who not only possess educational credentials but can also demonstrate hands-on experience.

Certifications and licenses were identified as important by 25.2% of employers. These certifications, which can range from technical training in areas like solar panel

installation or energy auditing to safety and regulatory compliance, are essential for workers to meet the energy sector's needs. The emphasis on certifications reflects the industry's demand for specialized skills that may not be addressed through traditional academic programs. This suggests that expanding certification programs, particularly in clean energy, electrification, and energy management, could help workers gain the necessary credentials to compete in the market.

Figure 11: Percentage of employers indicating the minimum level of education required by employers



Employee Skillsets Needed

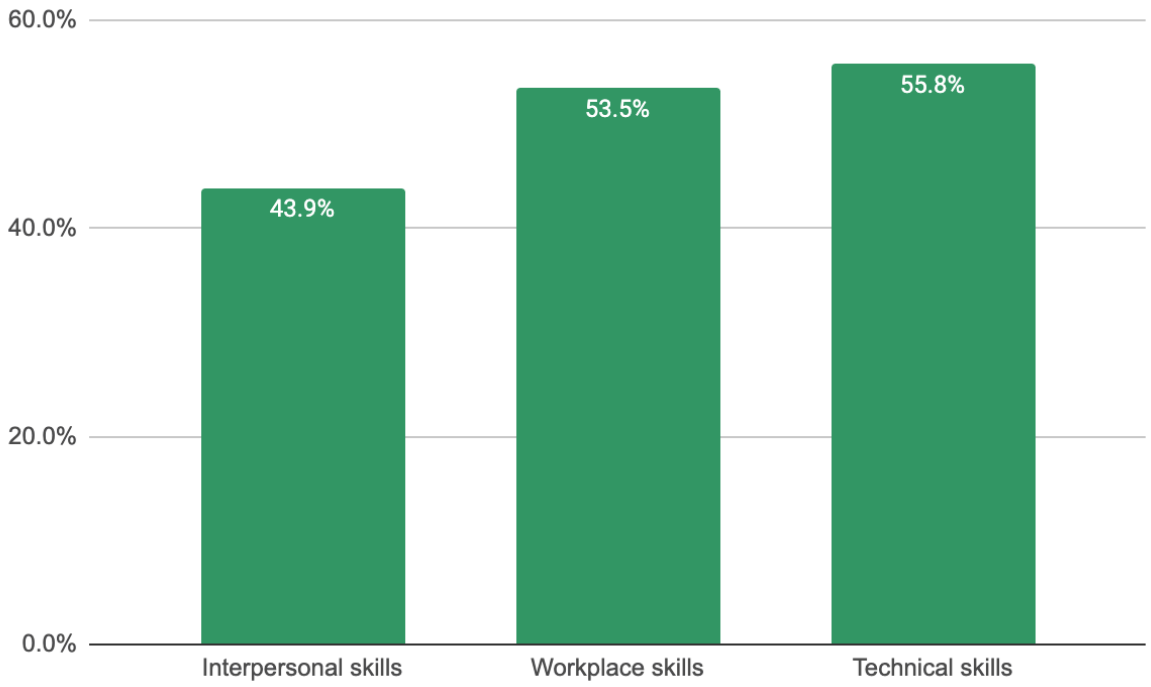
To better understand the skills applicants or employees may lack, we asked survey respondents to share which skills are typically lacking in your job applicants or employees. We categorized skills into three categories: interpersonal skills, workplace skills, and technical skills.

- Interpersonal skills refer to the behaviors and strategies individuals use to interact effectively with others. These skills encompass communication, active listening, attitude, and manners, all of which contribute to building positive relationships in the workplace with clients, coworkers, and supervisors.

- Workplace skills are essential for success in any job. These core competencies include the ability to understand instructions, solve problems, and collaborate effectively with coworkers and customers. They also include essential attitudes, such as professionalism and adaptability.
- Technical skills are specific, teachable abilities or knowledge required to perform particular tasks, often related to using tools, equipment, software, or specialized systems within a particular field or industry. These skills are foundational in the energy sector, enabling professionals to ensure that energy systems operate effectively, safely, and in line with industry standards.

Technical skills (55.8%) and workplace skills (53.5%) were the most frequently cited deficiencies by employers, with a clear need for improvement in both areas (Figure 12). This is followed closely by interpersonal skills, with (43.9%) of respondents indicating it is an area of improvement needed for the regional workforce. The survey findings suggest that a balanced focus on workplace, technical, and interpersonal skills is crucial for addressing the gaps in the region's energy workforce. The region could benefit from comprehensive training programs addressing hard and soft skill deficiencies.

Figure 12: Percentage of employers indicating particular skillsets are lacking in their job applicants or employees



Training and Skill Development

SECTION SUMMARY

- Survey respondents identified barriers for employees accessing training locations, limited opportunities, inadequate programs to address skill gaps, and high training costs. The most prevalent challenge, cited by 39% of energy employers, was the high cost of training, making it difficult for employees to access necessary certifications and training.
- 40% of survey respondents provide direct professional development opportunities or financial support for training to improve both soft and hard skills. These opportunities primarily come from established workforce development programs, such as apprenticeships, or employers offering specific training, certifications, and safety requirements.
- Key technical skills in demand include knowledge of electrical systems, mechanical proficiency, energy auditing and analysis, and expertise in programming and automation for smart grids and energy-efficient technologies.

Accessing Trainings

Survey respondents indicated barriers to workforce training, including inaccessibility of training locations, a lack of opportunities, inadequate programs to address skill gaps, and the high cost of certifications. While survey data indicates that energy sector workers are gradually gaining awareness of training centers and career pathways existing training infrastructure, the survey indicates that workers experience challenges accessing relevant training and certifications. These access challenges are demonstrated in regional equity data and training distribution later in this report. Job seekers, particularly from underserved communities, experience additional challenges in accessing workforce training to enter and thrive in the energy sector.

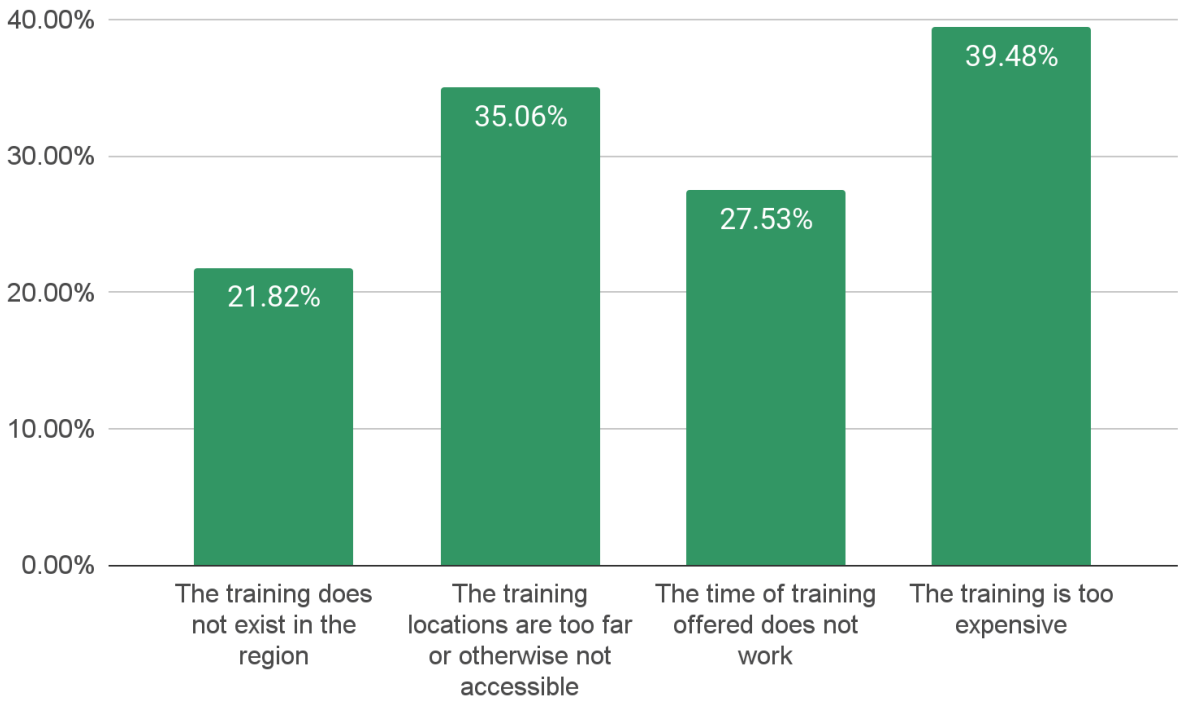
Energy employer survey respondents) identified the high cost of training as the most prevalent challenge for employees in accessing necessary certifications and training (39% of respondents listed "training is too expensive" as the primary barrier, see Figure 13). Although regional programs and scholarships exist, training costs remain a barrier, particularly impacting individuals from low-income or underserved communities. Training programs that do provide the required certifications and skills are often prohibitively expensive, making it difficult for both employers to cover the costs and employees to afford the training themselves.

Training affordability is compounded by logistical challenges, including the distance to training locations, which 35% of respondents indicated as a significant barrier. Additionally, 27.5% of respondents reported that the timing of training sessions

conflicts with workers' schedules, further limiting access to skill development opportunities. Another 21.8% of respondents highlighted that the specific training they need is unavailable in the region, revealing a gap in the Inland Empire's training infrastructure.

Employers also identified additional challenges related to training accessibility, such as the higher costs associated with qualified workers. Licensed and certified workers often come with increased expenses for employers, such as higher insurance premiums and taxes. Collectively, these barriers highlight the need for investment in more accessible, affordable, and flexible training opportunities.

Figure 13: Employers identify training and skill development challenges experienced by job seekers



Direct Employer Training

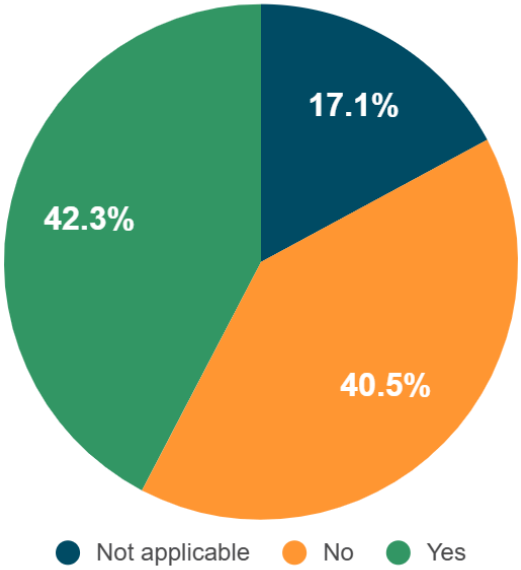
Approximately 40% of survey respondents indicated they offer direct professional development opportunities or provide financial support to access training to improve necessary (both soft and hard) skills. Respondents who offered training opportunities mostly came from established workforce development programs, such as apprenticeships, or employers offering specific training, certifications, and safety requirements or funds. Below is a categorized list of training from respondents:

- Foundational and Safety Training: Occupational Safety and Health Administration (OSHA) approved certifications, cardiopulmonary resuscitation (CPR)/first aid/automated external defibrillator (AED) training, personal protective equipment (PPE) usage and safety protocols, energy safety practices and procedures, safe working conditions, and conflict management.
- Energy-Specific Technical Training: Electrical and clean energy technologies certifications, solar panel installation, low-voltage, HVAC certifications, EV infrastructure training programs, energy efficiency, and use optimization.
- On-the-Job and Hands-On Training: Equipment operation, one-on-one driver training, machine handling, electrical work.
- Apprenticeships and vocational training: Electrical apprenticeships, union-sponsored trade apprenticeships, vocational programs in HVAC, plumbing, and electrical.
- Online and remote training opportunities: Information technology, renewable energy, marketing, energy transition software and tools, and industry-specific training through online courses (e.g., HVAC, National Comfort Institute (NCI), North American Technician Excellence (NATE), National Electrical Code (NEC), International Municipal Signal Association (IMSA).
- Certifications and Sponsored Programs: Employer-sponsored certifications or reimbursement for completing industry-specific licenses or certifications.
- Employer-Sponsored Advanced Education: sponsored classes, training, certifications, after-hours or evening programs, childcare support programs, incentives for additional training, and time allowance for training and exams.

Employer-Required Energy Certifications

Because entry-level energy industry jobs are a new and growing field in the Inland Empire, job seekers are sometimes unaware of job requirements and do not know the minimum qualifications required for roles. While energy employers do not always require incoming energy professionals to have certifications, licenses, or training, 42.3% of energy employers require certifications from job candidates (Figure 14). With over 600 energy-related certifications available statewide, different occupations and roles require varying qualifications.

Figure 14: Employer demand for energy-related certifications



Employers also value **interpersonal and communication skills**, such as team collaboration, effective communication, and project management abilities. With the energy sector's growing complexity, **regulatory and safety knowledge** is also critical, especially regarding compliance with local, state, and federal energy regulations (e.g., OSHA standards and environmental policies). Based on the employer survey, we found that employers in the energy sector seek workers with a diverse skill set that spans technical and interpersonal abilities. Key technical skills in demand include:

- **Electrical systems knowledge**: Proficiency in installing and maintaining electrical systems for utilities and clean energy systems.
- **Mechanical proficiency**: Operating, maintaining, and repairing energy production equipment.
- **Energy auditing and analysis**: Assessing energy usage and recommending energy efficiency improvements.
- **Programming and automation**: Coding and operating automated systems in smart grids and energy-efficiency technologies.

Required certifications from energy employers are outlined in Table 4 below.

Table 4: Required certifications disclosed by energy employers via energy workforce survey

General Safety and Compliance Certifications	• Occupational Safety and Health Administration (OSHA) Certification: compliance with occupational safety standards • Manufacturing Safety and Compliance (MSCH) Certification: state and federal manufacturing safety standards • Hazmat Certification: handling hazardous materials safely
Energy and Renewable Energy Certifications	• Certified Energy Manager (CEM): energy management and efficiency • Renewable Energy Professional (REP): professional certification specializing in renewable systems • North American Board of Certified Energy Practitioners (NABCEP): certification for solar energy professionals • Certified Energy Auditor (CEA): specialized in energy efficiency audits • LEED Accredited Professional (LEED AP): expertise in sustainable building and environmental design
Electrical and Technical Licenses	• Certified Journeyman and Apprentice Electrician: specializes in professional electrical work • Electric Vehicle Infrastructure Training Program (EVITP): specializes in EV charging systems • California Electrical License: required for electrical work in the state • Photovoltaic (PV) Installer Certification: for solar panel design, installation, and maintenance
HVAC and Mechanical Licenses	• HVAC Certification: required for heating, ventilation, and air conditioning technicians • Specialized Equipment Handling License: operating machinery like forklifts and heavy equipment • California Refrigerant Certification: technicians handling refrigerants in cooling systems
Professional Engineering Certifications	• Professional Engineer (PE): highly regarded certification for advanced engineering roles, especially in energy and systems design • Energy Systems Engineer Certification: focuses on designing and managing complex energy systems
Vocational and Hands-On Training	• Forklift Operation Certification: essential in warehousing and industrial roles • Building Performance Institute (BPI) Certifications: energy-efficient buildings • Welding Certification: for energy infrastructure and manufacturing

Employer and Worker Needs

SECTION SUMMARY

- High-demand energy roles, such as carpenters, electricians, and construction laborers, need more skilled workers with specialized training, certifications, or experience.
- Employers prioritize experience over formal training and have limited outreach to diverse communities, hindering their ability to fill job openings with qualified local candidates.
- Employers recognize the growing demand for battery storage, EV infrastructure, and clean energy roles. Still, more training programs and the skills required for these emerging sectors must be available.
- Workers, especially in rural and non-metropolitan areas, face challenges finding accessible and affordable energy sector training programs, which can limit their job competitiveness.
- Workers lack specific skills and knowledge to meet employer requirements and prepare for emerging roles in the energy sector. To bridge the gap between existing skills and employer demands, workers require targeted training and re-skilling initiatives.

Employer Needs

Key findings from the survey reveal that while there are numerous energy sector job openings, especially in high-demand roles, employers face critical challenges in sourcing skilled workers with specialized training, certifications, or experience. These findings emphasize the need to address workforce gaps to ensure a well-prepared talent pool for the energy sector's future needs. From the survey data, four main areas of employer need were identified:

1. Filling Job Openings: High-demand roles in the Inland Empire include carpenters, construction laborers, automotive service technicians and mechanics, and electricians. As these positions become available, employers are seeking skilled workers to fill them.

2. Effective Hiring Practices: Employers often prioritize experience over formal training and have limited outreach to diverse communities, excluding potential workers. This creates a significant barrier to filling job openings with qualified local candidates.

3. Addressing Skill Shortages: Many employers have difficulty recruiting and retaining employees with the necessary certifications or relevant work

experience. There is a notable gap between available job opportunities and the skills of the current workforce.

4. Keeping Up with Future Industry Trends: Employers recognize the need to prepare for emerging roles in battery storage, EV infrastructure, and clean energy project management. These sectors are expected to experience significant growth, requiring new skill sets and specialized knowledge.

Overall, there is a mismatch between available training programs and the skills required for energy-related roles, including emerging clean energy occupations.

Worker Needs

Despite growing job opportunities and projected high demand in the energy sector, job seekers face several barriers to securing employment, particularly in rural and non-metropolitan areas. Inland Empire residents struggle to access local, affordable training for careers in the energy sector. Key obstacles include:

- Access to Job Opportunities and Training: Many workers face difficulty locating accessible and affordable training programs, especially within the energy sector, which limits their ability to compete for job opportunities.
- Skill and Knowledge Gaps: The current workforce lacks specific skills or knowledge, which hinders workers' ability to meet employer needs, adhere to industry standards, or prepare for future job roles in emerging energy fields.
- Training and Development Needs: Workers need training programs and re-skilling initiatives to bridge the gap between the skills that employers require and the capabilities of the current workforce.
- Resource Gaps: Limited resources (financial, infrastructural, or logistical) pose challenges to training providers and job seekers.

Regional Training Assessment

The Inland Empire is home to a rapidly growing demand for skilled energy workers driven by the increased opportunities for energy occupations across key industries such as clean energy, construction, HVAC, and electrical. As the region shifts toward energy efficiency projects and clean energy technologies, the need for an adequately trained workforce has become even more critical. Local educational institutions, workforce development organizations, and employers collaborate to create pathways for workers into these high-demand fields. However, despite the expansion of training programs,

programs have not fully met the evolving needs of the energy industry and are not accessible enough to diverse populations.

This section assesses the availability of workforce training programs in Riverside and San Bernardino counties, focusing on aligning training content with the specific needs of local employers in the energy sector. It explores key factors such as the types of training offered, delivery methods, geographic accessibility, and equity considerations for underserved populations. Additionally, it identifies gaps in existing training offerings and examines barriers that workers face in accessing these programs, including challenges related to geographic location, cost, and lack of awareness.

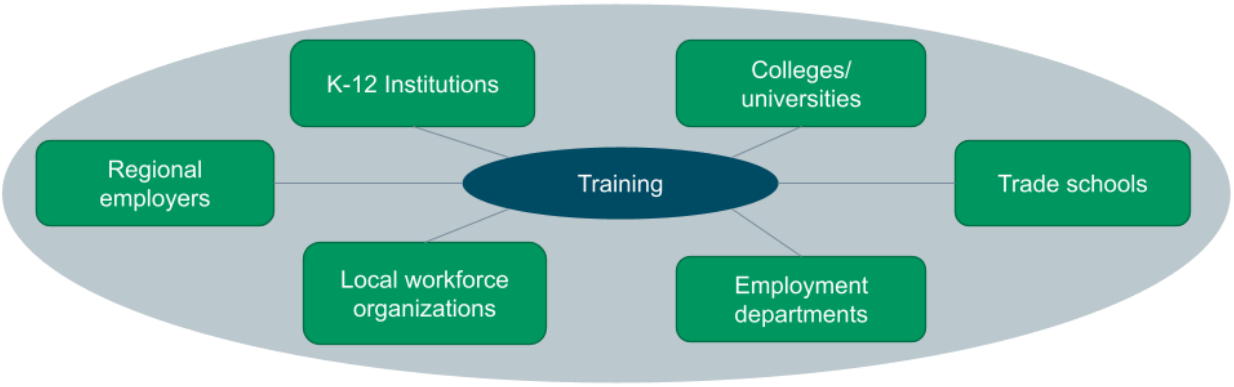
Regional Training Providers and Stakeholders

SECTION SUMMARY

- Collaboration between local stakeholders, including educational institutions, colleges, universities, K-12 schools, trade schools, workforce development agencies, community organizations, labor unions, and employers is essential.
- We identified over 100 training providers in Riverside and San Bernardino counties offering 360 energy-related training opportunities. Colleges, universities, and K-12 institutions provide nearly half of these training opportunities, emphasizing their key role in developing the energy workforce.

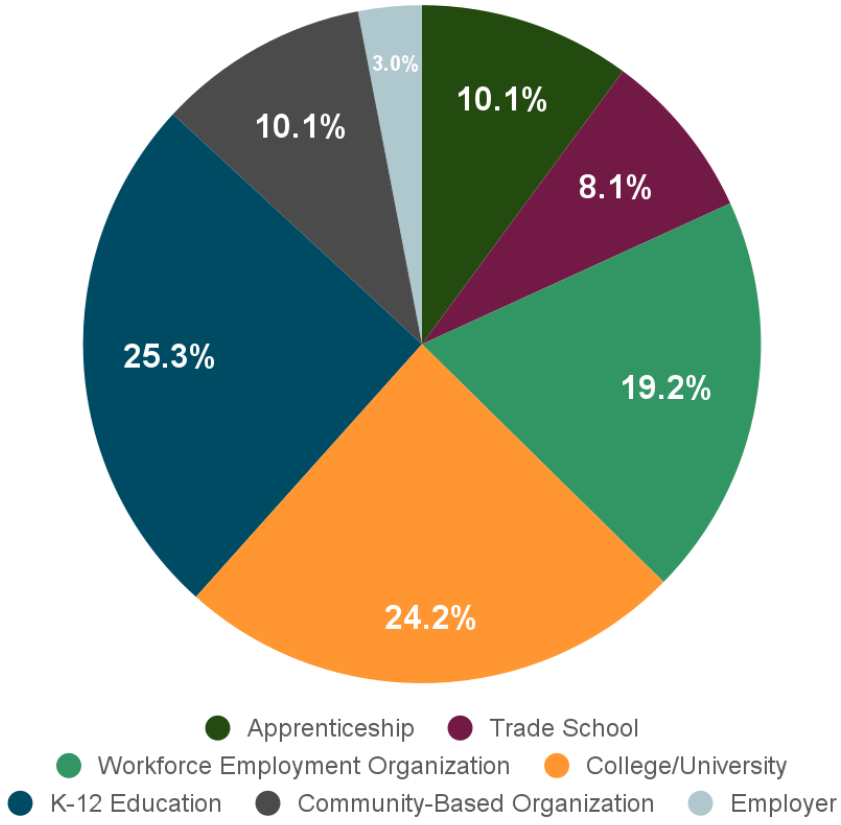
Riverside and San Bernardino counties contain a diverse and growing network of reputable educational institutions and community-based organizations committed to training the region's existing and incoming workforce. As the energy sector in the Inland Empire expands, it is critical that the region continues to build and strengthen its workforce development and training infrastructure. Continued expansion of the energy sector calls for enhanced collaboration between local stakeholders, including educational institutions, colleges, universities, K-12 schools, trade schools, workforce development agencies, community organizations, labor unions, and employers. These stakeholders can close workforce readiness gaps and improve existing training pathways, ensuring the region's workforce development ecosystem is prepared for traditional energy efficiency and emerging energy-related roles.

Figure 15: Regional stakeholders offering training resources and programming to support the workforce



To understand the available training offerings, data from various local and state databases were gathered to create a comprehensive list of over 100 training providers in Riverside and San Bernardino counties. These providers offer 360 training opportunities across multiple energy industries. Notably, nearly half of these opportunities are provided by educational institutions such as colleges and universities and K-12 institutions, highlighting the critical role formal education institutions play in shaping the energy workforce (Figure 16).

Figure 16: Training providers identified in the region by institution type



Key Training Stakeholders

SECTION SUMMARY

- Colleges and universities can collaborate with local energy companies to offer apprenticeships, hands-on experience, and industry-recognized credentials. However, to meet the evolving workforce needs in the energy sector, curricula must be updated to align with emerging technologies like electric vehicles and smart grids, and access and offerings in underserved communities must be expanded.
- K-12 institutions provide STEM education and offer Career Technical Education (CTE) programs to prepare students for careers in the energy sector. While many schools offer exposure to energy-related fields through specialized programs and internships, only 39 energy-related training pathways exist within local K-12 schools, with few integrated into CTE programs.
- Apprenticeship programs and trade schools prepare the Inland Empire workforce for skilled trades in electrical work, construction, HVAC, solar installation, and clean energy technologies. Challenges include geographic accessibility, high training costs, and a need

for more substantial alignment with regional workforce needs.

- Workforce development organizations and local employers play a key role in building a skilled energy sector workforce by providing on-the-job training, career services, and specialized programs in high-demand occupations, and existing programs provide value opportunities to energy-related workforce development.

Colleges and Universities

Riverside and San Bernardino counties host several well-regarded colleges and universities. These institutions offer academic programs aligned with local energy sector needs, providing clear pathways to careers in both traditional energy efficiency and emerging energy fields. Local universities offer degrees in environmental sciences, engineering, and energy systems. Local community colleges provide certifications and associate degrees in clean energy and technical trades, such as HVAC, electrician technician training, and solar energy installation. See Appendix A for a full list of regional educational institutions and their relevant training offerings.

Many colleges collaborate with local energy companies, unions, and workforce organizations to offer apprenticeships in clean energy, electrical work, and grid maintenance. These partnerships provide students with hands-on experience and industry-recognized credentials, increasing their employability. Additionally, regional institutions lead research in clean energy technologies, driving innovation and ensuring academic programs remain aligned with industry advancements.

Despite these strengths, challenges persist. Educational programs must adapt to technological advancements like electric vehicles and smart grids, which require investment in curriculum development, faculty training, and infrastructure. Many colleges serve underserved, low-income, and minority communities, where students need scholarships, mentorship, and training support to enhance equitable access to energy careers.

Of the 24 higher education institutions in the region, 21 offer at least one energy-related training pathway, indicating a strong commitment to workforce development. See Appendix A for a full list of regional institutions and their relevant training offerings. However, expansion in emerging energy fields and more equitable access to these programs are needed to meet the evolving needs of the energy sector and ensure a skilled, diverse workforce in the Inland Empire.

K-12 Educational Institutions

K-12 educational institutions are a critical part of the region's educational ecosystem, laying the foundation for future careers by providing students with essential knowledge and skills. K-12 schools are increasingly emphasizing STEM—science, technology, engineering, and math—education that is integral to careers in the energy sector. Through specialized programs, internships, and industry partnerships, K-12 schools expose students to energy careers and provide a glimpse into pathways in the energy industry. This early exposure builds a pipeline of future workers and raises awareness about the opportunities within the energy workforce.

K-12 schools, particularly middle and high schools, often offer Career Technical Education (CTE) programs that allow students to explore potential career paths. CTE pathways blend theoretical and applied knowledge, preparing students for direct entry into the workforce or further education. California has 15 CTE industry sectors. CTE pathways typically reflect the state's workforce needs, but a similar approach should be applied regionally. CTE offerings in California are typically focused on health science, information technology, and engineering. With the Inland region's growing energy industry and emphasis on sustainability, it should develop energy-related CTE pathways to encourage students to pursue energy-related careers.

While Riverside and San Bernardino school districts offer a variety of CTE pathways, only a small number focus on energy-specific fields. Across both counties, only 39 energy-related training pathways are available within K-12 institutions, with only a few incorporated into CTE programs. For a full list of K-12 educational institutions offering energy-related training, see Appendix A. Expanding these programs and introducing new energy-focused pathways will better prepare students for careers in clean energy, infrastructure, and sustainable development and better equip them with the foundational and technical knowledge needed for energy-related professions.

CTE aligns education with regional workforce needs and creates opportunities for students to enter high-demand industries like the energy sector.

Apprenticeship Training and Trade Schools

Apprenticeship programs and trade schools are integral to workforce development in the Inland Empire. They provide hands-on training and classroom instruction that equips individuals with the skills and experience for skilled trades such as electrical work, construction, HVAC, solar installation, manufacturing, and clean energy technologies. Apprentices work under the guidance of experienced professionals while attending local technical schools, community colleges, or training centers to

complement their learning. Upon completion, they earn industry-recognized credentials or certifications, ensuring they are workforce-ready.

Trade schools offer specialized training aligned with industry standards, preparing students to meet the demands of the energy sector and helping to prepare the region's workforce to support its evolving energy needs.

Despite the benefits of apprenticeships and trade schools, several challenges remain. These programs must better align with regional workforce needs and remove barriers for prospective trainees, such as geographic accessibility and the high cost of training. Building stronger collaboration between industry partners, including local energy companies, is critical to ensure that apprenticeship programs are responsive to employers' skill requirements. Additionally, apprenticeship programs should incorporate more soft skills training—such as communication, teamwork, and job readiness—to meet the soft skills gap identified by regional employers.

While apprenticeships provide a valuable pathway to skilled employment, the average 2-4 years of training they require can be a financial challenge for some job seekers. Furthermore, apprenticeship centers are concentrated in the most populous areas of Riverside and San Bernardino counties, limiting access for individuals in more rural or underserved communities (see Figure 21 in the regional energy map section). Expanding access to apprenticeship opportunities in these regions and improving affordability will be essential to building a stronger career pipeline in the energy sector.

Workforce Development Organizations and Local Employers

Workforce development organizations and local employers are pivotal in addressing job seekers' needs and supporting their career growth. Workforce development organizations provide on-the-job training, educational opportunities, and hands-on experience in high-demand fields such as HVAC, electric vehicles, and solar energy. Many also offer career services, job placement assistance, and professional development resources, helping workers build the skills for long-term success in the energy sector. Local employers offer on-the-job training that enables new and existing employees to gain the skills and knowledge required for their positions. This model benefits both employers—by ensuring a skilled, ready workforce—and employees who gain valuable experience to meet industry demands. Approximately 40% of employers surveyed offer some form of training to employees. Employers understand which skills are necessary for their employees, so they are well-equipped to address skill gaps. Some employers offer support services to assist employees with obtaining certifications.

Workforce, Education, and Training (WE&T) programs, funded through ratepayer funds and offered by Portfolio Administrators, advance energy efficiency initiatives and shape career pathways in the state and regional energy sectors. These programs provide specialized skills for energy-efficient construction, retrofitting, and energy-saving technologies. Many programs include no-cost resources for underserved communities. WE&T programs help increase training accessibility in hard-to-reach areas, filling gaps where larger training providers may lack the capacity or reach (see Appendix C for a full list of offerings).

Some of the programs available in the region include the statewide Energy is Everything program, administered by investor-owned utilities (IOUs) and the ACES program, administered by the Southern California Regional Energy Network (SoCalREN). Both Energy is Everything and the ACES program engage K-12 students to learn essential energy skills and provide hands-on energy careers guidance and pathways. These education initiatives are built to provide resources to underserved communities and offer no-cost programming with Spanish offerings to reach a larger audience. Additionally, the statewide IOU-administered Energized Careers (partnered with Inland Empire Electrical Training Center) and the SoCalREN-administered Green Path Careers program provide training and job placement for disadvantaged workers. These programs provide youth and emerging professionals with hands-on experience in green energy jobs, support contractors entering the energy efficiency sector, and offer mentorship and resources to enhance industry engagement. These programs prepare individuals for the growing clean energy sector, focusing on accessibility, skills development, and sustainable job opportunities.

There is a concerted effort from workforce organizations in the region to shift away from reliance on lower-wage industries and create sustainable, high-quality jobs within the green sector. Workforce organizations and local employers are working together to offer training tailored to industry needs, with a growing emphasis on clean energy and infrastructure careers. These programs respond to increasing demand for green energy jobs and support the transition to sustainable energy solutions. However, the programs could improve by connecting workforce organizations with local employers to create training pathways that align with industry requirements.

Key Training Implementers

Energy-related training comes from a wide range of institutions and workforce organizations. A few key institutions stand out for their leadership, impact, and vision:

- Riverside Community College District (RCCD) is a prominent training entity offering workforce development programs in clean energy, energy efficiency,

and construction trades. RCCD is part of the broader California Community Colleges system, which serves as an essential resource for equipping workers with the skills needed for high-demand energy jobs.

- San Bernardino County and the San Bernardino Community College District (SBCCD) provide specialized training programs that support careers in energy systems, HVAC, and electrical trades. These programs are available across several campuses and contribute to meeting the growing demand for skilled workers in energy efficiency and emerging clean energy industries.
- GRID Alternatives Inland Empire, a leading community-based organization, runs the Clean Tech Training Center (CTTC) in Riverside. The CTTC offers hands-on training in solar energy installation, electric vehicle service, and battery energy storage. Notably, GRID Alternatives prioritizes equitable access to training, focusing on disadvantaged communities and providing no-cost training.
- Inland Empire/Desert Regional Consortium connects K-12 and community colleges with programs tailored to meet the growing demand for careers in energy and infrastructure.
- Inland Empire Labor Institute (IELI) leads the PlugIn IE initiative, focusing on union-led training programs in energy and water infrastructure and zero-emission transportation. The primary goal of the training programs is to provide equitable access to green jobs and support the state's climate adaptation needs.

Training Gaps and Opportunities

SECTION SUMMARY

- Most available training programs focus on technical and foundational skills within the existing energy sector; the most common programs are in technical trades such as welding, electrical work, construction, and HVAC.
- The most common training pathways in the region are general training courses covering foundational and specialized energy-related skills, followed by certifications and apprenticeship programs.
- There are gaps in advanced clean energy training, particularly in clean energy technology, energy storage systems, innovative grid technologies, and electric vehicle infrastructure; additional training in energy auditing, green building standards, and emerging technologies like hydrogen and geothermal systems is needed to meet growing skill demands in the clean energy sector.

While local institutions are expanding their training offerings to meet industry and employer needs, significant gaps remain in energy-related training across the Inland Empire. Local entities must identify missing offerings and assess which programs must be developed to meet evolving industry demands. Currently, most available training programs focus on technical and foundational skills within the existing energy sector. Figure 17 provides a breakdown of available training by industry, showing that the most common programs are in technical trades such as welding, electrical work, construction, and HVAC. Limited opportunities exist to explore career pathways and required skills in emerging fields. As the region navigates the transition to a more sustainable energy future, training programs should reflect the job opportunities available in these emerging sectors.

Although there is a high demand for workers in the skilled and technical trades, training for emerging fields is essential to building an energy workforce with skills and training needed for all energy-related fields. There is a shortage of training options in emerging and expanding fields like clean energy, architecture/design, and mechanical engineering, which are critical to meeting the growing needs of the energy sector.

Figure 17: Count of training pathways available in the region by subject matter

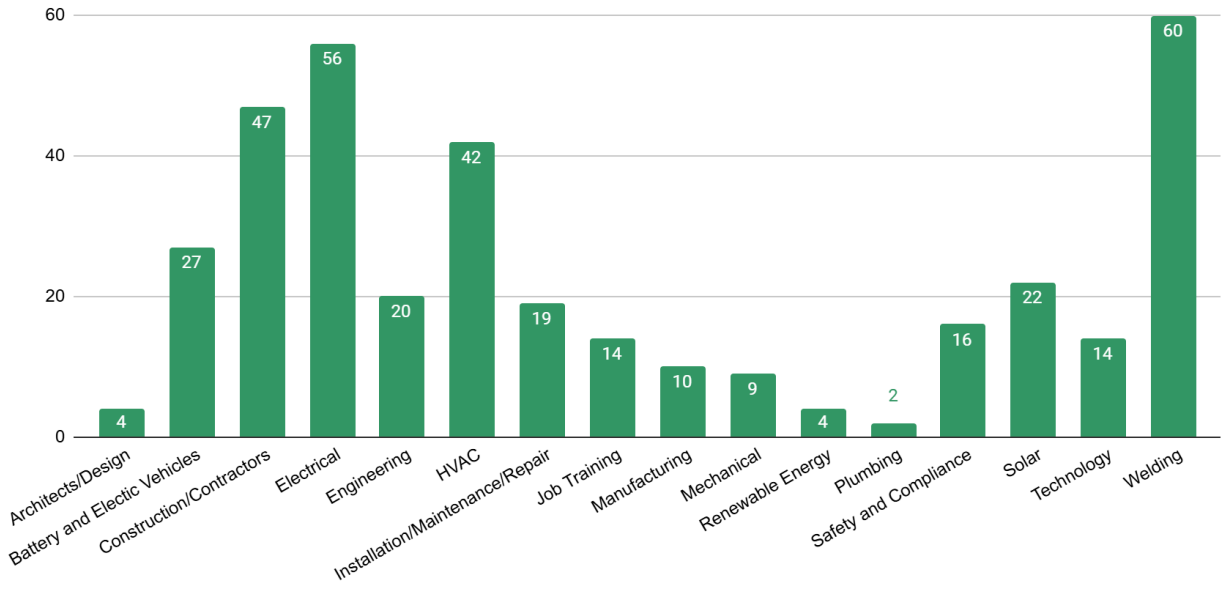
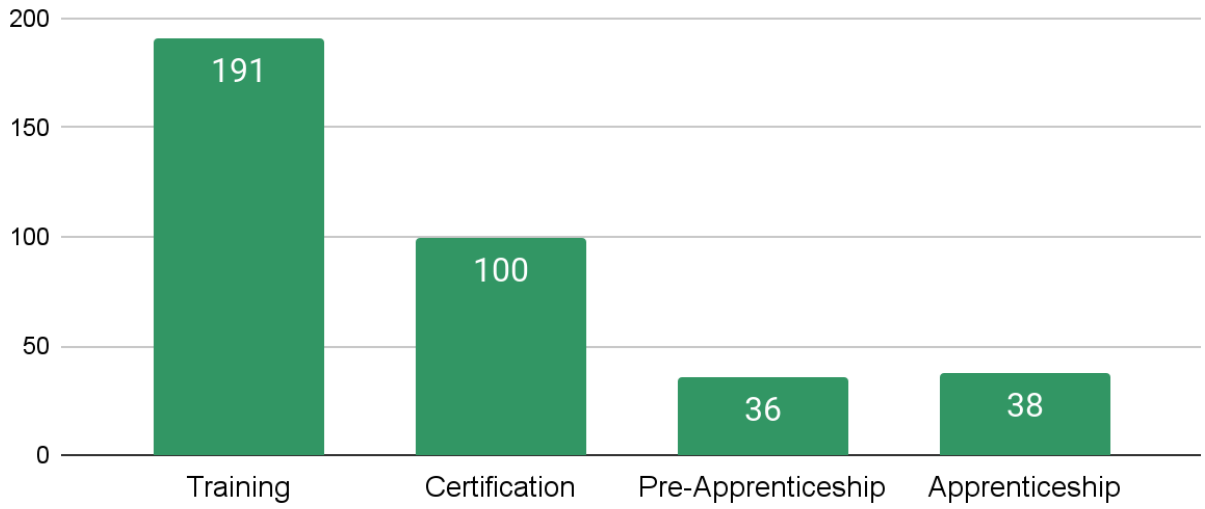


Figure 18 provides an overview of training pathways within the region. It shows that general training, such as courses on energy-related topics or hands-on skills, is the most common pathway offered in the area, followed by certifications and apprenticeship programs. General training covers foundational skills and specialized

knowledge that prepare individuals for a wide range of roles within the energy sector. Through general training, individuals can learn technical and practical skills to apply to their roles and meet transferrable skill demands preferred by employers. This data aligns with feedback from the energy employer survey, which disclosed that the minimum education level required is typically a high school diploma or relevant experience, which is usually preferred when reviewing and selecting job applicants. Although some employers request certifications or higher education, most require training or experience in basic technical skills. General training that introduces core concepts and prepares energy workers to fulfill their specific job duties is most available within the region as it is sufficient for most energy-related roles, as seen in *Table 3: Occupations' education requirements and on the job training availability* (reference page 25), where a high school diploma or equivalent is the entry-level education requirement. Typically, employers provide on-the-job training to support employee upskilling.

Figure 18: Count of training available in the region by training type



Gaps in Training Related to Clean Energy Systems

Currently, available training offerings focus primarily on skilled trades in clean energy and traditional trade careers. However, there are limited options in advanced clean energy training, such as solar and wind technology. Current offerings cover basic installation, but advanced training on system design, troubleshooting, and large-scale clean energy is scarce. Training on emerging electrification efforts, such as battery storage and smart grid technologies is also scarce but will be necessary to meet skill demands within the clean energy space. New training could focus on energy storage

systems and integration into modern grid infrastructure, which will be important as clean energy systems expand.

Opportunities for Energy Efficiency Extension Through Transportation Electrification

As transportation electrification becomes more prominent in the region, electric vehicle infrastructure will require specialized knowledge and skills related to EV chargers and power systems. As EV chargers become more common, training employees on installing and maintaining EV charging stations and high-voltage safety and diagnostics will be essential.

Opportunities to Increase Energy Efficiency and Auditing

Buildings and residences have high energy demand and will need to increase energy efficiency to reduce grid strain and energy costs as regional energy demand increases.Training programs must provide employees with the necessary skills to assess energy usage and recommend cost-effective improvements for commercial and residential buildings. Moreover, green building standards and Leadership in Energy and Environmental Design (LEED) training can provide employees with a comprehensive education on green construction practices. Building usage and energy auditing should be incorporated into local training pathways, especially within clean energy technologies or construction industries. There are currently no professional firms that provide auditing services located in the Coachella Valley; green building employer services must expand to fulfill the energy sector's anticipated needs.

Emerging Technologies

Though training pathways within prominent clean energy industries such as solar and wind are available throughout the region, training in emerging technologies is limited. Energy generation using hydrogen or geothermal systems is becoming more available. Still, employees in the trades will need specialized instruction to handle and apply the new technologies, which must be included in performing these roles correctly. As employees transition to new roles from traditional fossil fuel jobs, cross-training from one role to a new role is an underdeveloped area and will need to be added as energy infrastructure changes.

Table 5: Growing careers within the clean energy sector and anticipated duties[16]

Industry	Job Title	Anticipated Duties
Clean Energy Development	Solar photovoltaic (PV) installers	Installing and maintaining solar panels for residential, commercial, and industrial purposes
	Wind turbine technicians	Servicing and repairing wind turbines
	Hydroelectric plant operators	Managing small-scale hydroelectric systems
Energy Storage and Grid Modernization	Battery engineers and technicians	Developing and maintaining energy storage systems
	Smart grid specialists	Designing and managing advanced electrical grids
	Energy systems analysts	Analyzing and optimizing energy systems to ensure efficiency and reliability
Sustainable Construction and Building Retrofits	Green building designers	Specializing in design practices, prioritizing the use of sustainable materials and techniques
	Energy auditors	Evaluating energy efficiency in buildings and providing recommendations for improvements
	LEED specialists	Overseeing and certifying that construction projects meet energy efficiency and environmental standards
Electrification and Transportation	EV technicians	Maintaining and repairing electric cars, buses, and trucks
	Charging infrastructure specialists	Planning, installing, and maintaining EV charging networks
	Engineers	Advancing technological developments for changing energy infrastructure

[16] Department of Energy, United States Energy & Employment Report 2024 and University of Pennsylvania, Powering the future: explore the rise of clean energy jobs.

Training Modalities

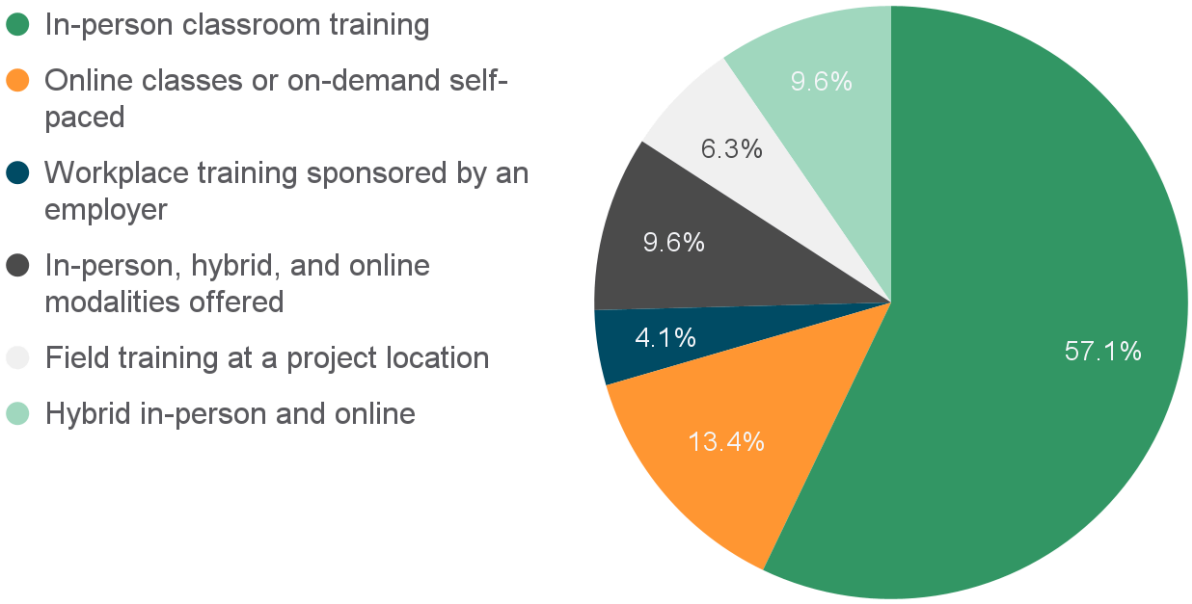
SECTION SUMMARY

- 57% of regional energy sector training is delivered through in-person classroom instruction, which presents barriers related to travel, time commitment, and costs, particularly for workers in rural or underserved areas.
- 10-13% of regional training is offered through online or on-demand self-paced courses, which provide flexibility but may need more hands-on experience and face access issues due to limited technology.

In Riverside and San Bernardino counties, 57% of available energy sector training is delivered through in-person classroom instruction (Figure 19). While this traditional format allows for direct interaction between instructors and students, it also presents several barriers to accessibility. In-person training requires participants to travel to designated training centers, which can be challenging for workers in rural or underserved areas where training facilities may be limited or far from their homes. Additionally, the time commitment involved in attending in-person classes can be difficult for workers who need to balance training with other responsibilities, such as family or work obligations. The costs associated with attending in-person training, including travel expenses, can further limit access, especially for low-income workers.

Alternative modalities like online or on-demand, self-paced courses represent only 13% of the available offerings. These options provide greater flexibility for workers who cannot commit to fixed schedules or travel long distances, but they may lack the hands-on experience needed for technical roles. Furthermore, many workers have limited access to technology or reliable internet, making online training less accessible. Hybrid models, which combine in-person and online elements, offer a promising solution, but they currently represent only 10% of the region's available training programs.

Figure 19: Percentage of training modalities identified



I-REN Regional Equity, Employer, and Training Map

SECTION SUMMARY

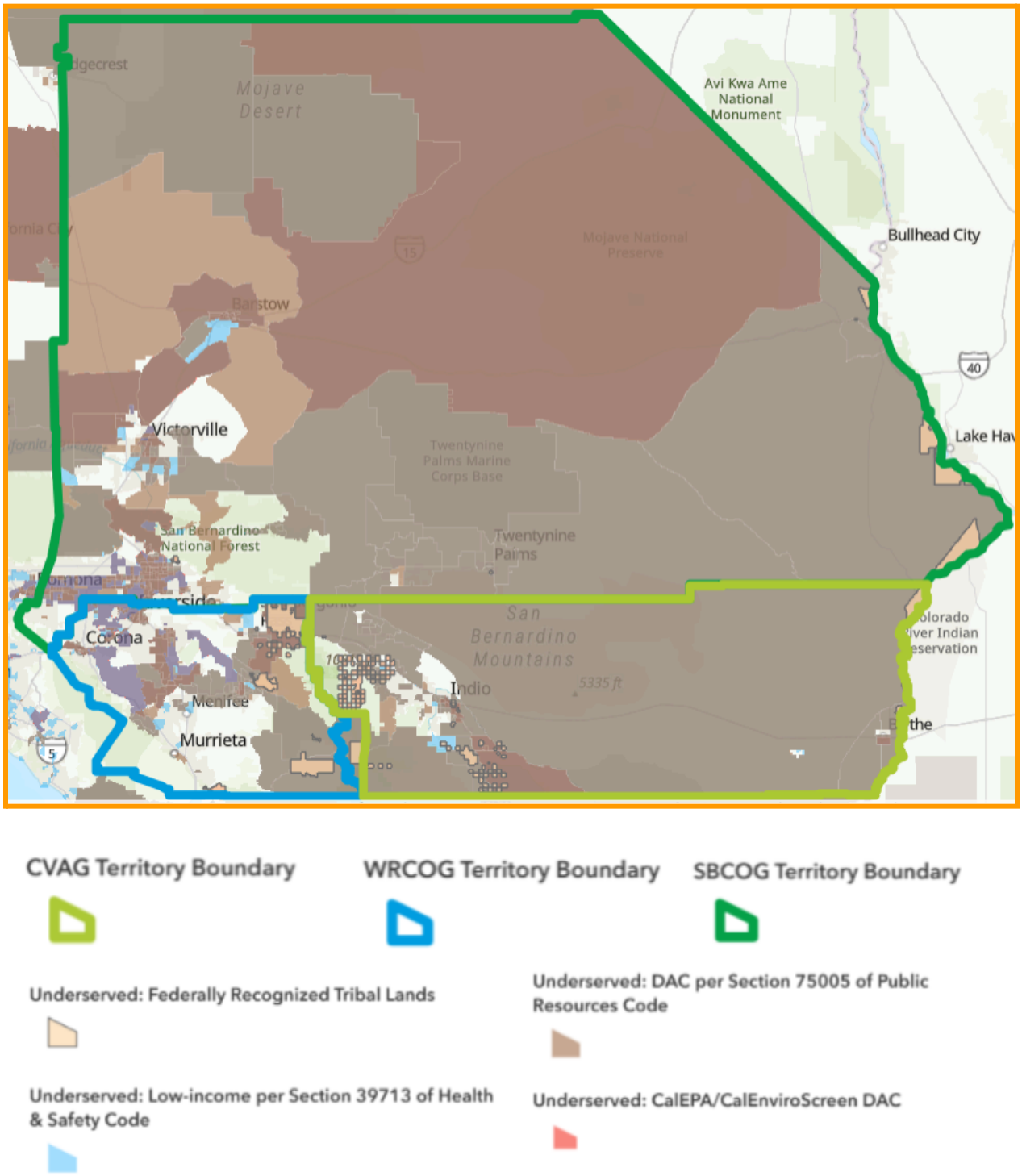
- A regional equity map helps to identify underserved communities and integrate equity demographics into program planning, ensuring expanded programming reach to these areas.
- The equity map is enhanced with an employer heat map showing the distribution of energy employers across the Inland Empire. This map reveals that areas like the high and low deserts have limited energy employment opportunities.
- The locations of training providers show that colleges and universities have the broadest reach, including rural areas, while the rest of the training is concentrated in urban hubs.

I-REN serves the workforce of Riverside and San Bernardino counties by providing community members access to relevant training and employment resources. I-REN developed a regional equity map[17] highlighting regional equity data, such as disadvantaged communities in the I-REN service territory with the integration of equity demographics into program planning, organizations like I-REN can gain a deeper understanding of the region's population and socioeconomic conditions and identify

[17]Regional Equity Map, https://www.iren.gov/177/Regional-Equity-Maps

gaps in access to critical resources. The information in the map is essential data to expand programming reach to disadvantaged communities within Riverside and San Bernardino counties.

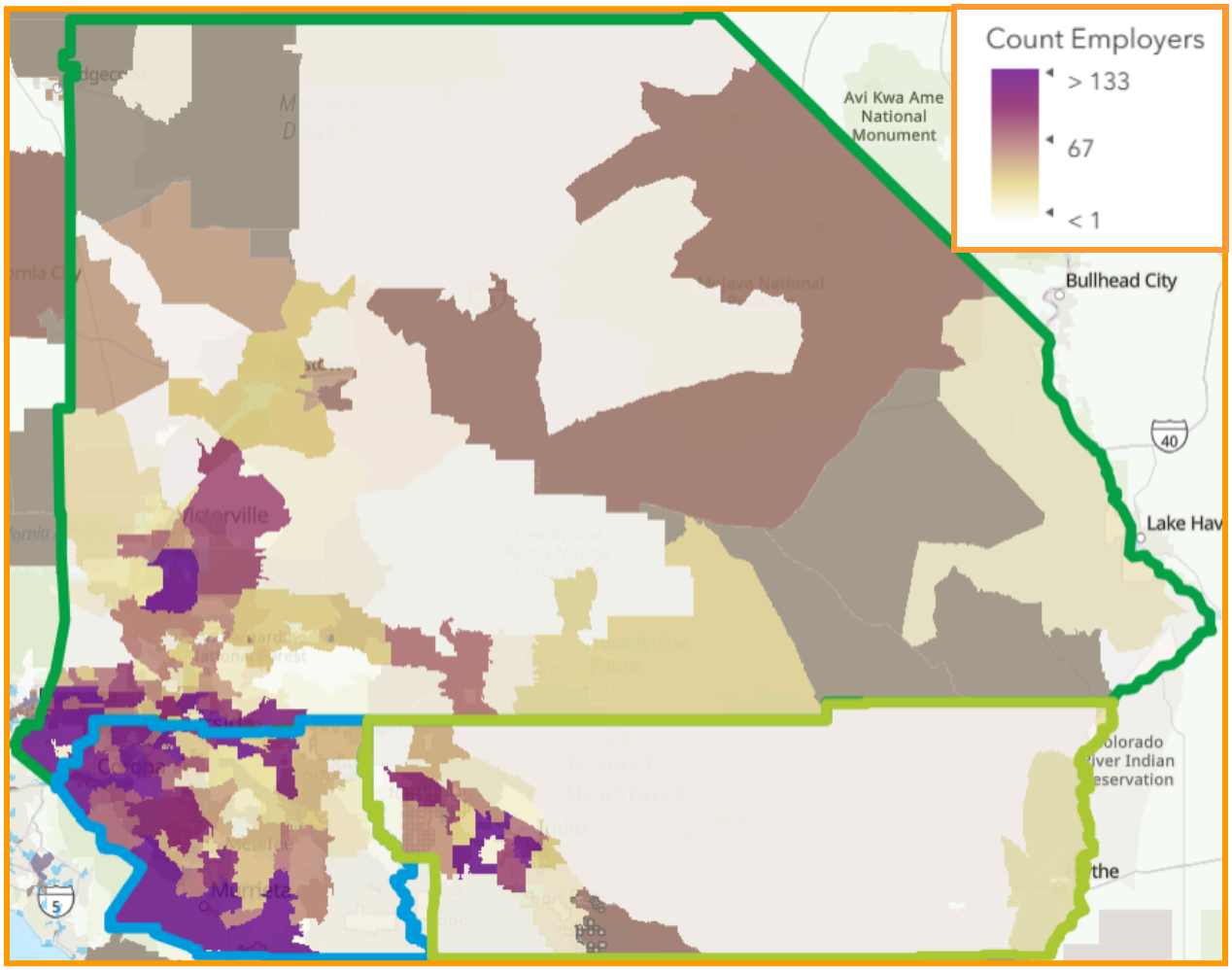
Figure 20: I-REN equity map before adding employer and training data



I-REN's regional equity map has revealed significant gaps within the Inland Empire region caused by the underrepresentation of minorities, women, and other marginalized groups in energy-related jobs. Additionally, rural and low-income communities across the Inland Empire face barriers to accessing training resources. To enhance the regional equity map, I-REN has integrated additional components using employer and training data on where job opportunities and training accessibility are limited in the region.

Employer Heat Map: The regional equity map now features a heat map that illustrates the distribution of energy employers by zip code and the total number of employers within each area. Users can interact with the map by clicking on individual employers to view detailed information, including company size and industry focus. In Figure 21 below, areas highlighted in a purple gradient indicate a higher concentration of employers. The lighter tan shade displays the low empower areas. Based on this map, it is clear that areas within the high and low deserts have low energy employment opportunities.

Figure 21: I-REN regional equity map and energy-related employer heat map

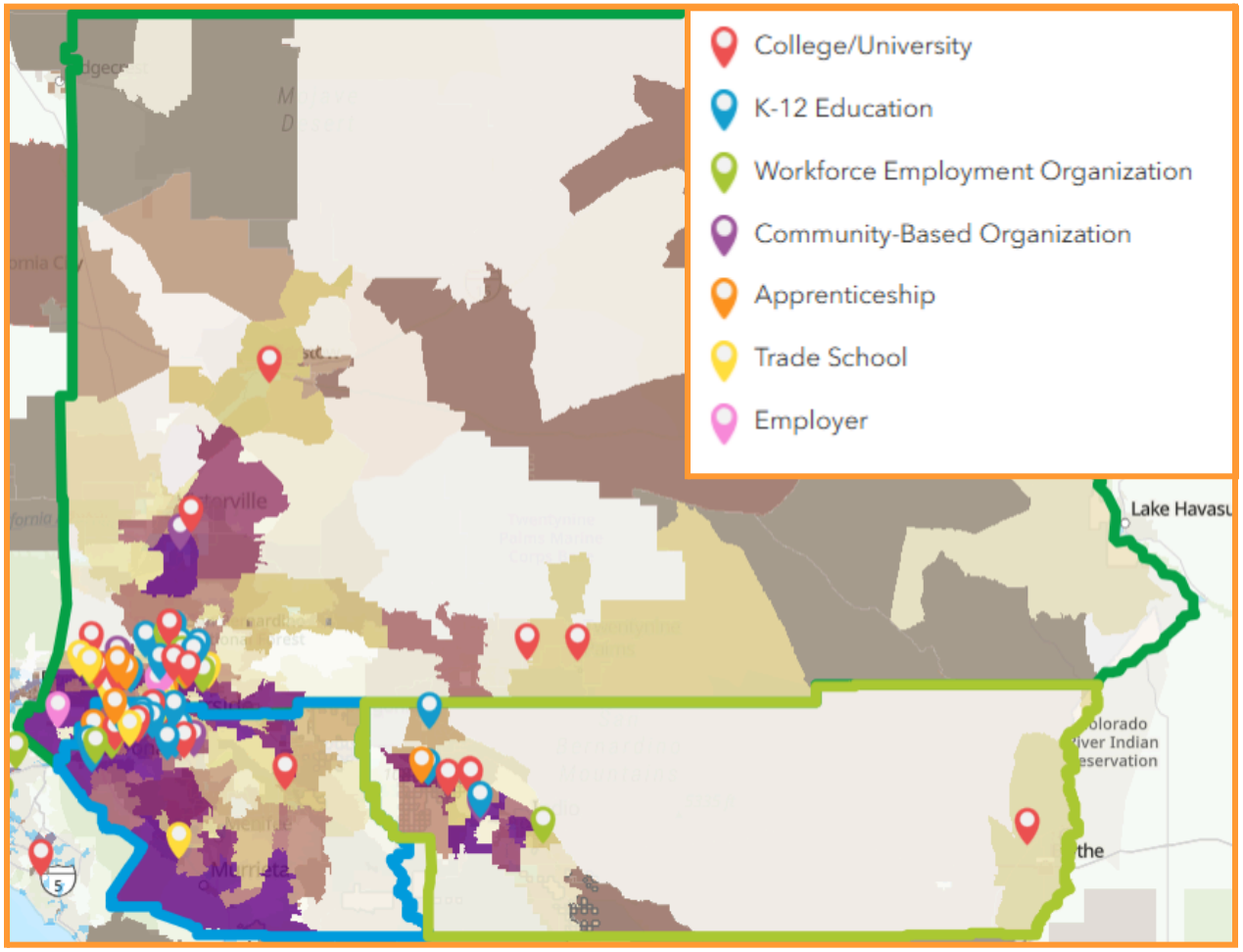


Training Provider Pinpoints: The map includes visual markers (pinpoints) indicating the locations of training providers, color-coded by the industry. By clicking on these pinpoints, users can access a list of available training programs and detailed information on each program, such as Training topics offered, locations of training providers, available incentives, program costs, and time commitment.

Training institutions are concentrated in major cities and populated regions. Colleges and universities have the most significant reach, with locations in both counties and harder-to-reach areas. This map aligns with our compiled data, showing that most training institutions are concentrated in the most populated areas. The geographic mapping indicates that colleges and universities (the red pinpoint) have the largest geographical spread in the region, thus providing opportunities for more rural communities to access energy-related training opportunities. K-12 institutions also offer many programs, but these training offerings are limited to school districts and sites' reach and are primarily concentrated in the urban hubs. The blue pinpoints in Figure 22

demonstrate that energy-related training programs are available in school districts with high job availability and major cities within the Inland Empire.

Figure 22: Updated I-REN regional equity map with an employer heat map and training provider pinpoints



Conclusion and Recommendations

The Inland Empire is developing into a hub for the energy industry, and is projected to gain thousands of quality jobs over the next decade and beyond. To ensure local employers and job seekers can successfully build a skilled workforce, the region will need a comprehensive approach that addresses the challenges faced by employers and job seekers, leverages strategic partnerships, and incorporates education and resources tailored to the region's unique economic needs. This regional analysis and recommendations section offers recommendations to enhance and expand training programs to develop a skilled energy workforce that meets both industry standards and the evolving needs of the region.

Employer Recruitment and Retention of Skilled Workers

SECTION SUMMARY

- The Inland Empire's energy sector faces competition from retail, healthcare, manufacturing, and logistics industries. Still, energy-related occupations offer more stability due to consistent demand driven by population growth and the transition to clean energy.
- Energy-related jobs in the region are expected to grow by 20% between 2020 and 2030, with over 167,000 job openings anticipated due to retirements and transfers. These jobs require job seekers to have the necessary training, certifications, and skills.
- Employers should communicate job requirements, certifications, and training opportunities to help job seekers prepare for careers in the energy sector, ensuring long-term retention and sector stability.

The Inland Empire's energy sector must compete with other key regional industries, including retail, healthcare, manufacturing, and education. While logistics and transportation have historically been major drivers of local employment, recent downturns in these sectors—due to reduced freight volumes and slowed supply chains—have created instability. These industries are also under pressure from increasing environmental regulations.

In contrast, energy-related occupations offer stability. Energy jobs are essential and less susceptible to market fluctuations, with demand driven by population growth and the global transition to clean energy. Additionally, sectors like transportation, construction, and manufacturing will increasingly integrate electrification, further boosting energy job demand. The energy industry employs over 8 million professionals across the United States; California has approximately 956,400 residents in energy-related roles. Within the Inland Empire, high-demand energy occupations are projected to increase by 20% on average between 2020-2030. Energy-related occupations are expected to see a wave of retirement or transfers, which is anticipated to provide over 167,000 job openings in the region.[18]

To successfully fill these open positions, job seekers must have the necessary training, certifications, and skills to meet employer preferences and requirements. Ensure job seekers understand the certifications, licenses, and training required for their roles, which is crucial for setting clear expectations. By providing clear job descriptions and certification requirements during the hiring process, employers can equip potential

[18] Data from the Bureau of Labor Statistics' Employment Projections by Occupation 2020-2030 Riverside-San Bernardino-Ontario, CA Metro Area

employees to plan their career paths and understand what is expected of them. Employers should maintain open lines of communication and regularly update employees on any changes to certification requirements or new training opportunities. This proactive approach can support retention efforts by ensuring that workers feel well-prepared for their roles and are motivated to stay in a sector that offers long-term stability and growth.

Recruitment and Induction Energy-Related Career Pathways

SECTION SUMMARY

- Employers in the energy sector must improve recruitment strategies by educating local communities about energy careers, emphasizing job security, competitive pay, and moderate training requirements to attract local talent.
- To attract younger workers, employers should clearly define job roles, required certifications, and accessible training programs, highlighting the diversity of opportunities in traditional and emerging energy roles.
- Early exposure to energy careers through hands-on experiences, mentoring, and integrating energy topics into STEM curricula can increase youth interest in these jobs, especially if they align with values such as combating climate change and sustainability.

As the energy workforce expands and new roles emerge, employers should reevaluate their recruitment strategies to attract local talent. Survey results highlight that many job seekers are increasingly looking to other industries or regions due to a lack of awareness about the energy sector's opportunities and skill requirements. This underscores the need to better educate local communities about energy careers and their benefits, such as job security, moderate training requirements, and competitive pay.

To attract younger workers to energy jobs, employers should clearly define available roles and outline the necessary qualifications, including certifications and training. Survey feedback indicates employers find it challenging to recruit and hire for their open positions because many potential applicants lack the skills or certifications needed for energy positions. This skill gap often deters employers from successfully recruiting applicants to fill their roles. A comprehensive recruitment strategy emphasizing job awareness, accessible training programs, and clear certification pathways will help build a strong talent pipeline. It is important to highlight the diversity of roles within the energy sector, ranging from traditional positions like electricians to modern roles like smart grid specialists.

Early education often directs students toward careers that require advanced degrees, leaving many unaware of the opportunities in skilled trades. In the Inland Empire, 38% of the workforce is in blue-collar jobs[19], but energy careers provide a broad spectrum of opportunities at various skill and education levels. Exposing younger generations to energy-related careers through hands-on experiences and mentoring can increase interest in the industry. Incorporating energy topics into STEM curricula can boost engagement and interest in clean energy, energy efficiency, and technology careers.

Based on conversations with regional stakeholders (Appendix D), there is a perception that younger generations are motivated by careers contributing to larger initiatives like combating climate change. Although regional stakeholders are concerned that younger generations lack an interest in the skilled trades, studies show that Generation Z is enrolling in vocational-focused community college programs more than in previous years.[20] By emphasizing the importance of transitioning to cleaner energy sources and reducing emissions, training entities can inspire youth to pursue energy roles that align with their values, provide high-quality careers, and address local and industry-wide needs.

Employee Retention Strategies

SECTION SUMMARY

- Employers that focus on offering competitive wages, comprehensive benefits, and bonuses to retain top talent in the energy sector. Many employees seek long-term stability and advancement opportunities.
- Clear pathways for internal promotion and opportunities for upskilling and reskilling, particularly in emerging technologies, help improve employee retention by fostering career growth.
- Providing tuition reimbursement, financial support for certifications, and increasing online or remote training access can reduce financial barriers and enhance employees' professional development.
- Partnering with local workforce organizations, offering transportation support, and providing flexible or hybrid work options can improve recruitment and retention by addressing regional and personal challenges.

Employers should prioritize retention strategies to establish a stable and sustainable energy workforce. Most job seekers prefer long-term employment. The energy sector's

[19] https://properties.zoomprospector.com/california/community/Inland-Empire-CA-/r1698/profile#
[20] https://www.nasrcc.org/the-wall-street-journal-how-gen-z-is-becoming-the-toolbelt-generation/

consistent demand positions it as a stable career option, particularly with the growing need for skilled workers in the energy sector. Based on the employer survey, employers indicated they struggled with employee retention primarily due to economic factors, such as pursuing other opportunities with better benefits, pay, or career advancement. The survey also showed that employers found it challenging to offer competitive wages and benefits and often had to hire based on what they could afford to pay. Below are suggested strategies that could address these issues and support employee retention:

- Competitive Wages: While energy roles typically offer fair wages, aligning compensation with industry standards ensures that top talent remains with the organization. Competitive pay is key to long-term retention.
- Comprehensive Benefits: Attractive benefits are crucial for job seekers, as many rely on their employer to provide essential resources such as healthcare and child care. Strong retirement plans and paid time off further promote long-term personal and financial well-being.
- Bonuses and Incentives: Job seekers are more likely to be drawn to positions offering sign-on bonuses and performance-based incentives, which add immediate value to employment offers.

Energy careers often provide clear pathways for advancement, essential for employee retention. Most workers begin in entry-level positions but can quickly progress to higher-paying roles once they obtain the necessary certifications and training.

- Internal Promotion: Employees are more likely to stay with a company if they see opportunities for growth within the organization. Clear paths for internal promotion enhance motivation and loyalty.
- Upskilling and Reskilling: Offering training in emerging technologies allows employees to develop new skills and advance their careers, improving retention by supporting their professional growth.
- Tuition Reimbursement: Financial support for education and certifications makes a significant difference in career advancement, especially for lower-income employees who may find high training costs prohibitive.
- Greater Access to Training: Online learning platforms can significantly increase access to training, particularly when local training options are limited. Employers should consider providing or sponsoring remote courses paired with financial support, such as scholarships or discounts, to reduce financial barriers to participation.

Employers can adapt hiring practices to attract local talent and meet regional workforce needs.

- Local Collaboration: Partnering with local workforce and job boards can align recruitment with regional labor needs.
- Transportation Support: Offering travel stipends or transportation assistance helps address commuting challenges, particularly for job seekers in rural or underserved areas.
- Hybrid/Remote Work: For roles that allow it, offering remote or hybrid work opportunities reduces commuting time and costs, improving employee satisfaction and work-life balance. Flexible hours or staggered shifts can also accommodate personal needs.
- Employee Resource Groups: Creating or supporting employee resource groups, particularly for underrepresented groups, fosters community, inclusion, and advocacy within the workplace.

Partnerships and Regional Networks

SECTION SUMMARY

- Education institutions, workforce organizations, industry, and local government must collaborate to align curricula with industry standards and create clear career pathways in the energy sector.
- Regional stakeholders should analyze labor market trends and use performance metrics (job placement, retention, satisfaction) to refine training programs to meet industry needs.
- Training providers should engage employers through advisory committees and ensure programs align with energy sector demands. They should incorporate internships, apprenticeships, and on-the-job training to build a steady workforce pipeline.
- Connecting students and trainees directly with employers through guaranteed hiring pipelines will ensure smooth transitions from education and training to full-time employment.

A coordinated effort between education, training, industry, and the community would build economic growth and workforce readiness.

Local educational institutions, from K-12 schools to community colleges, universities, and trade schools, must establish strong lines of communication and collaboration to align curricula with industry standards. This partnership can create clear pathways for students into energy-related careers. Additionally, local government departments, workforce organizations, and economic development agencies should work together with workforce development boards to pool resources, share expertise, and increase outreach to both employers and job seekers.

Regional stakeholders should analyze labor market trends, including identifying prevalent jobs in traditional and emerging energy sectors, to create training and educational initiatives that respond to real-time workforce needs. Performance metrics such as job placement rates, retention rates, and employee satisfaction surveys can provide valuable insights into the effectiveness of training programs. This feedback loop ensures that programs are refined to meet industry standards.

Training providers should engage employers and industry stakeholders to work together on energy-related programming and ensure their programs are relevant and meet the energy sector's demands. One effective way to strengthen employer engagement is through advisory committees. These committees can gather direct input from employers on curriculum development and program priorities to ensure their offerings align with industry needs and produce workers with the skills employers require. Connecting students and training participants directly with local employers for on-the-job training, internships, co-op programs, and apprenticeships will help build a steady workforce pipeline. As participants progress through their programs, guaranteed hiring pipelines can ease their transition into full-time employment, ensuring a seamless connection between education, training, and job placement.

Workforce Mobility

Workforce mobility is critical in supporting regional collaboration and providing equitable resource access. Riverside and San Bernardino counties, due to their large geographic size, present challenges in providing equal access to all communities. Consistent coordination across city and county lines ensures workforce programs address local needs. While in-person meetings may not always be feasible, virtual platforms can provide an effective way to connect stakeholders in rural or underserved areas, ensuring broad participation and input from all corners of the region.

Addressing Training Barriers

SECTION SUMMARY

- Private and public funding for energy-related training programs can drive economic growth and development, especially in underserved communities in the Inland Empire, where limited access to training sites and workforce hubs creates barriers.
- Investing in alternative training modalities, such as remote or virtual programs with real-life simulations, can expand access to energy sector training. Enhanced community outreach and digital visibility are crucial to raise awareness and encourage participation in these career pathways.

Private and public funding for energy-related training programs will support and strengthen the region's financial health, economic growth, and development. Policies that support green job training could also become an integral part of the region's economic development.

The limited training and employment opportunities within the Inland Empire's energy sector impact underserved communities within I-REN territories the most. Inland Empire residents within high and low desert communities have less access to training sites, and Inland Empire residents are far from workforce development hubs in larger metro areas, making it more challenging to engage in energy-sector training. Alternative training modalities can make training more accessible to underserved communities. Based on employer feedback, we've learned that hands-on training is essential in becoming a skilled worker, especially for roles within the trades. Remote or virtual training opportunities do not typically allow trainees to practice the skills they are developing. Nonetheless, with technological advancements and training formats, remote training programs can simulate real-life scenarios and enhance trainees' learning experience. Investing in tools within the digital space can significantly broaden access to training options that are otherwise not feasible for trainees to access.

Worker awareness of available resources is important for connecting energy workers to training and employment opportunities. Through community outreach, school partnerships, and visibility on digital platforms, we can enhance promotion and encourage more participants to participate in training pathways. Outreach highlighting the economic and environmental benefits of careers within the energy sector can incentivize individuals to pursue these careers.

Actionable Recommendations

As part of the Inland Regional Energy Network's efforts to provide the Inland Empire with equitable access to energy efficiency, I-REN's Workforce, Education, and Training (WE&T) sector programs will seek opportunities to create and enhance energy workforce development programming. Through this workforce assessment, engagement with regional partners, and the energy employer survey, I-REN is gathering the information needed to address the region's energy industry challenges and opportunities. This section provides actionable recommendations for the future of I-REN's WE&T programming.

SECTION SUMMARY

- Recommendation #1: To address barriers faced by job seekers, especially in underserved areas, I-REN should strengthen partnerships with local and third-party training providers, ensuring access to clear, affordable, and comprehensive training and certification programs. Engaging with regional trade associations and specialized organizations will further expand opportunities for networking, professional development, and exposure to industry standards and technologies.
- Recommendation #2: I-REN should collaborate with training providers and employers to offer support services, such as subsidized certification costs, financial assistance, paid time off for training, and transportation stipends, to reduce barriers for job seekers in underserved areas, ensuring greater access to energy sector training and certification opportunities.
- Recommendation #3: I-REN should strengthen the regional education and training pipeline by collaborating with educational institutions to offer virtual and hands-on training options, enhance existing CTE Pathways or induce new opportunities, introduce certification programs in K-12, provide mentorship and on-the-job training, and incorporate entrepreneurial skills into pathways to support self-employment, enhancing career opportunities and local economic growth in the energy sector.
- Recommendation #4: Strengthen collaboration between employers, workforce development organizations, and educational institutions to align training programs with industry needs, regularly assess training effectiveness through metrics like completion rates and satisfaction, and use data-driven approaches to address skill gaps and improve workforce development.

Recommendation #1: Connect local job seekers to established training providers and introduce third-party training providers

Feedback from energy employers and assessments of local training institutions indicate that job seekers—particularly in underserved and rural areas—face significant barriers in acquiring the necessary skills, training, and certifications to secure stable employment in the energy industry. To address these challenges, I-REN should build strong partnerships with the region's leading training providers to expand recruitment efforts for energy-related jobs.

If employers require employee certifications, they should ensure that employees can access clear, comprehensive information about local training centers and programs that offer the required certifications. By partnering with nearby training institutions or providing a list of trusted providers, employers can help employees find convenient, affordable options.

Employees should engage with regional trade associations to access widely-recognized industry certifications and training programs. These organizations frequently offer

certifications, workshops, and other resources aligned with current industry standards. They also offer opportunities for energy professionals to network, increase industry advocacy, gain access to industry information and resources, and raise awareness of available professional development.

Key Regional Trade Associations (see Appendix A for a full list of stakeholders):

- National Electric Contractors Association (NECA), Inland Empire Chapter: supports electrical contractors with training, labor agreements, and safety initiatives.
- GRID Alternatives Inland Empire: actively works on partnerships with local organizations and provides job training and hands-on experience for energy professionals.
- Solar Energy Council for the Inland Empire (SEC-IE): provides workforce training and public education for advancing solar energy within the Inland Empire.

Third-party organizations or industry experts can offer specialized training support, extending the reach of established training providers. This may include hosting workshops, webinars, or on-site training sessions tailored to specific job roles within companies. These collaborations can create valuable networking opportunities and expose employees to the latest tools, technologies, and best practices in their respective fields.

Suggested Actions

1. I-REN facilitates partnership with local labor unions to recruit apprentices and provide on-the-job training to meet employers' needs (Appendix A list of stakeholders).
2. Connect energy employers with apprenticeship and pre-apprenticeship programs to build a pipeline of skilled workers and secure employment for program participants.
3. Integrate third-party training providers that offer high-quality, industry-aligned certifications and up-to-date knowledge with established training centers and institutions (Appendix A list of stakeholders).
4. I-REN supports connecting job seekers to regionally relevant WE&T programs (see list in Appendix C) to enhance workforce and training opportunities.
5. Offer flexible learning formats such as online courses, evening classes, and hands-on training to accommodate employees with varying schedules.
6. Organize local job fairs and informational sessions to raise awareness about training opportunities in the region.

7. Encourage employees to engage with trade associations and workforce development networks to stay informed on industry trends and certifications.
8. Develop a clear, data-driven framework to measure the effectiveness of training programs and partnerships, including metrics like job placement and retention rates.
9. Ensure that training programs are tailored to specific needs in diverse energy sectors, from traditional energy efficiency to clean energy fields.

Recommendation #2: Provide employees with support services to enhance training and certification attainability

Feedback from energy employers and assessments of local training institutions reveals that job seekers, particularly in underserved and rural areas, face significant barriers to obtaining the necessary skills, training, and certifications for stable employment in the energy industry. To address this, I-REN should establish strong partnerships with the region's leading training providers to enhance recruitment efforts for energy-related jobs. Subsidizing certification costs and offering financial support through grants, government funding, or affordable training centers would reduce financial barriers and make these programs more accessible for employees. I-REN can work with energy employers to support them in providing their workforce with training stipends for free transportation, covering costs for materials and exams, and offering paid time off to study and complete certifications could significantly increase accessibility, particularly for those who cannot afford these expenses.

Employers can demonstrate a commitment to employees' professional growth and foster a culture of learning within the organization by offering support services for education and skill development. These long-term investments in employees make them feel supported in their career journeys. Paid time off for training allows employees to focus on their studies without the stress of balancing work obligations. Employers can also partner with local community organizations or government-funded programs to provide training to underserved populations, such as those from disadvantaged backgrounds. Offering free or subsidized training for residents in specific areas can help close local skills gaps, benefiting both employees and the businesses that hire them.

Suggested Actions

1. I-REN to support employers in providing funds for personal costs (e.g., housing, childcare, emergency expenses) and training-related costs (e.g., transportation, work clothing, tools, application fees).
2. I-REN to support employers in providing affordable or free training options, especially for certifications essential to employees' roles.
3. I-REN to support employers in providing employees to take paid time off to study for and complete their certifications or training programs.
4. I-REN to support employers in offering tuition reimbursement or financial assistance for higher education programs related to employee roles.
5. I-REN to support employers in developing specific incentives or initiatives for underserved communities to improve access to training and employment opportunities.

Recommendation #3: Strengthen the regional education and training pipeline from K-12 to employment

To address gaps in training accessibility, I-REN should collaborate with educational institutions to offer virtual training options that combine theoretical learning with hands-on, practical experience. A comprehensive education-to-career pipeline will equip individuals of all ages with the skills needed for in-demand energy sector jobs. Local academic institutions, from K-12 to higher education institutions (Appendix A), must develop pathways that connect education directly to employment.

Introducing certification programs at the secondary education level will enable students to secure employment immediately after graduation or pursue further training at local institutions. These certifications can help young people build a clear career path, making the transition from education to employment more seamless. In addition to traditional academic training, internal and external training programs should offer hands-on, practical learning experiences. Experienced staff or external instructors can provide personalized training, enhancing skill development. Furthermore, mentorship programs where senior employees guide new hires can offer invaluable support. On-the-job training allows employees to apply what they have learned in real time, boosting confidence, improving retention, and enhancing job satisfaction.

As the demand for energy-related services grows, particularly in underserved and rural areas, many job seekers may find interest in exploring self-employment. While large corporations and local businesses provide stable, good-paying jobs, self-employment allows trade workers to control their careers, determine their income potential, and meet their communities' needs. With the addition of business development and entrepreneurial skills to training pathways, training providers can broaden the scope of existing training pathways to attract energy workers incentivized by increasing their earning potential and professional aspirations. This entrepreneurial path can be especially appealing in regions with limited or seasonal traditional energy employment opportunities. By pursuing entrepreneurship, trade workers in the energy sector can bridge the gap in service availability, create jobs, and inject economic vitality into local markets that may struggle to attract large-scale employers.

This growing demand for specialized services presents a significant opportunity for individuals with trade skills to launch their businesses and contribute to the ongoing transformation of the energy industry, all while expanding their potential earning capacity. By empowering energy workers to pursue self-employment, I-REN can cultivate a dynamic and resilient ecosystem that strengthens local economies, creates job opportunities, and helps meet the increasing demand for skilled trade services across the region.

Suggested Actions

1. I-REN enhances or develops new energy-related CTE pathways in local high schools, which teach students the skills for energy sector jobs.
2. I-REN organizes career fairs focused on energy careers to increase awareness and visibility among younger generations.
3. I-REN develops internship opportunities for high school students that connect and provide students with essential workplace skills and experience.
4. I-REN creates mentorship programs that connect incoming employees with experienced senior staff to offer guidance, training, and support.
5. I-REN can connect high school educators and students to regionally relevant WE&T programs (see list in Appendix C) to harness existing programs, enhance regional training opportunities, and build a stronger energy workforce pipeline.
6. I-REN offers funding or grants to trade workers interested in transitioning from traditional employment to self-employment. These funds can help cover startup costs, such as purchasing tools, vehicles, and equipment or securing necessary business licenses and insurance. Financial support could also help workers gain

specialized certifications to operate as independent contractors in energy-related fields.

7. Training programs include business development and entrepreneurial skills as part of energy-related training programs, targeting youth who may not be interested in traditional trade careers but are interested in self-employment and starting their own businesses.

   Related skills:

   - Strategic planning: developing long-term goals and actionable plans to achieve business objectives
   - Communication and networking: building and maintaining relationships with clients and investors
   - Financial management: budgeting, financial analysis, and efficient use of resources
   - Sales and marketing: developing branding and understanding data analytics to reach target customers to drive revenue
   - Leadership: managing teams effectively to work toward business goals collectively and fostering a positive work environment

Recommendation #4: Strengthen collaboration between employers and workforce development organizations to continuously assess training effectiveness

Given the region's vast geographic area, where educational institutions are often limited in reach, it is essential to build stronger partnerships between local educational institutions, employers, and workforce development organizations. These partnerships are key to aligning industry-aligned curricula with employer needs, ensuring that training programs are relevant and accessible. Currently, there are few opportunities for employers, workforce development organizations, and educational institutions to collaborate directly on strategies for building an energy-focused workforce.

To address this gap, local workforce development boards and chambers of commerce should work with employers to coordinate training initiatives, job fairs, and resource-sharing efforts. Workforce and training institutions should regularly evaluate the effectiveness of training programs in connection to the needs of the labor force, including metrics on program completion rates and participant satisfaction. These metrics are essential to adapting and improving training pathways, ensuring they remain responsive to industry needs. Regularly assessing the effectiveness of

energy-related training programs can help organizations align workforce development with current industry requirements.

Employers that do not already conduct periodic skills assessments, should be proactive in evaluating their workforce's skill levels and needs. This will allow them to identify knowledge gaps and certification requirements so they can develop training programs that address specific areas for improvement. By implementing this data-driven approach, companies can ensure employees receive the most relevant and impactful training, enhancing their performance and long-term career growth.

Suggested Actions

1. I-REN organizes quarterly hybrid meetings (in-person and virtual) that bring together employers, workforce development organizations (Appendix A, Workforce Employment Organizations), and educational institutions. These meetings will provide a platform to discuss energy industry standards, evolving workforce needs, and strategies for effective training programs.
2. I-REN proactively reaches out to energy employers, workforce development organizations, and educational institutions to align on the development of training programs. Engaging all parties in ongoing discussions will ensure that training content is current, effective, and meets the needs of both employers and job seekers.
3. I-REN develops and tracks clear, measurable metrics—such as program completion rates, post-training employment outcomes, and participant satisfaction surveys—to evaluate the effectiveness of energy-related training programs. These metrics will provide valuable feedback for continuous improvement and program optimization.
4. I-REN encourages employers to conduct regular skills assessments to identify areas where employees may require additional training or certification. Tailoring training programs based on these assessments will ensure the workforce is equipped with the most relevant and up-to-date skills, improving overall productivity and employee retention.

Appendix A: Training Institutions

Colleges and Universities

Provider	Industry	Cost	Time	Modality
American College of Healthcare and Technology	HVAC	$17,850.00	36 weeks	hybrid in-person and online
Barstow College	Electrical, Installation/Maintenance/ Repair, Welding	$400-$1,000 per course	Varies	hybrid in-person and online
Cal Baptist Career Center	Electrical	$19,538 per semester	3 years	hybrid in-person and online
California State University, San Bernardino	Electrical, HVAC, Installation/Maintenance/ Repair, Manufacturing, Mechanical, Plumbing, Solar, Welding	$500 - $5,000	Varies	hybrid in-person and online
Chaffey College	Electrical, Mechanical, Welding	$11,000 - $20,000	10-18 weeks	in-person classroom training
College of the Desert	Electrical, Construction, HVAC, Solar	$400-$2,500 per course	Varies	in-person classroom training
Copper Mountain College	Electrical, Construction, Mechanical, Welding	$400-$2,500 per course	Varies	hybrid in-person and online
Heavy Equipment College	Safety and Compliance Certifications	$8,000 - $12,000	2-4 weeks	In-person and field training
InterCoast College Riverside	Electrical, HVAC, Solar	$9,000 - $22,000	16-40 weeks	hybrid in-person and online
La Sierra University	Engineering, Technology	$47,310.00	4 years	in-person classroom training
Mayfield College	Electrical, HVAC	$3,000 - $16,000	Varies	hybrid in-person and online

Mt. Jacinto College	Engineering, Technology	$500 - $14,000	Varies	in-person classroom training
Norco College	Electrical, Construction, Installation/Maintenance/ Repair, Manufacturing, Renewables	$500 - $2,000	Varies	hybrid in-person and online
Palo Verde College	Construction, Technology, Solar, Welding	$500 - $2,000	Varies	in-person classroom training
Riverside City College	Construction, HVAC, Welding	$500 - $2,000	Varies	in-person classroom training
San Bernardino Community College District	Construction, HVAC	$1,000 - $5,000	1-9 weeks	in-person classroom training
San Bernardino Valley College	Electrical, HVAC, Installation/Maintenance/ Repair, Manufacturing, Welding	$1,000 - $2,000	34-48 Weeks	in-person classroom training
San Joaquin Valley College	Electrical, Construction, HVAC, Installation/Maintenance/ Repair	$16,000 - $80,000	Varies	in-person classroom training
Summit College	Electrical, HVAC, Welding	$16,000 - $18,000	36-40 Weeks	hybrid in-person and online
UMass Global (Riverside)	Engineering, Technology	$500 - $2,000	Varies	online classes
University of California Riverside Extension-Professional Studies	Engineering	$18,200	34 weeks	in-person classroom training
Victor Valley College	Electrical, Construction, HVAC, Installation/Maintenance/ Repair, Solar, Welding	$500 - $7,000	Varies	in-person classroom training

K-12 Educational Institutions

Provider	Industry	Type of training	Modality
Arroyo Valley Highschool	Construction	Pre-Apprenticeship	in-person classroom training
Cajon Highschool	Construction, Battery and Electric Vehicles	Pre-Apprenticeship	in-person classroom training
Carter Highschool	Construction	Pre-Apprenticeship	in-person classroom training
Corona-Norco Adult School	Welding	Training	in-person classroom training
Curtis Middle School	Job Training	Pre-Apprenticeship	in-person classroom training
Earhart Middle School	Electrical, Engineering	Pre-Apprenticeship	in-person classroom training
Fontana Adult School	Electrical, Installation/Maintenanc e/Repair	Training	online classes
Gage Middle School	Construction	Pre-Apprenticeship	in-person classroom training
Indian Springs Highschool	Mechanical	Pre-Apprenticeship	in-person classroom training
J.W. North Highschool	Job Training	Pre-Apprenticeship	in-person classroom training
Lee Pollard Highschool	HVAC	Pre-Apprenticeship	in-person classroom training
Lincoln Highschool	Battery and Electric Vehicles	Pre-Apprenticeship	in-person classroom training
Martin Luther King Highschool	Architects/Design, Engineering	Pre-Apprenticeship	in-person classroom training
Norte Vista Highschool	Construction	Pre-Apprenticeship	in-person classroom training
Palm Desert Highschool	Engineering, Welding	Pre-Apprenticeship	in-person classroom training
Palm Springs Unified School District Renewable Energy Academy of Learning (REAL) - Desert Hot Springs Highschool	Clean Energy	Pre-Apprenticeship	in-person classroom training
Ramona Highschool	Construction	Pre-Apprenticeship	in-person classroom training

Rialto Highschool	Construction	Pre-Apprenticeship	in-person classroom training
Riverside County Office of Education, School of Career Education	Welding	Training	in-person classroom training
Riverside STEM Academy	Engineering	Pre-Apprenticeship	in-person classroom training
San Bernardino Highschool	Engineering	Pre-Apprenticeship	in-person classroom training
San Gorgonio Highschool	Construction, Battery and Electric Vehicles, Engineering	Pre-Apprenticeship	in-person classroom training
Science and Technology Education Partnership: STEP	Construction, HVAC, Manufacturing, Welding	Training	field training at a project location
Sierra Middle School	Engineering	Pre-Apprenticeship	in-person classroom training

Apprenticeship Training Centers

Provider	Industry	Cost	Training Time
AGC Apprenticeship and Training Trust	Construction	Paid Opportunity	8,000 hours 2-4 years
California-Nevada JATC Power Lineman Program	Electrical	Paid Opportunity	7000 hours 3 years
Construction Teamsters Apprenticeship Program	Construction	Paid Opportunity	3 years
Chaffey College InTech Center Apprenticeship	Mechanical	Paid Opportunity	2.5 years
Ipply Employer Focused Career Development Apprentice Program	Multi-Sector	Paid Opportunity	2-4 years
Lancaster Burns Construction, Inc. Apprenticeship (CAMAC)	Construction	Paid Opportunity	N/A
Osceola Consulting Geographic Information System Technician	Technology	Paid Opportunity	N/A
Southern California Surveyors Joint Apprenticeship Program	Engineering	Paid Opportunity	6000 hours
Western Electrical Contractors Association, Apprenticeship	Electrical	Paid Opportunity	3-5 years

Trade Schools

Provider	Type of institution	Cost	Type of training
Colton Redlands Yucaipa ROP	Battery and Electric Vehicles	$1,350.00	in-person classroom training
RTC College	Electrical	$2,000 - $20,000	in-person classroom training
UEI College	Electrical, HVAC	$21,500.00	hybrid in-person and online
Masters Vocational College	HVAC, Mechanical	Not available	in-person classroom training
Universal Technical Institute	Installation/Maintenance/Repair	$21,180.00	in-person classroom training
AGI Technology Institute	Installation/Maintenance/Repair	$2,000 - $3,000	in-person classroom training

Workforce Employment Organizations

Provider	Type of institution	Industry	Type of training
Construction Trades Workforce Initiative (CTWI)	Community-Based Organization	Electrical, Engineering	Apprenticeship
Southern California Pavement Striper, Road Slurry, Seal Coat	Community-Based Organization	Installation/Maintenance/Repair	Apprenticeship
Inland Refrigeration JATC	Employer	HVAC	Apprenticeship
Asbestos Workers Joint Apprenticeship Fund	Workforce Employment Organization	Safety and Compliance Certifications	Apprenticeship
Inland Empire Electrical Training Center	Workforce Employment Organization	Electrical, Battery, and Electric Vehicles, Construction, Solar	Apprenticeship
Department of Energy	Workforce Employment Organization	Battery and Electric Vehicles	Certification
Employment Development Department- Veterans Division	Workforce Employment Organization	HVAC	Certification
Energy Code Ace	Workforce Employment Organization	Electrical, HVAC, Solar	Certification
Life Lifters International	Community-Based Organization	Construction/Contractors	Pre-Apprenticeship

Inland Empire Job Corps	Workforce Employment Organization	Electrical, Construction, Plumbing	Pre-Apprenticeship
Empowering Success Now	Community-Based Organization	Job Training	Training
First Institute Training and Management	Community-Based Organization	Welding	Training
GRID Alternatives	Community-Based Organization	Solar	Training
Pilot Trucking School	Community-Based Organization	Safety and Compliance Certifications	Training
Sillers Institute	Community-Based Organization	Construction/Contractors	Training
Skyway Trucking School	Community-Based Organization	Safety and Compliance Certifications	Training
Technical Employment Training, Inc.	Community-Based Organization	Manufacturing	Training
A-Z Bus Sales	Employer	Battery and Electric Vehicles	Training
EMC Squared Vehicles	Employer	Battery and Electric Vehicles	Training
Inland Empire Utilities Agency	Employer	Installation/Maintenance/Repair	Training
America Truck Driving School-Riverside	Workforce Employment Organization	Safety and Compliance Certifications	Training
Associated Builders and Contractors (ABC) Inland Empire Branch	Workforce Employment Organization	Electrical	Training
California Climate Action Corps	Workforce Employment Organization	Job Training	Training
Center for Employment Training- Coachella	Workforce Employment Organization	Construction. HVAC	Training
Center for Sustainable Energy	Workforce Employment Organization	Solar	Training
Citadel Community Development Corporation (CCDC)	Workforce Employment Organization	Job Training	Training
Civic Well, Civic Spark	Workforce Employment	Job Training	Training

Fellowship	Organization		
Corona Chamber of Commerce	Workforce Employment Organization	Job Training	Training
Frontier Energy	Workforce Employment Organization	Electrical, Battery, and Electric Vehicles, Solar	Training
Goodwill Career Center	Workforce Employment Organization	Job Training	Training
North American Training Center	Workforce Employment Organization	HVAC	Training
NV5	Workforce Employment Organization	Electrical	Training
Tom's Truck Center dealership	Workforce Employment Organization	Battery and Electric Vehicles	Training

Appendix B: Employer Needs Survey

1. Company Name _____ Contact Name _____ Phone Number _____ Email Address _____		
2. Please mark the options that best describe your organization's work. *If not listed, please describe your organization's focus areas.*	☐ Heating, Ventilation, and Air Conditioning (HVAC) ☐ Marketing ☐ Non-Profit/Community-Based Organization (CBO) ☐ Renewable Technologies	☐ Energy/Business consulting ☐ Electrical ☐ Mechanical ☐ Construction ☐ Other: List below ☐ N/A
3. On average, how many energy-related positions does your organization recruit and hire annually in Riverside and San Bernardino counties? *An "energy-related" job is any role contributing to producing, distributing, managing, or efficiently using energy across various industries. This includes jobs in traditional energy sectors like electricity, oil, and renewables and positions in manufacturing, construction, HVAC, logistics, city planning, and more.* ☐ 1-5 ☐ 6-10 ☐ 11-25 ☐ 26-50 ☐ 50+ ☐ N/A		
4. What are the biggest challenges you are facing when hiring an energy-related employee? *Check all that apply.*	☐ Not enough local applicants ☐ Lack of qualified applicants ☐ Applicants do not have relevant experience ☐ Applicants do not have relevant training	☐ Applicants do not have relevant certifications or licenses ☐ Other: List below ☐ N/A
5. To your knowledge, what challenges do workers have in accessing pertinent certificates, training, and skill development? *Check all that apply.*	☐ The training locations are too far or otherwise not accessible ☐ The training does not exist in the region ☐ The time of training offered does not work ☐ The training is too expensive ☐ Other: List Below ☐ N/A	
6. What are the biggest challenges you are facing when retaining energy-related employees? *Check all that apply.*	☐ Employees are retiring ☐ Employees are not fulfilling duties ☐ Employees are seeking better pay or benefits ☐ Employees leaving the region ☐ The job market is too competitive	☐ Employees do not feel that they have the skills to be in the position ☐ Employees do not see job progression opportunity ☐ Other: List Below ☐ N/A

7. Do you offer employee training programs to build new and/or improve current skills?	☐ Yes ☐ No ☐ N/A		
8. What type of training programs do you offer your employees?			
9. Please list what skill brackets you have observed are typically lacking in your job applicants or employees.	Interpersonal skills are the behaviors and tactics a person uses to interact with others effectively. Workplace skills are a person's basic skills to succeed in any workplace. Technical skills are the abilities and knowledge needed to perform specific tasks.	☐ Interpersonal ☐ Workplace ☐ Technical ☐ Other: List Below ☐ N/A	
10. Do your energy-related employees need any certifications, licenses, or training?			
11. What are those certifications, licenses or training?			
12. How can we best help your energy-related employees or potential employees access certifications, licenses, or training?			
13. What minimum level of education do you typically require when hiring new employees? *Check all that apply.*	☐ Relevant work experience ☐ High school diploma or GED ☐ Associate degree ☐ Bachelor degree ☐ Master degree ☐ Certifications or licenses	☐ Preapprenticeship ☐ Apprenticeship ☐ Journeymen ☐ Other: List Below ☐ N/A	

Appendix C: WE&T Programs Offered by Portfolio Administrators

Statewide Investor Owned Utilities (IOUs)

Overview		
Program Implementer	The Energy Coalition (TEC)	Energy is Everything aims to build a pipeline of qualified energy workers by creating pathways for energy education for K–12 students, particularly in disadvantaged communities (DACs). Goals under the program include: increasing students' pro-environmental literacy and behaviors, expanding the population of students exposed to environmental, STEM, and green career pathways by offering CTE, certification, and internship programs, and promoting environmental science concepts that correlate to the Next Generation Science Standards (NGSS) and Common Core State Standards (CCSS).
Program Name	Energy is Everything	
Audience	K-12 Schools	
Reach	Statewide	
Overview		
Program Implementer	Strategic Energy Innovations (SEI)	The Energized Careers Program's goal is to train and prepare disadvantaged workers to enter the energy-efficiency workforce and to place program participants into energy-efficiency jobs where they can use the knowledge and skills the training provided. This Program is implemented through training partnerships with 9 different community-based organizations (CBOs). For the region is Inland Empire Electrical Training Center
Program Name	Energize Careers	
Audience	Disadvantaged Workers	
Reach	Statewide	
Overview		
Program Implementer	IOUs and partners	Technical Upskill and Core Energy Education Collaboration (CEEC), whose primary target populations include people in an energy efficient-related career seeking to improve upon their technical skills; college students and apprentices on post-secondary education tracks working to obtain or enhance an energy career; and/or disadvantaged workers seeking certifications to enter the energy workforce or technical upskilling for those who have already entered the energy industry
Program Name	Technical Upskill and Core Energy Education Collaborations programs	
Audience	Incumbent Workforce	
Reach	Statewide	

Regional Energy Networks (RENs)

Overview		
Program Implementer	Rising Sun Center For Opportunity	Opportunity Build is a pre-apprenticeship job training program for adults (18+) interested in starting a career in construction, solar, or entering a union apprenticeship. It provides 10-12 weeks of construction training and a full-year case management and job placement program.
Program Name	Opportunity Build	
Audience	Adults	
Reach	BayREN Territory	
Overview		
Program Implementer	Rising Sun Center For Opportunity	Climate Careers provides youth employment through no-cost energy and water-saving delivery services to homes in the Bay Area and Stockton through Green House Calls and exposure to green jobs through an externship placement.
Program Name	Climate Careers	
Audience	Low-income young people (ages 15-24)	
Reach	BayREN Territory	
Overview		
Program Implementer	Emerald Cities Collaborative	ACES Engages, exposes, and challenges students from Title 1 schools to explore architecture, engineering, and construction careers by capitalizing on public works investment, community college science, technology engineering, art, and math STEAM course offerings, and strong industry participation. Dual enrollment is a key component of the project.
Program Name	Architecture Construction Engineering Students (ACES)	
Audience	High School Students	
Reach	SoCalREN Territory	
Overview		
Program Implementer	Emerald Cities Collaborative	The Green Path Careers program is designed to help transition-age youth, justice-impacted workers, and disadvantaged workers enter the green energy and sustainable economy by teaching them the skills required in the high-growth clean energy industry.
Program Name	Green Path Careers (GPC)	
Audience	High School Students	
Reach	SoCalREN Territory	
Overview		

Program Implementer	Emerald Cities Collaborative	The Green Path Careers program is designed to help transition-age youth, justice-impacted workers, and disadvantaged workers enter the green energy and sustainable economy by teaching them the skills required in the high-growth clean energy industry.
Program Name	Green Path Careers (GPC)	
Audience	Foster Youth 18+	
Reach	SoCalREN Territory	
Overview		
Program Implementer	Emerald Cities Collaborative	Assist contractors entering the Energy Efficiency (EE) sector by providing access to resources, quality training, one-on-one assistance including access to capital, bonding and insurance and procurement assistance, and fundamentals of green building
Program Name	E-Contractor Academy (ECA)	
Audience	Small Minority Disabled Veteran Business Enterprise	
Reach	SoCalREN Territory	
Overview		
Program Implementer	Emerald Cities Collaborative	Organizes the infrastructure needed to connect SoCalREN's small and minority contractors and disadvantaged workers to capacity-building resources and opportunities.
Program Name	Opportunity Hub	
Audience	Contractors and Workers	
Reach	SoCalREN Territory	
Overview		
Program Implementer	3-CREN	Connecting guest speakers to classrooms to help younger generations explore opportunities in sustainable design and construction. 3C-REN speakers are professionals with backgrounds in green building.
Program Name	Education for the Future Workforce	
Audience	High School Students	
Reach	3-CREN Territory	
Overview		
Program Implementer	3-CREN	This series is designed for new, aspiring, and current building professionals to understand the basics of building science.n each training, expert instructors will focus on industry best practices and new building technologies that are better for owners, better for the
Program Name	High Performance Fundamentals	

	Certification	environment, and better for your work as building professionals.
Audience	Contractors and Workers	
Reach	3-CREN Territory	
Overview		
Program Implementer	CivicWell, CivicSpark	AmeriCorps Fellowship is dedicated to building capacity and energy comprehension within local public agencies. The program places up to 27 fellows at member agencies across Riverside and San Bernardino counties
Program Name	Energy Fellowship	
Audience	Adults	
Reach	I-REN Territory	

Planned Regional Energy Network WE&T Programs

Newly Authorized RENs	Vision for Programming	Reach
Central California RURAL Regional Energy Network (CCR-REN)	The vision for these services is to train youth as part of a comprehensive workforce education and training curriculum to become energy auditors, and then deploy them as part of the residential equity program. The program will substantially increase the skills of the local workforce and provide pathways for the employment of local workers within local communities.	Central Coast, Eastern Sierra, and San Joaquin Valley regions
Rural REN North (NCRREN)	The vision is to empower rural communities by assessing local needs, engaging with tribes, and upskilling contractors. By expanding access to existing training and partnering with community colleges, we aim to provide targeted workforce development in hard-to-reach areas, ensuring equitable opportunities for a sustainable energy future.	North Coast and Northern Sierra regions
San Diego Regional Energy Network (SDREN)	The vision of this program increases access to education and training resources needed to develop high school students' awareness of energy/green career pathways and helps them learn the necessary skills to enter the workforce.	San Diego
	This vision is to enhance the clean energy workforce, focusing on skill development for adult and incumbent workers. Targets employees and employers to boost employee skill development and the employer's capacity to work on electrification and decarbonization projects.	

Appendix D: Regional Stakeholder and Training Provider Discussions

Meetings with Stakeholder and Training Providers

Regional Stakeholder	Key Discussion Points
Inland Empire Labor Institute (IELI), PlugIn IE	• Discussed available training programs that equip workers with necessary skills needed in emerging industries within the region such as green energy, advanced manufacturing, and logistics. • Quality Green Jobs regional initiative focused on expanding pathways to energy and water infrastructure union careers.
San Bernardino Community College District (SBCCD)	• SBCCD reviews available degree programs available within the region and employers hiring every two years. • Discussed shared goals on setting up stable infrastructure to connect the incoming workforce with equitable resources.
San Bernardino County Superintendent of Schools (SBCSS)	• Discussed the challenges of expanding energy-related curricula and CTE pathways. • Encouraging students to consider careers within the skilled trades is difficult compared to other popular career paths, especially as social media and communications careers have become more popular.
Roots of Success	• Discussed training program offered that connects environmental literacy and workforce readiness in green economy careers and targets supporting individuals from underserved communities. • Roots of Success offers online courses, apprenticeship, and pre-apprenticeship programs that help connect trainees with employment opportunities post-training.
U.S Green Building Council (USGBC-CA)	• Discussed training programs offered by USGBC that are available to energy professionals within the Inland Empire.
Energz	• Discussed possible collaboration opportunities to inform and educate the public and students about emerging energy technologies, such as EVs and EV charging stations.

Ten Strands	• Discussed how community choice aggregations (CCA's) can support environmental and climate action education in TK-12 schools.
Center for Employment Training (CET)	• Discussed possible collaboration between CET and I-REN to customize training pathways to fit the needs of the energy workforce and explore recruitment and placement services and community engagement strategies.
Interplay Learning	• Discussed virtual training options for simulated 'hands-on' learning, foundational skills in common trades, and alignment with energy industry standards.
Community Home Energy Revolution Project (CHERP) Solar Works & CRW Energy	• Discussed training opportunities CHERP and CRW Energy offers within the clean energy industry, specifically related to solar panel manufacturing and installation.
Switch Energy Alliance	• Reviewed virtual no-cost energy and environment educational resources and lessons that are NGSS-aligned.
UCR Center for Community Solutions	• Discussed prevalent policy questions most relevant to regional needs and the center's strategy for influencing local policies via their data-driven approach. • Discussed community outreach and survey strategies to support engagement with local employers.

In-Person and Virtual Outreach and Engagement

Event	Outreach Purpose
2024 Energy and Infrastructure Sector Showcase	• Connected with influential organizations within the energy sector, leading efforts in identifying industry needs and gaps. • Event sessions focused on leading conversations about sourcing local employees as the workforce diminishes, establishing better pathways to support job seekers with securing entry-level positions sooner, and societal challenges in engaging younger generations in K-12.
Energize SoCal 2024	• Engaged with local workforce organizations and energy professionals to discuss regional energy initiatives. • Observed energy expert panelists discuss the energy transition within the Inland Empire, available incentive programs and energy efficiency, and the overall energy landscape.

Inland Empire Economic Partnership (IEEP) Webinar Series: Navigating Workforce Trends in the Inland Empire	• Attended informational session exploring the collaboration between educational institutions and industries supporting the skilled workforce. • Covered vocational training and apprenticeship opportunities, highlighted best practices for retaining local talent, and emphasized the importance of accessible career pathways.
Thrive SoCal Sub-Regional Backbone Convening	• Discussed catalyst funding opportunities for local organizations to support the pre-development of sector-specific projects in the region. • Engaged with non-profit business owners on challenges while shaping initiatives and policies that address the needs of their communities.
Quality Green Jobs Roundtable	• Attended a roundtable reviewing the principles of a 'just transition' to green jobs and the intersection with health and safety, climate, and environment for workers and local families.
Leaders In Energy Summit - Inland Empire Energy Outlook 2024	• Convened with prominent regional entities from large businesses, energy start-ups, and clean energy experts to discuss the energy outlook for the Inland Empire region.
Inland Empire MegaMix Expo	• Attended a multi-day conference to engage with energy-related employers attending the business-focused expo directly. • Engaged with energy-related exhibitors, from small businesses to local workforce organizations, to promote energy employer surveys.
Innovation Council and Chino Valley Leadership Collaboration	• Engaged with local entrepreneurs and business-minded individuals to discuss workforce development resources within the Inland Empire.
Chino Valley Women's Conference	• Engaged with local workforce development organizations and regional stakeholders within the Inland Empire to promote the energy employer survey. • Participated in sessions highlighting the under-representation of women and minority groups within the workforce industry during conversations with local employees and larger workforce entities.
I-REN Kick-Off Workforce Roundtable	• Presented initial workforce assessment findings to regional partners and stakeholders to include their input and foster productive conversations centering on the future of the energy workforce.