High Voltage Electrical Careers

Cross-Sector Advisory: Energy, Construction, Utilities and Advanced Manufacturing

April 15th, 2025

Welcome & Introduction

Caitlin Blockus
Valley Vision
21st Century Workforce Project Manager

Liz Kilkenny
Valley Vision
21st Century Workforce Project Coordinator

Housekeeping

- Enable your video camera (optional)
- Please stay on unless you are called on to ask a question
- Submit all questions and commentary using the chat function
- This meeting will be recorded and will be provided as part of the post-meeting materials

Agenda

1:00 PM: Welcome and Introduction

1:10 PM: Guest Speaker

1:30 PM: Labor Market & Trend Analysis

2:00 PM: Panel Discussion

2:50 PM: Closing Remarks

3:00 PM: Conclusion

Optional Networking Opportunity

3:00 PM Rivian Vehicles Experience

Thank you

to all of our supporters

LOS RIOS COMMUNITY COLLEGE DISTRICT

California Community Colleges

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CENTERS OF EXCELLENCE
Inform Connect Advance

SETA

Workforce Development Board NCCC

Lake Tahoe Community College

Woodland Community College

Yolo County, CA WIB

North Far North Regional Consortium

YCCD
YUBA COMMUNITY COLLEGE DISTRICT

Golden Sierra

Welcome & Introduction

Amy Schulz
Sierra College,
Executive Dean, Workforce & Strategic Initiatives

Julie Muir
Los Rios Community College District,
Director of Employer Partnerships for Advanced Manufacturing

April A. Vera
Los Rios Community College District,
Director of Employer Partnerships for Energy, Construction, and Utilities

Guest Speaker

Larry Rillera
California Air Resources Board,
Staff Air Pollution Specialist, Community Outreach and Engagement

CALIFORNIA
AIR RESOURCES BOARD

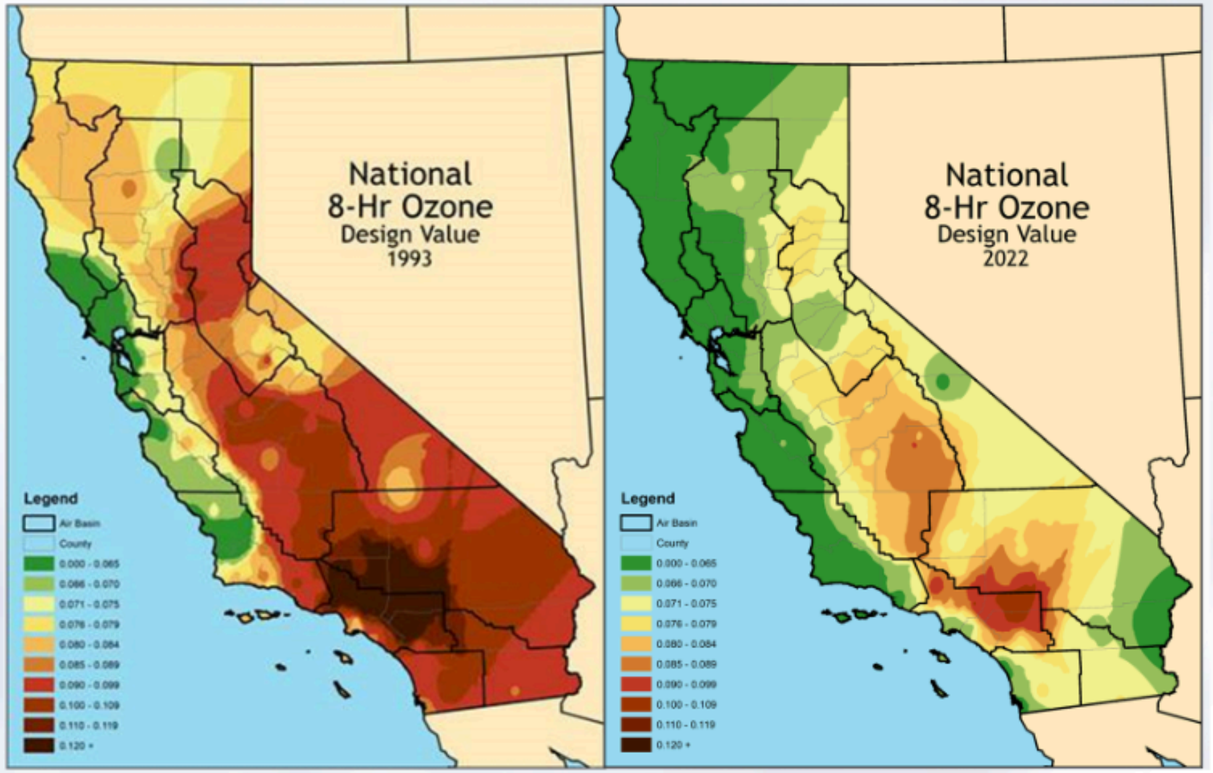
High Voltage Pathways and Careers in Zero-Emission Transportation

April 2025

California Air Resources Board

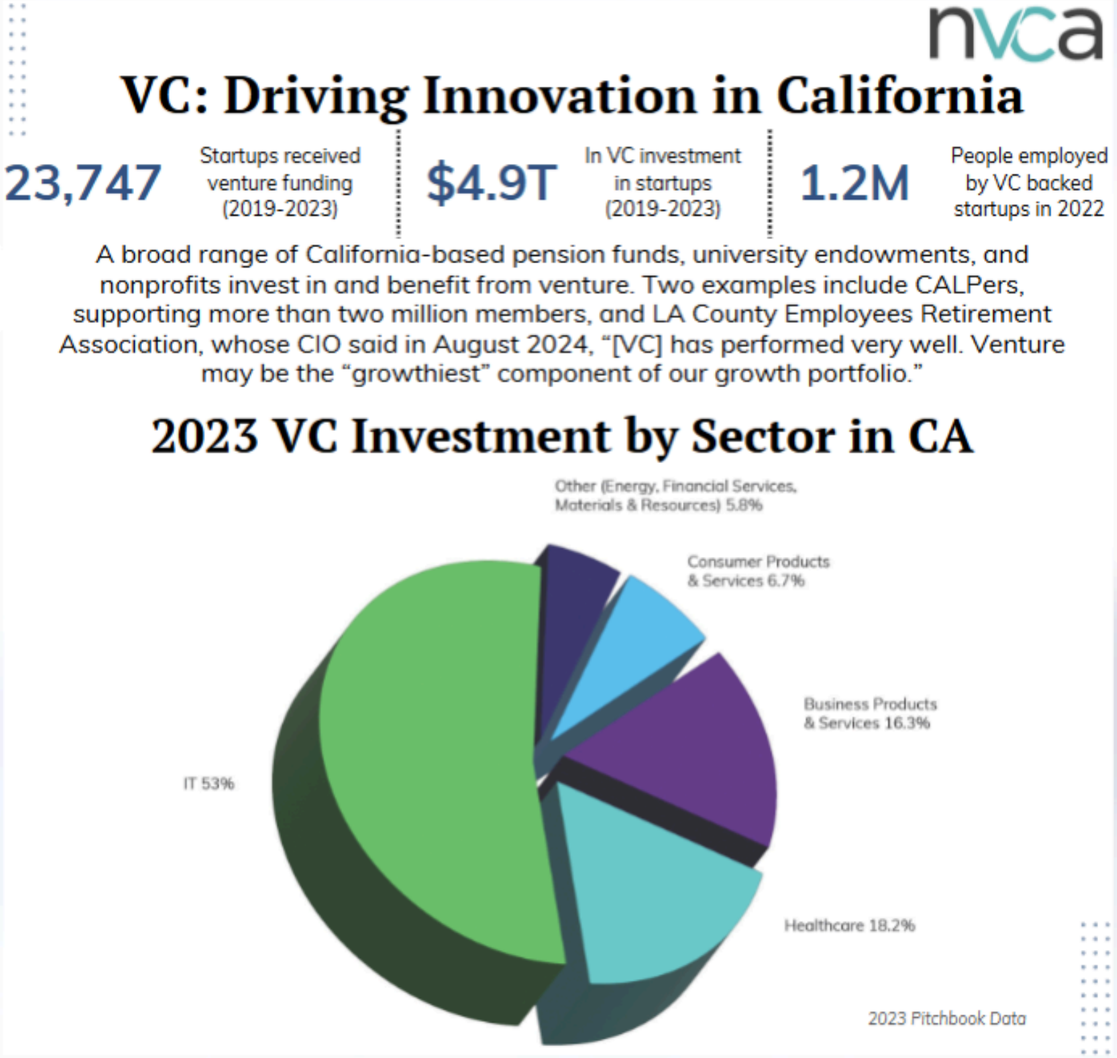
- Protect public from air pollution
- Develop programs/actions
- Regulate motor vehicle pollution / consumer products
- Community outreach and engagement
- Collaborate with 35 air pollution control districts

(Information: Homepage | California Air Resources Board)



CARB

Innovation and Venture Capital



(Information: National Venture Capital Association – NVCA)

ZEV Market Development Strategy

Workforce

The ZEV workforce includes workers throughout the supply chain needed to design, manufacture, sell, construct, install, service, and maintain ZEVs, ZEV infrastructure, ZEV distribution systems, dealerships, energy systems, charging and fueling stations, and other ZEV-related build.

A full definition of this pillar is in ZEV Market Development Strategy.

(Information: California Zero-Emission Vehicle Market Development Strategy)

CARB

ZEV Manufacturing in California

(Information: Zero-Emission Vehicle Related Manufacturing | California Energy Commission

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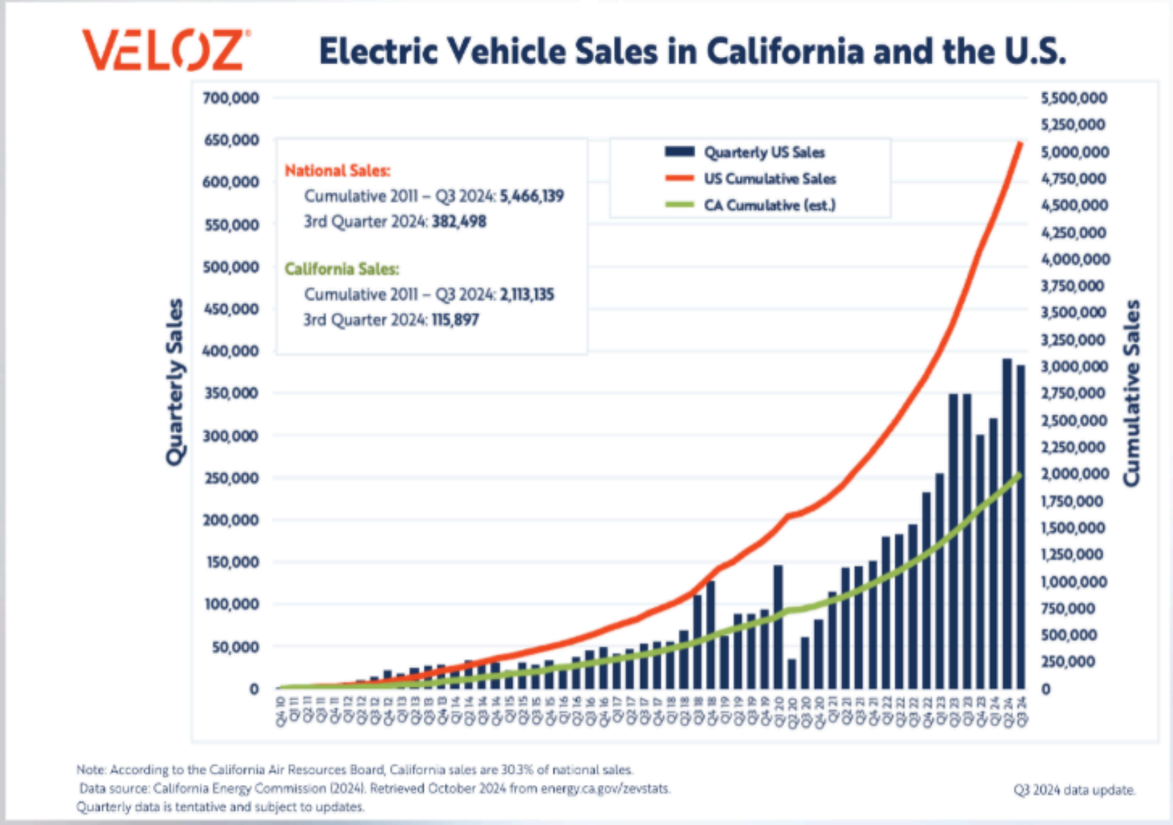
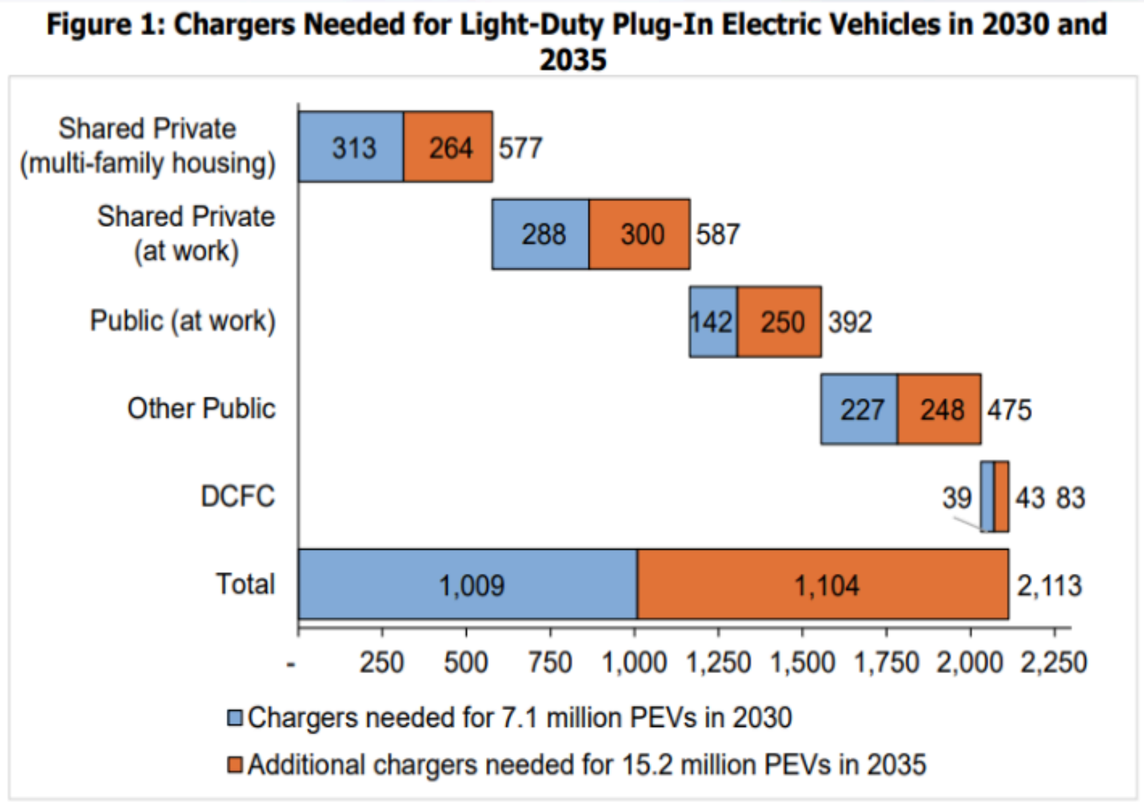
LDV EV Sales and EV Charger Need



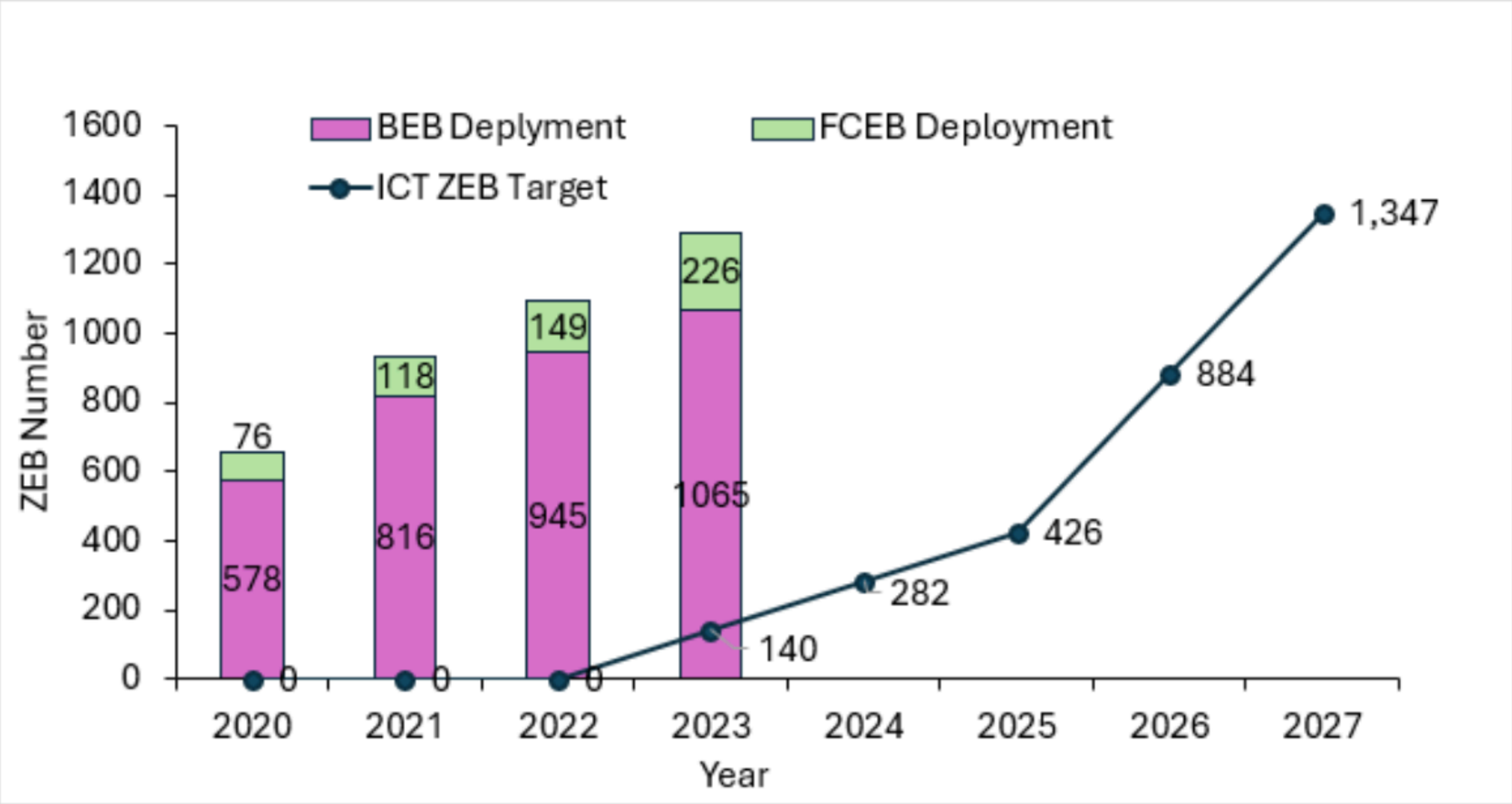
(Information: Q3-2024_EV-Sales-in-CA-and-USA-1.png (1850×1080)



(Information: TN254869_20240305T171243_Assembly Bill 2127 Second Electric Vehicle Charging Infrastructure Assessment (2).pdf)

CARB

Cumulative Innovative Clean Transit ZEB Deployment



(Information: Innovative Clean Transit | California Air Resources Board)

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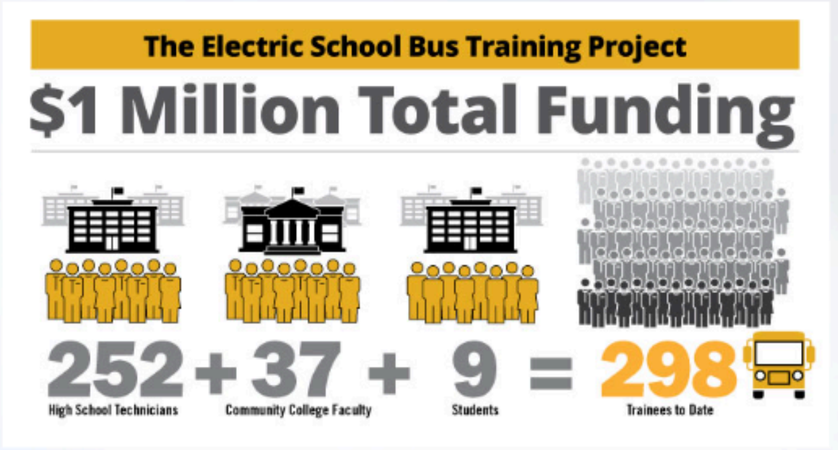
Electric School Bus Training

- All California school districts receiving public funding for electric school buses
- Curriculum development, technician/instructor training
- Service technicians and bus operators
- Online training
- Six course topics

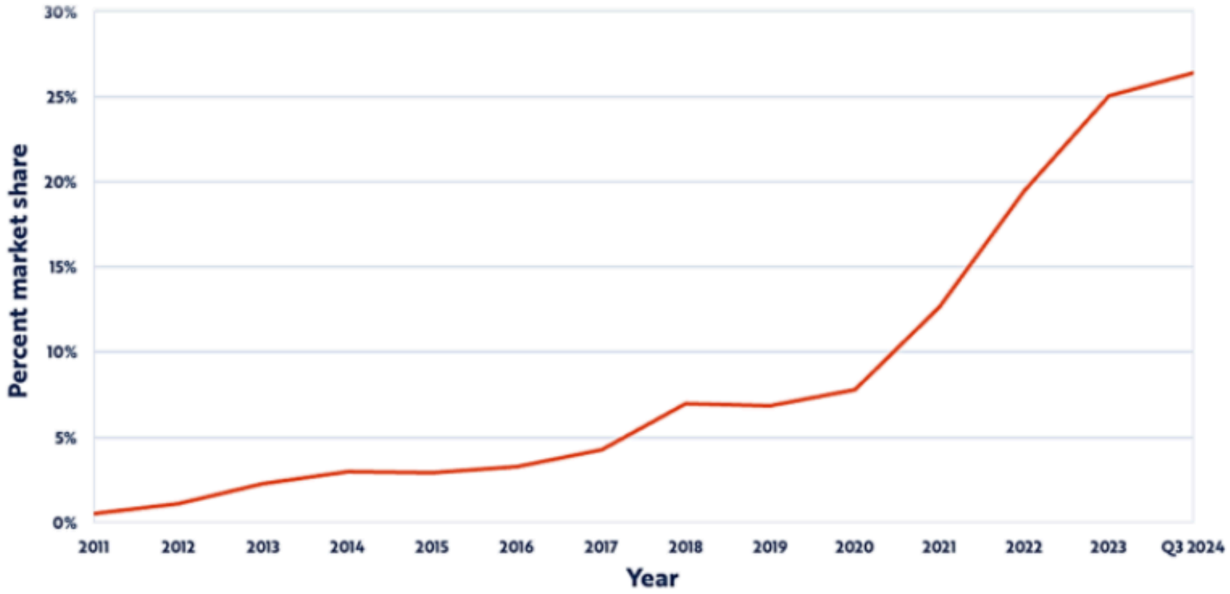


(Information -The Electric School Bus Training Project)

CARB

Demand for Zero Emission Vehicles is Increasing in California

Electric Vehicle Market Share in California



5,466,139
U.S. EV Sales

2,113,135
CA EV Sales

152,356
CA EV Chargers

68
CA Hydrogen Stations

129
CA Light-Duty Models Available

853
CA Medium/Heavy-Duty EV Trucks

2,062
CA EV Buses

869
CA EV Delivery Vans

Q3 2024 data update.

Data source: California Energy Commission California Light-Duty ZEV Sales Data (October 2024).
Quarterly data is tentative and subject to updates.

Graphics from https://www.veloz.org/ev-market-report/

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Alameda – Contra Costa Transit District

MIXED REALITY TRAINING

Immersive

Simulated Environment

Live-Assist

Hands-On Experience

Controlled & Secure

CARB

Today's Service Bay

Today's Traditional Training

Today's Training Center

Federal Transit Administration FY 2023/2024 Grant Awards:

$16M for Facility Modernization

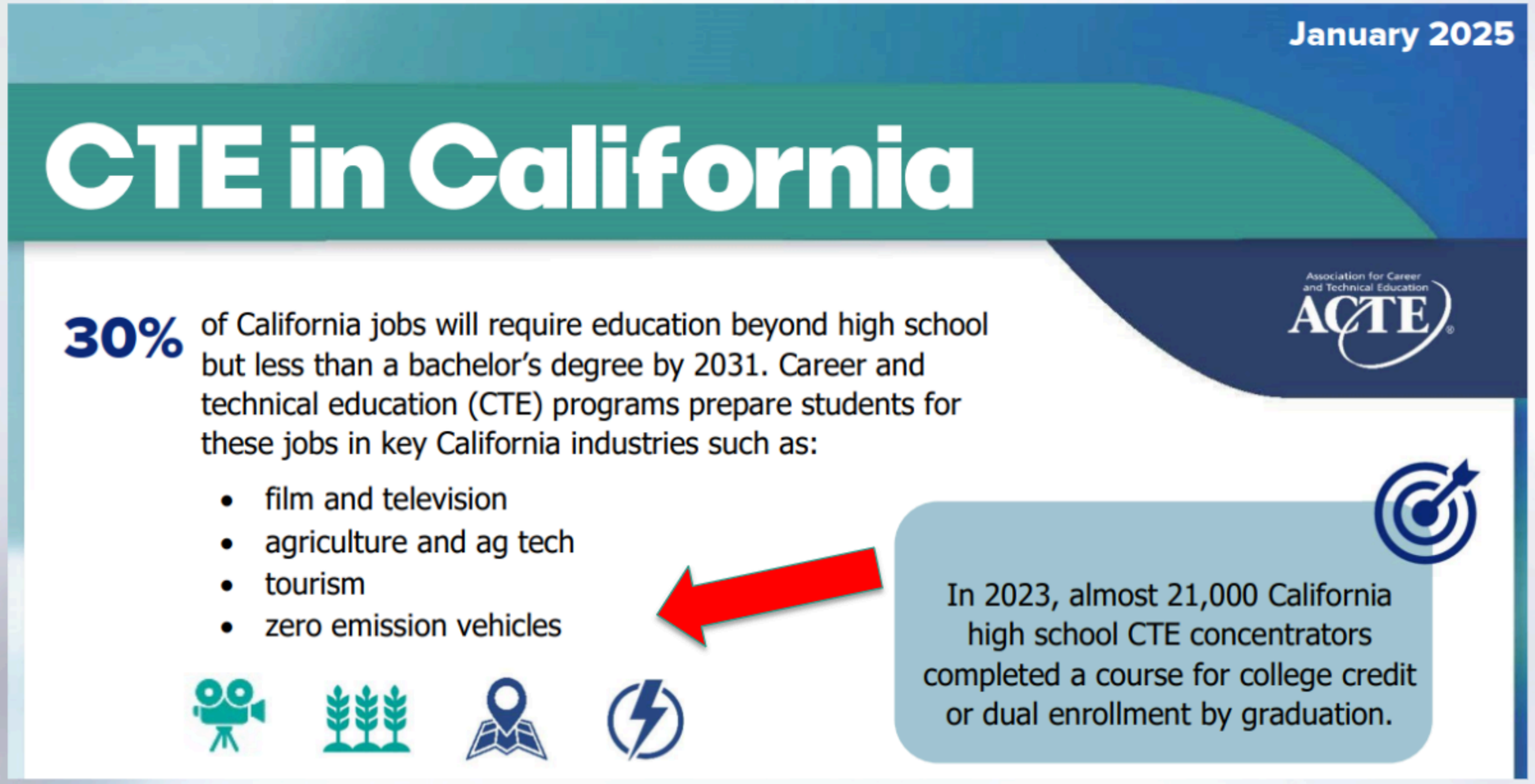
$2.3M for Workforce Development

Future Zero Emission Bus University (ZEBU)

Future ZEBU Training Bay

ZEBU Immersive Training

Career Technical Education

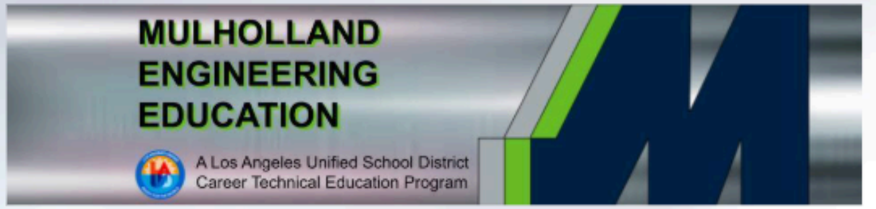


(Information: California-CTE-Fact-Sheet-2025)

William Mulholland Middle School: Fuel Cell Vehicle Build

- Los Angeles Unified School District
- Approximately 1,000 students in 6th – 8th grade
- 8th grade students design/build 1/10th scale remote controlled hydrogen car
- Students prove their design/build
- Distinguishing students participate in the Hydrogen Grand Prix

(Information: H2 Grand prix California 2023/2024 H2GP Season Begins!



(Information: Engineering – Engineering – Mulholland Middle School)

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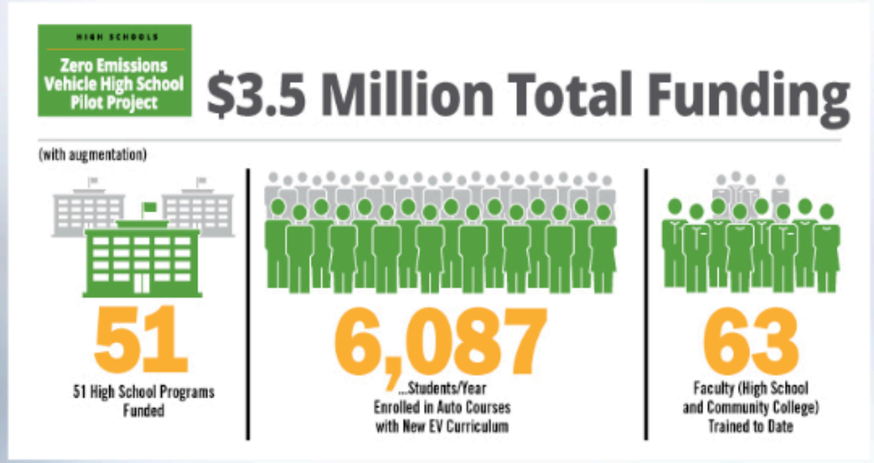
Calexico High School: ZEV Automotive Program

- One mile north of the California-Mexico border
- 8,300 students
- Two-year curriculum track: Juniors (automotive basics), Seniors (electric vehicles)
- Complements the state's vision of sales of new cars and light trucks be ZEVs by 2035



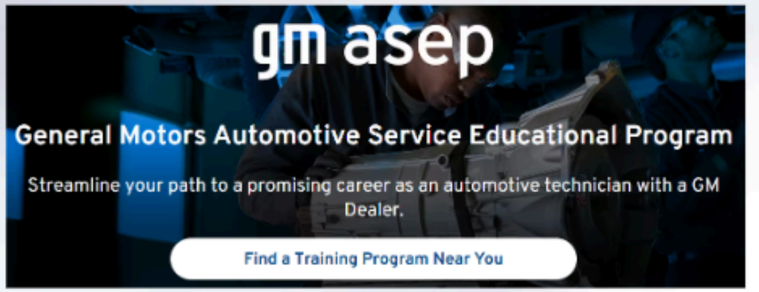
(Information: How EVs and high schoolers could help California meet green tech goals - CSMonitor.com)

(Information: Calexico High School)

Fresno City College: Automotive Dual Enrollment

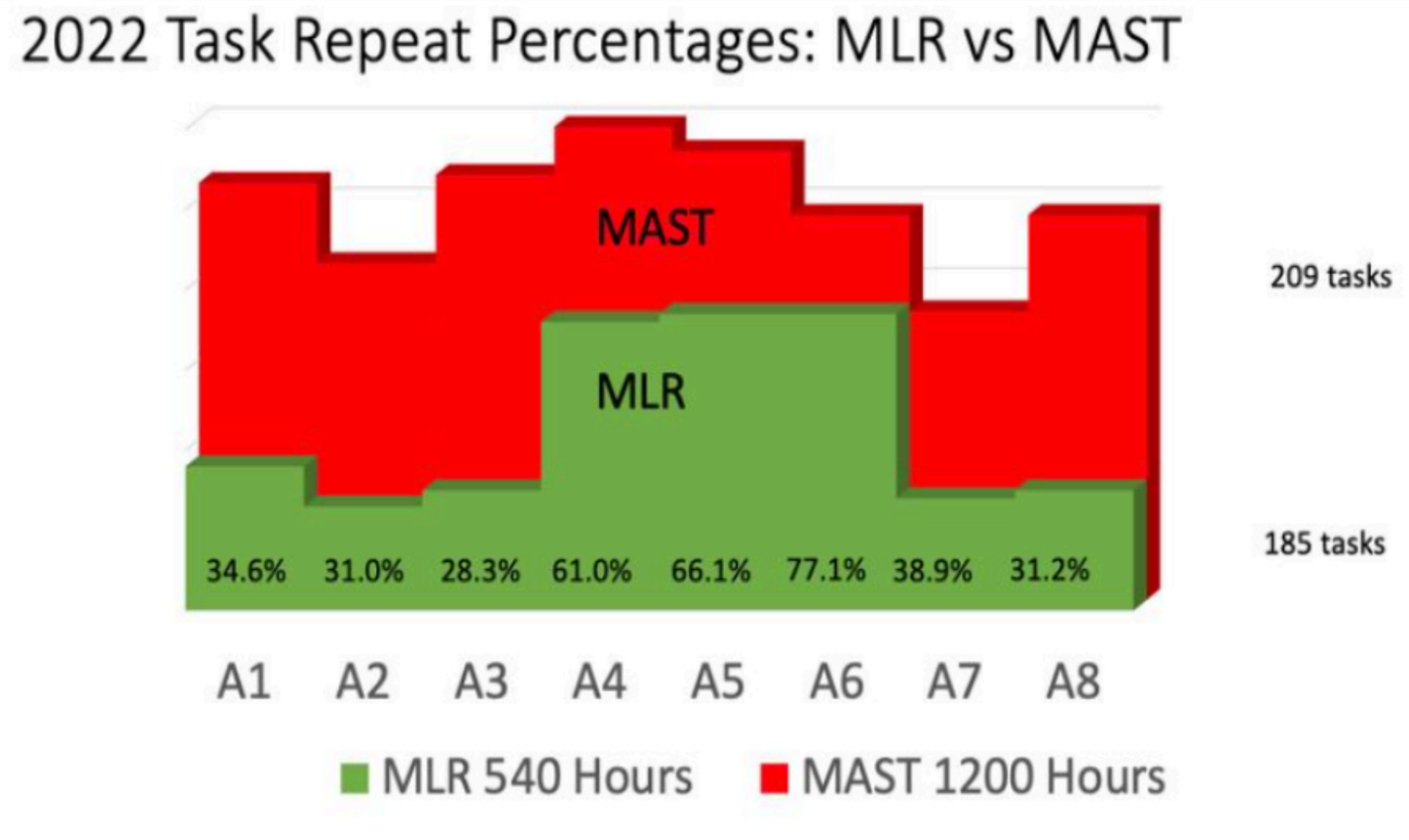
- "ZEV Service Technician Educational Pathway" grant
- Clovis West High School, Central East High School, Kerman High School
- General Motors Automotive Service Excellence Program
- Advisory/Industry Committee Meetings

(Information: CTE | Fresno City College)



(Information: Bring Us Your Talent - Technician Careers | Certified Service)

Automotive Tasks



(Information: (13) "Larry Engelbrecht" | Search | LinkedIn)

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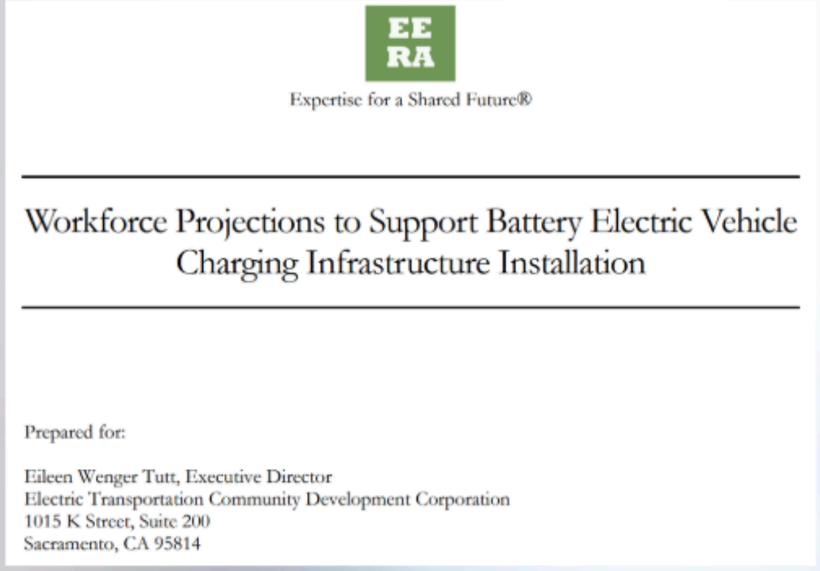
ZEV Infrastructure Workforce


EE RA

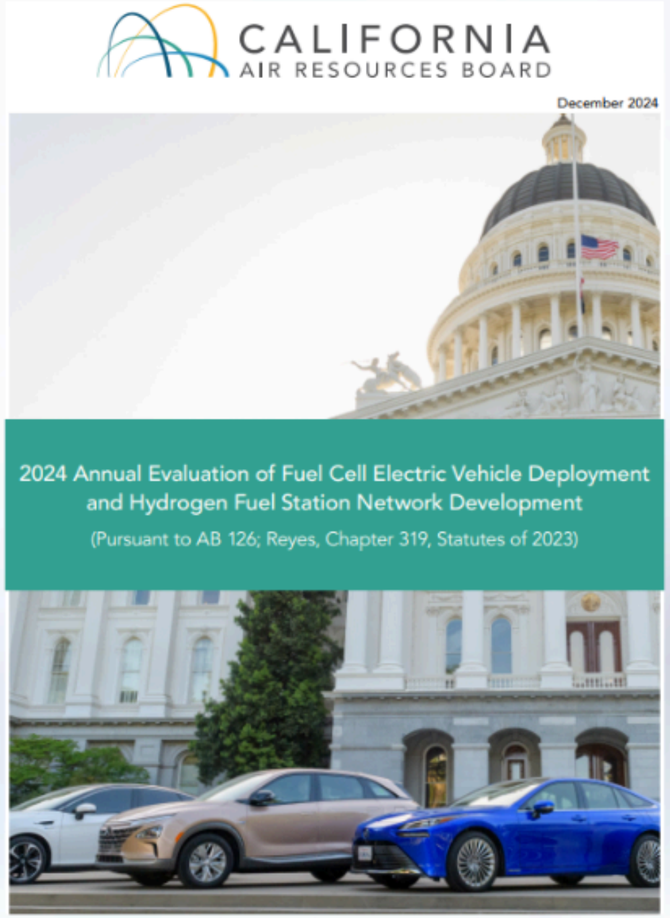
Expertise for a Shared Future®

Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation

Prepared for:

Eileen Wenger Tutt, Executive Director
Electric Transportation Community Development Corporation
1015 K Street, Suite 200
Sacramento, CA 95814

(Information: Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation – Final)



(Information: 2024 Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development)

Information: California Mobility Center | Home)

International Brotherhood of Electrical Workers

IBEW LOCAL 569: RIGOROUS TRAINING, LIFELONG LEARNING

IBEW Local 569's members are highly trained professionals who receive ongoing training throughout their career. Local 569's industry training is the best in the region in quality, education and technical expertise. and is provided by our San Diego and Imperial Counties Electrical Training Institute.

Electric Vehicle Infrastructure Training Program™

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ZEV Workforce Study

FOUNDATION *for* CALIFORNIA COMMUNITY COLLEGES

SUCCESS CENTER *for* CALIFORNIA COMMUNITY COLLEGES

Research Design Plan: Workforce Assessment of Zero Emission Vehicle Training Programs in California Community Colleges

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Green Tech Education and Employment

- Community-based training solution in Sacramento
- Training includes:
  - Skills Development
  - Understanding Technology
  - Safety Protocols
  - Regulatory Compliance
  - Sustainability Awareness
  - Market Trends
  - Business Opportunities

GREEN TECH
EDUCATION & EMPLOYMENT
WWW.GREENTECHEDU.ORG

(Information: Green Technical Education and Employment)

San Diego Automotive Educators Conference

(Information: Charged Up: Highlights from the San Diego Automotive Educators Conference - Motortopia - EVERYTHING Automotive!)

CARB

Thank you!

Larry Rillera

California Air Resources Board

Staff Air Pollution Specialist

Larry.Rillera@arb.ca.gov

CARB

Labor Market Assessment

Ebony Joy Benzing
Director
Greater Sacramento Center of Excellence for Labor Market Research

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FOR LABOR MARKET RESEARCH
GREATER SACRAMENTO

LOS RIOS
COMMUNITY
COLLEGE DISTRICT

The Labor Market Outlook for High-Voltage Jobs in Greater Sacramento

Ebony Joy Benzing, Director

Greater Sacramento Center of Excellence for Labor Market Research

Tuesday, April 15, 2025

The Centers of Excellence for Labor Market Research

Economic Region	Regional Director
North Far North	Ebony J. Benzing (North)
	Sara Phillips (Far North)
Bay Area	Marcela Reyes
Central Valley/Motherlode	Patricia Salinas
South Central Coast	Jacob Poore
Los Angeles	Luke Meyers
Orange County	Jesse Crete
Inland Empire/Desert	Shannon Moran
San Diego/Imperial	Tina Ngo Bartel
Statewide	Laura Coleman

Our Research Focuses On:

We use data about…

- Industries & businesses
- Size & performance of labor market
- Occupations & job titles
- Wages & earnings
- Education & training requirements
- Credentials
- Skills
- Emerging trends

To answer questions…

What is the **employment outlook** for students?

Which jobs offer the opportunity to earn a **living wage**?

What **skills and credentials** are needed?

Where are the opportunities for **career mobility**?

And others.

And support…

Investments into new and relevant programs

Reviewing and modifying existing programs

Assessing regional labor market needs

Grant applications

Presentation Overview

- Defining "High-Voltage"
- High-Voltage Job Postings Analysis
- Postsecondary Training Options
- Takeaways and Recommendations

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Defining “High-Voltage”

Defining “high-voltage” to find relevant

What is considered “high-voltage”?

- California:
  - A voltage of more than 600 volts or a system conductors and equipment operating at (or intended to be operated at) a sustained voltage of 600 volts or more.
- Related licenses and statuses:
  - C-10 electrical contractor license
  - Qualified Electrical Worker (QEW)

"Qualified Electrical Worker"

- Title describes someone who has demonstrated the necessary skills, knowledge, and safety training required to perform specific electrical tasks.
- Only QEWs, and employees in training under the supervision of a QEW, are allowed to work on energized systems.
- Aka "Qualified Person"

- Key requirements:
  - Minimum of two years of training and experience with high-voltage electrical circuits and equipment
  - "Demonstrated familiarity" with the work to be performed and hazards involved.
    - Includes understanding minimum approach distances, required personal protective equipment (PPE), and safe work practices.

Source: California Department of Industrial Relations, "Qualified Electrical Worker"

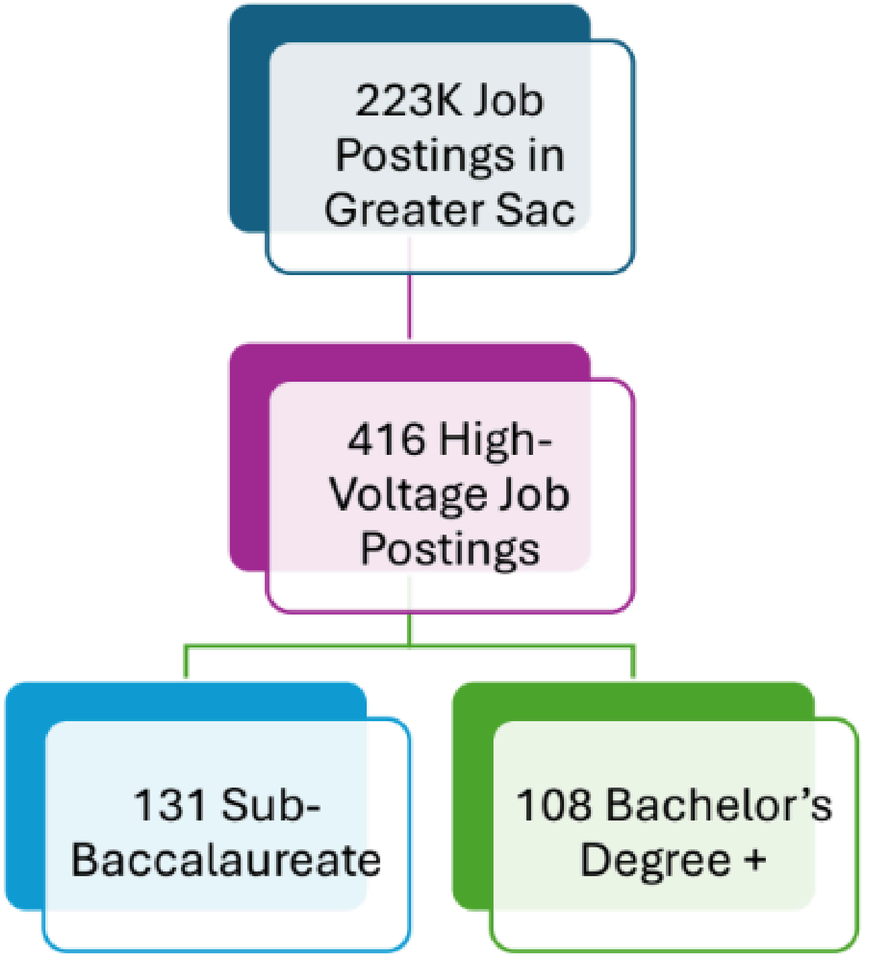
High Voltage Job Postings in Greater Sacramento

Lightcast Job Posting Analytics Tool – Q1 2025 Data Set

Job advertisements with “high-voltage” skill sets, newly posted online between April 1, 2024, and March 31, 2025

Analysis excludes internships (5 postings) and staffing companies (33 postings)

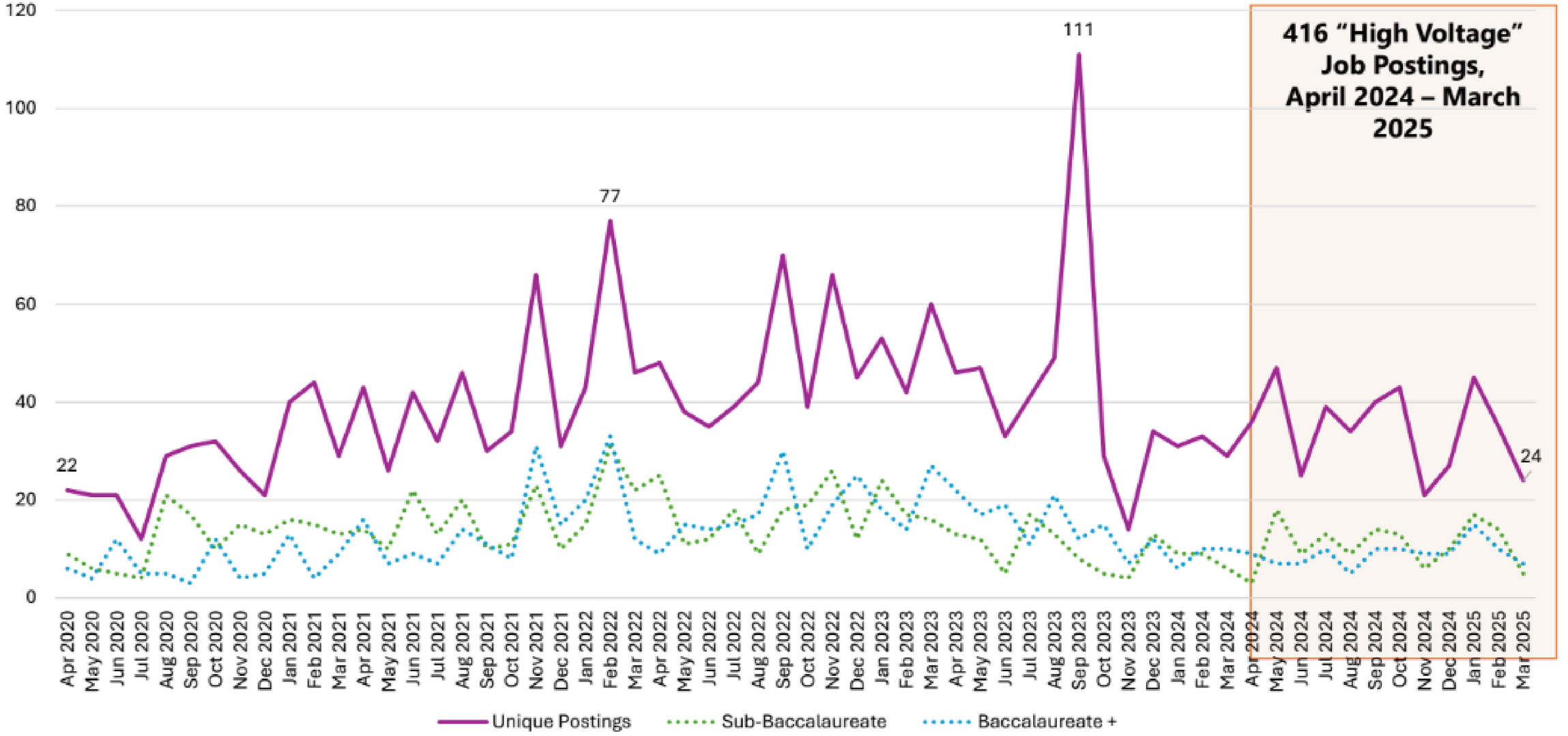
High-Voltage Job Postings Analysis



- Conduct multiple keyword and skill-based job searches
- Selected "high-voltage" skills as primary search
- Analysis of two timelines
  - Last five years (April 2020 – March 2025) for overall posting trends
  - Last 12 months (April 2024 – March 2025) for details on employers, job titles, potential occupations, and skills.

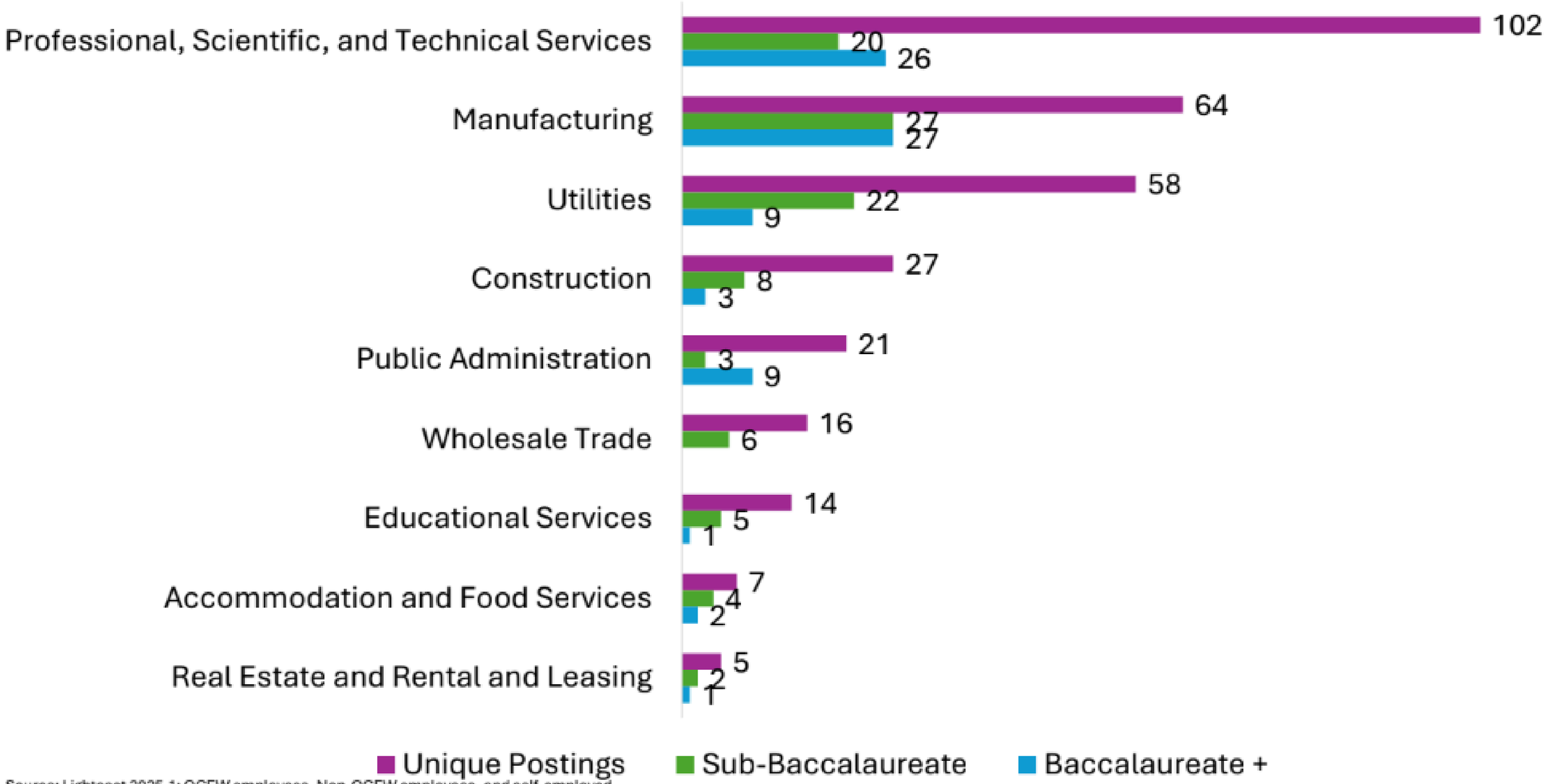
Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

High Voltage Job Postings Trends



Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

“High-Voltage” Job Postings by Industry



Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Employers with the most postings

Company	# of Postings
Sacramento Municipal Utility District (SMUD)	31
California ISO	22
Sargent & Lundy	22
Tellus Solutions	16
PG&E	11
University of California, Davis	9
City of Sacramento	9
Rivian	8
Vertiv	8
RES (Renewable Energy Systems) Group	7

- **Sub-Baccalaureate**
  - PG&E (10)
  - SMUD (9)
  - Rivian (8)
  - RES Group (6)
  - Glow Networks (5)
- **Baccalaureate**
  - California ISO (15)
  - City of Sacramento (8)
  - Thermo Fisher Scientific (6)

Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Job titles with the most postings

Job Title	# of Postings
High Voltage Electricians	24
Calibration Technicians	13
Protection and Control Engineers	12
Field Service Technicians	12
Solar Installers	7
Apprentice Electricians	7
Electrical Engineers	7
Field Service Engineers	7
Staff Electrical Engineers	7
Power Supply Repair Technicians	6

- **Sub-Baccalaureate**
  - Field Service Technicians (11)
  - Power Supply Repair Technicians (6)
  - Field Technicians (5)
  - Journeyman Lineman (4)
  - Apprentice Electricians (4)
- **Baccalaureate**
  - Field Service Engineers (6)
  - Staff Electrical Engineers (6)
  - Project Engineers (5)

Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Occupations with the most postings

Occupation	# of Postings
Electrical Engineers	50
Electricians	42
Maintenance and Repair Workers, General	24
Solar Photovoltaic Installers	15
Electronics Engineers, Except Computer	14
Calibration Technologists and Technicians	14
Project Management Specialists	13
Electrical and Electronic Engineering Technologists and Technicians	13
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	9
Architectural and Engineering Managers	8

- **Sub-Baccalaureate**
  - Maintenance and repair workers, general (17)
  - Electricians (14)
  - Electrical Power-Line Installers and Repairers (7)
- **Baccalaureate**
  - Electrical Engineers (23)
  - Electronics Engineers, Except Computer (12)
  - Project Management Specialists (8)

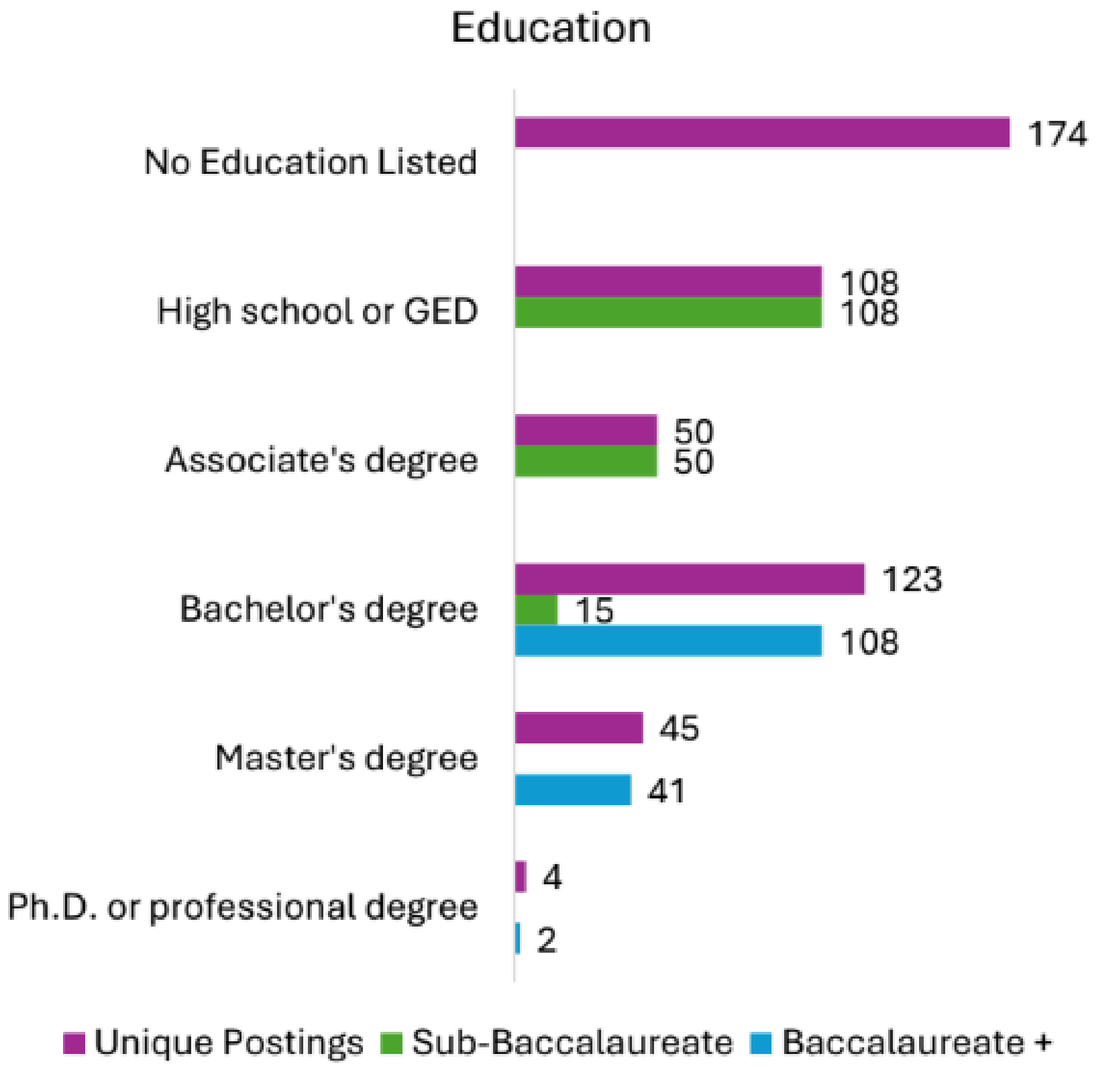
Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

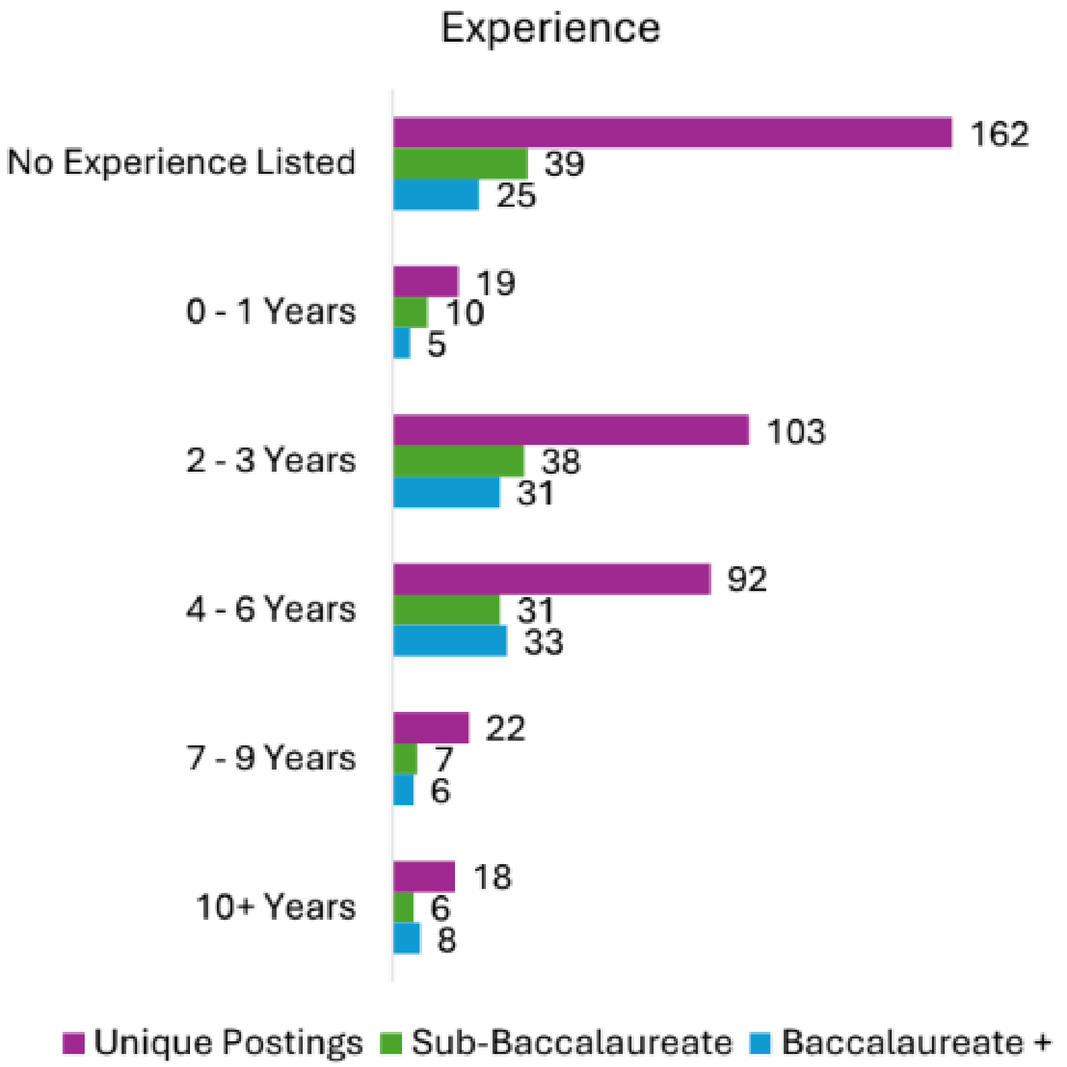
Most Desired Skills

	Sub-Baccalaureate	Baccalaureate
Specialized	• High Voltage • Hand Tools • Low Voltage • Power Tool Operation • Transformers	• High Voltage • Project Management • Electrical Engineering • Continuous Improvement • Physics
Common	• Communication • Troubleshooting • Operations • Customer Service • Detail Oriented	• Communication • Operations • Problem Solving • Planning • Management
Software	• Microsoft Office (Excel, Outlook, PowerPoint, Word)	• Microsoft Office (Excel) • Python • AutoCAD

Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Preferred Education and Experience





Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Key Takeaways

- Overall
  - Key industries: Professional, Scientific, Technical Services; Manufacturing; Utilities; and Construction.
  - Challenges with identifying sub-baccalaureate occupations beyond electrician and electrical line workers.

- Sub-Baccalaureate
  - Key occupations include maintenance and repair workers, electricians, and electrical power-line installers and repairers
  - Some occupations require apprenticeships
  - Desired skills suggest these roles are primarily technical, hands-on

- Bachelor's Degree +
  - Key occupations are engineering roles
  - Skills suggest roles are design-focused and project-centered

Source: Lightcast 2025.1; QCEW employees, Non-QCEW employees, and self-employed.

Postsecondary Training

What programs exist in the region to train individuals for analyst careers?

Potential Training related to QEWs

Third-Party Administered Programs Found Online

- High Voltage (HV) Qualified Course
  - Focused on NFPA 70E and OSHA 1910.269 standards
  - The requirement for the course is usually a low-voltage qualified training course
- High Voltage (HV) Switching Course
  - Designed for electrical workers involved in the operation and maintenance of HV electrical systems; covers topics such as isolation and permit-to-work systems

Existing Regional Training Programs

Electrician

- American River
- Independent Training & Apprenticeship Program (iTAP)
- InterCoast Colleges – Rancho Cordova
- National Career Education

Electronics and Electrical Technology

- American River
- Sacramento City

Industrial Electronics

- American River
- Sierra

Community colleges conferred an average of 121 awards in related program areas for the last three years.

Takeaways and Recommendations

Key Takeaways

- "High-voltage" is a skill set for specific jobs in construction, manufacturing, utilities, and the professional, scientific, and technical services sectors.
  - Relatively stable job posting activity suggests a consistent level of demand for these jobs.
- However, HV tasks vary by industry sector and job.
  - Electricians and powerline installers work on energized HV systems and require detailed knowledge about HV, while other jobs may not require the same level of knowledge.

Thank you!

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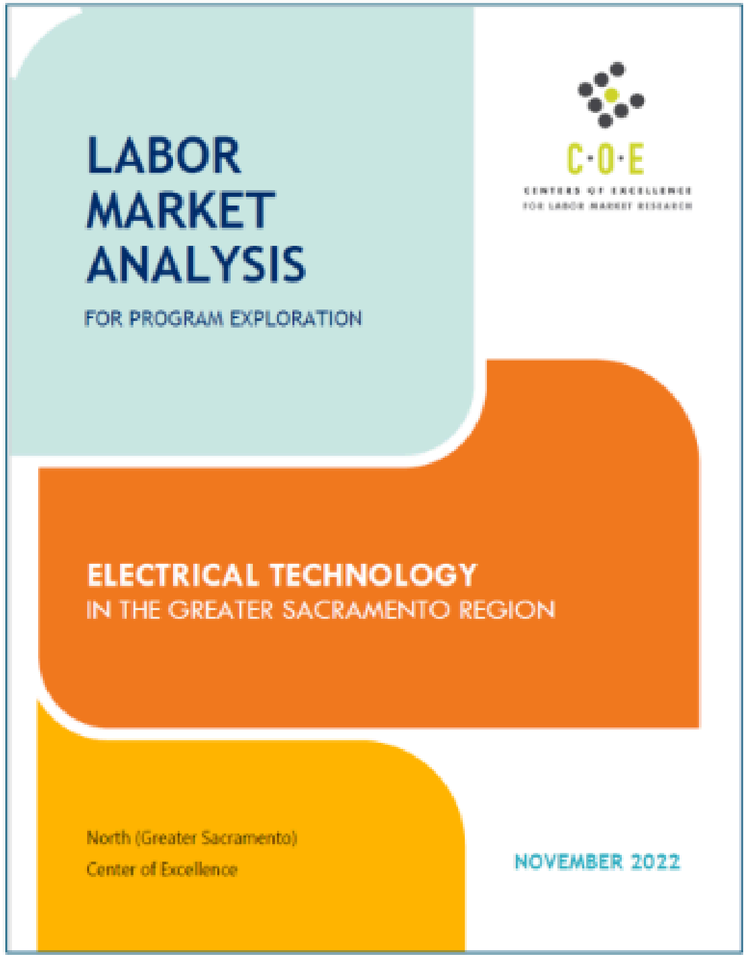
Greater Sacramento COE

ebony.benzing@losrios.edu

Related Report from Nov 2022



https://drive.google.com/file/d/1G6a7V1O9tGPiRbz-s7iHs77xLEHQAHEZ/view?usp=drive_link

Industry Panel Discussion

Caitlin Blockus
Valley Vision
21st Century Workforce Project Manager

Industry Panel Discussion

Christy Dray

Manager, Substation Construction & Maintenance, Grid Assets
Sacramento Municipal Utility District (SMUD)

Orville Thomas

Chief Executive Officer
California Mobility Center

Tom Clarke

Lead Learning & Development Program Manager
Rivian

Chris Tillery

Training Director
Sacramento Electrical Training Center

Thank you for joining!

For more information, please contact:

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Valley Vision
21st Century Workforce Project Manager
Caitlin.Blockus@valleyvision.org

Liz Kilkenny
Valley Vision
21st Century Workforce Project Coordinator
liz.kilkenny@valleyvision.org

Fill out our survey and let us know what you think!

Optional Networking Opportunity

Exit to the Rivian Vehicles Park in the Sierra College Welding Area.