



# Clean Transportation Workforce Development Plan

San Joaquin Council of Governments

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WestEd is a nonpartisan, nonprofit organization that aims to improve the lives of children and adults at all ages of learning and development. We do this by addressing challenges in education and human development, reducing opportunity gaps, and helping build communities where all can thrive. WestEd staff conduct and apply research, provide technical assistance, and support professional learning. We

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# Executive Summary

## Background and Context

In 2021, the San Joaquin Council of Governments (SJCOG) secured funding for a pioneering workforce development program focused on EV carsharing and E-bike sharing operations through a CARB Sustainable Transportation Equity Project (STEP) grant. This program was part of a larger initiative to introduce clean transportation options in disadvantaged areas of Stockton<sup>1</sup> according to CalEPA thresholds based on "geographic, socioeconomic, public health, and environmental hazard criteria," and to develop a career pipeline in shared mobility operations, including EV maintenance, repair, and fleet management. As the program progressed, SJCOG recognized the need for a comprehensive plan for certification, expansion, and long-term sustainability beyond the initial grant period.

The following recommendations advance the goals of the STEP workforce plan by providing guidance for training program certification and its integration into the broader workforce development ecosystem of San Joaquin County and the northern San Joaquin Valley. These recommendations will also help ensure a skilled local workforce is available as investments in clean transportation increase across local, state, and federal levels.

## Project Approach

This workforce development plan is informed by research and activities conducted from May 2024 to January 2025. These activities were carried out in two phases. The first phase lasted from May 2024 to August 2024 and involved qualitative and quantitative data collection and analysis of various sources of economic, education and training, and workforce system information. Specifically, the work conducted included:

1. Analysis of labor market and economic data to evaluate the occupational demand for E-bike, EV maintenance and repair, and EV charger installation training programs and identify cross-cutting skills and competencies in related pathway occupations
2. Literature review and documentation scan of green transportation initiatives nationwide
3. Outreach and engagement with key workforce, education, economic development, and employer/industry interest representatives to understand the regional clean transportation workforce, education, and economic ecosystem(s)
4. Examination of opportunities, gaps and challenges within the current STEP program and further development of a clean transportation workforce development ecosystem.

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<sup>1</sup> See <https://oehha.ca.gov/calenviroscreen/sb535> for definition of disadvantaged community.

After completing the first phase of the project, the WestEd team issued an interim report on November 13, 2024, summarizing findings and offering preliminary recommendations for integrating the STEP workforce program into the larger clean transportation training and workforce ecosystem.

Phase two activities built on the first phase through strategic meetings with education and training providers to integrate SJCOG training programs into regional educational pathways, including the Manteca Education and Training Center, Stockton School for Adults, Delta College, and the Green Economy Lab. These discussions explored implementation opportunities for E-bike, EV maintenance and repair, and EV carshare training programs and development of Integrated Education and Training (IET) and Integrated English Literacy and Civics Education (IELCE) modules combining basic skills instruction with specialized clean transportation technology training, including recognized industry credentials, to support participants facing language barriers and foundational skill needs.

## **Clean Transportation Career and Education Opportunity Mapping**

To clarify pathways from the SJCOG's training programs into aligned education and training and, ultimately, jobs, the WestEd team developed a Clean Transportation Opportunity Map, found on the next page. The Map encompasses the formal education and training offered through the regional community college and trade schools, as well as the accelerated training contextualized for adult learners offered through local project partners such as the Green Economy Lab, Manteca Education & Training Center (Adult School), and the MDP fellowship program.

Wage ranges are listed for occupations based on 10th percentile (as proxy for entry-level wages), median, and 75th percentile earnings for each occupation. Educational and training pathways are categorized into four main types:

1. Job Training available through partner organizations offering a fellowship model
2. Skill Building through local non-profit organizations and Adult Schools offering a short-term training model open to the public
3. Credit Certificates through postsecondary institutions offering a traditional, semester-based credit model, and
4. Apprenticeships are offered through the IBEW-registered apprenticeship model, or Associate Degrees are offered through postsecondary institutions using traditional, semester-based credit models.



# Opportunity Map SJCOG Clean Transportation

## Specialized Skills:

- Mechanical aptitude
- Suspension/Forks
- Brakes
- Lithium batteries
- Cables/housing
- Wheels/tires
- Automotive Electricity and Electronics
- 12-volt electricity
- Electrical wiring
- Safety standards

- Engine Performance /Fuel & Ignition
- Auto HVAC
- Steering and Suspension
- Transmissions & Transaxles
- Automotive Brakes
- Programmable Logic Controllers (PLC)
- Automation
- Instrumentation
- Control Systems
- Blueprint Reading
- Electromechanics
- Low Voltage
- Electrical codes
- Electrical equipment
- Transformers
- Network Switches
- Electrical systems

**\$15-24/hr.**

Bicycle Repairers  
Counter and Rental Clerks

**\$15-26/hr.**

Electrical and Electronics Installers and Repairers, Transportation Equipment

- Automotive Service Technicians and Mechanics
- Electrical, Electronic, and Electromechanical Assemblers

**26/hr.-\$37**

Automotive Service Technicians and Mechanics

- Electrical and Electronics Installers and Repairers, Transportation Equipment
- Electrical and Electronics Repairers, Commercial and Industrial Equipment
- Electrical, Electronic, and Electromechanical Assemblers
- Industrial Machinery Mechanics

**\$26-45/hr.**

Senior/Supervisor Automotive Mechanic

- Electrical and Electronic Engineering Technologists and Technicians
- Electricians

**Job Training**

MDP:  
E-Transportation Basics  
Transportation  
Share Operations

- Skills Builders**
- Green Economy Lab:*  
EV mechanic Bootcamp  
EV Charging Station – Installation & Maintenance  
Customer Service  
Electrician Certificate Program
- Manteca Education & Training Center:*  
Logistics, Industrial Maintenance, & Manufacturing  
Basic Welding  
Forklift Safety Certification Series

- Credit Certificates**
- Delta College:*  
Electromechanical/Electromechanical Engineering Technology/Technician  
Electrician  
Electrical/Electronics Equipment Installation and Repair Technology/Technician, General  
Heavy Equipment Maintenance Technology/Technician  
Industrial Mechanics and Maintenance Technology/Technician  
Automobile/Automotive Mechanics Technology/Technician

- Apprenticeships, Associates, & Bachelors**
- IBEW Local 595 Electricians Apprenticeship  
San Joaquin Electrical Training Institute
- Delta College:*  
AAS Electromechanical/Electromechanical  
Engineering Technology/Technician  
AAS Electrician  
AAS Heavy Equipment Maintenance  
Technology/Technician  
AAS Automobile/Automotive Mechanics  
Technology/Technician

## Findings and Recommendations

The following section summarizes key findings and recommendations based on research and outreach conducted by the WestEd team and informed by ongoing conversations with the SJCOG. Findings and Recommendations are organized in the following key areas: Curriculum and Pathway Design, Participant Engagement and Navigation, Partnerships and Program Integration, and Project Feasibility and Infrastructure.

### Curriculum and Pathway Design

#### Key Findings

- **The current fellowship model functions as on-the-job training with little formal instruction.** While providing valuable paid work experience and opportunities for self-directed learning, it lacks structured curricula and clear pathways to further education or career advancement in technical fields.
- **Separating technical from operational skills training could enhance adult learning outcomes.** Research on adult learning principles suggests that separating technical training (E-bike mechanics) from operational training (transportation share operations) would reduce cognitive load, allow for deeper skill processing, and better align with adults' preference for immediately applicable, problem-centered learning experiences.

#### Recommendations

- Identify and delineate the technical and operational competencies within the fellowship model and finalize formal curricula.
- Ensure training aligns with (and optimally leads to) third-party industry credentials, especially relevant Automotive Service Excellence (ASE) credentials.
- Consider expanding the Skills Builder Training at the Green Economy Lab to include Delta College's 40-hour noncredit Advanced EV boot camp.
- Consider adopting a cohort model to develop a learning track and assess, compare, and contrast learner experiences and outcomes, as well as expand the program's reach to serve more prospective students.

## Participant Engagement and Navigation

### Key Findings

- **Recruitment methods could be more effective if strategically scaled and diversified.** Current recruitment methods—relying on classroom visits and online job platforms—have limited reach and should be expanded through multiple communication channels, formalized marketing efforts, and partnerships with educational institutions to support a cohort-based training model that cycles learners every 9-12 months.
- **Participants enter the program with diverse levels of readiness and barriers.** Participants' varying levels of academic and professional readiness necessitate leveraging braided funding through established service providers like Delta College or the San Joaquin America's Job Center of California to provide comprehensive wrap-around services, including financial support for tools that could qualify workers for California's higher minimum wage of \$22 per hour.
- **Integrated pathways and co-enrollment maximize learning opportunities and earning potential.** Creating integrated pathways across Community-Based Organizations, Adult Schools, and postsecondary institutions offers community members diverse opportunities for skills development while framing training as a stepping stone to additional fields and communicates the importance of continuous upskilling.

### Recommendations

- Align and embed outreach within additional courses and through an education partner, conduct a marketing campaign, and coordinate with local partners.
- Build on WestEd's preliminary Opportunity Map to showcase possible trajectories that training can lead to and make these maps accessible to students and interested parties (e.g., partnering colleges, employers, community organizations, and members).
- Conduct pathway mapping to delineate program pathways into related programs and jobs within the clean transportation workforce ecosystem.
- Ensure that the program design integrates multiple on-ramps and off-ramps for adult learners and provides referrals or direction access to needed wraparound support services to support student persistence.
- Combine fellows' success stories and positive experiences with the program to inform both targeted improvements based on challenges they identify and refine outreach messaging that emphasizes the aspects current fellows find most interesting or essential.
- Incentivize and provide additional training and articulation opportunities outside the program for certification, badging, or professional learning events to bolster student experience and employability.

## Partnerships and Program Integration

### Key Findings

- **Partnering with community-based organizations to provide education and training is most sustainable when implemented in conjunction with traditional educational institutions and workforce systems.** The most effective workforce development strategy leverages both the strengths of community-based organizations (specialized expertise, community connections, agility) and established educational institutions (curriculum expertise, credentialing capabilities, resources for sustainability) to address immediate industry needs while building sustainable programs with recognized credentials and clear career advancement opportunities.
- **Agencies like SJCOG benefit from specialized technical assistance to effectively design and implement training programs integrated into the workforce ecosystem.** Specialized technical assistance helps agencies like SJCOG effectively bridge the gap between community-based providers and established institutions, enabling them to create integrated programs that realize a sustainable training ecosystem.

### Recommendations

- Consider engaging an external technical assistance provider for future initiatives to support program design and implementation.
- Develop a partnership framework for engaging potential partners that incorporates coordinated instruction, support, and onramps with regional educational institutions and articulates clearly defined expectations around each partner's deliverables and roles.
- Compile an integrated table detailing agency types and their core focus areas. This table would serve as a planning tool to help foster cross-agency dialogue and collaboration.
- Explore options for convening a multi-agency working group dedicated to the ongoing alignment and integration of work streams and programs focused on addressing infrastructure workforce development pathways.
- Identify topics for the workgroup, such as how to get listed on the Eligible Training Provider List (ETPL). Providers listed on the ETPL are eligible to receive Workforce Innovation and Opportunity Act (WIOA) Title I funds to pay for training services provided to eligible individuals (out-of-school youth aged 16-24, adults, or dislocated workers) via their Individual Training Account (ITA).

## Project Feasibility and Infrastructure

### Key Findings

- **Transportation infrastructure needs improvement to support program uptake and e-bike utilization.** Until structural improvements outlined in Stockton's Active Transportation Plan and Bicycle Master Plan are implemented to create safer biking conditions in South Stockton, the Bike Stockton program will continue to struggle with community uptake.
- **Project area boundaries are limiting.** The geographically restricted project area defined by CARB funding diverts staff resources toward compliance rather than structural integration with the broader workforce ecosystem. Despite serving the intended populations facing systemic barriers, this limits the program's reach and impact.
- **Leveraging local businesses could enhance local impact and engagement.** Shifting from outside vendors to local businesses for E-bike fleet purchasing, maintenance, and replacement parts would create a multiplier effect in the regional economy, enhance local employer engagement, and align with successful models in other sectors like hospitality and national parks.

### Recommendations

- Incentivize and encourage local biking infrastructure development in alignment with regional plans and programs.
- Report to CARB on the restrictive nature of project boundaries and the need for technical assistance to support project grantees. Technical assistance may include initial resources and planning time to ensure programs meet their objectives and align with the overall intent of the funding.
- Engage local and regional businesses in expanding the transportation share program. Connecting this initiative to local businesses will garner greater buy-in, increase economic impact, and align with local and regional priorities to support small business owners. The COG is encouraged to engage local owners to better understand interest and opportunities to retain dollars in the local community and expand local employment opportunities through apprenticeship programs.

## Looking Forward

The challenge of establishing and aligning integrated training, pathway planning, and long-term career opportunities for the region is complex but critical for ensuring economic growth, addressing skill gaps, and promoting development that meets the evolving needs of both the workforce and industries. With its role in integrated transportation and land use planning, access to diverse funding sources, and expertise in regional data analysis, SJCOG is ideally situated to coordinate across public agencies, educational institutions, private employers, and community organizations to facilitate efforts to address gaps in the clean transportation ecosystem. The recommendations outlined above can help ensure a skilled local workforce is available as investments in clean transportation are expected to continue increasing across local, state, and federal levels.

To read the full report, please visit:

<https://www.sjcog.org/708/13176/Clean-Transportation-Workforce-Plan>

# Introduction

## Background and Context

In 2021, the San Joaquin Council of Governments (SJCOG) secured funding for a pioneering workforce development program focused on EV carsharing and E-bike sharing operations through a CARB Sustainable Transportation Equity Project (STEP) grant. This program was part of a larger initiative to introduce clean transportation options in disadvantaged areas of Stockton<sup>2</sup> according to CalEPA thresholds based on "geographic, socioeconomic, public health, and environmental hazard criteria," and to develop a career pipeline in shared mobility operations, including EV maintenance, repair, and fleet management. As the program progressed, SJCOG recognized the need for a comprehensive plan for certification, expansion, and long-term sustainability beyond the initial grant period.

The following recommendations advance the goals of the STEP workforce plan by providing guidance for training program certification and its integration into the broader workforce development ecosystem of San Joaquin County and the northern San Joaquin Valley. These recommendations will also help ensure a skilled local workforce is available as investments in clean transportation increase across local, state, and federal levels.

## Project Approach

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1. Analysis of labor market and economic data to evaluate the occupational demand for E-bike, EV maintenance and repair, and EV charger installation training programs and identify cross-cutting skills and competencies in related pathway occupations
2. Literature review and documentation scan of green transportation initiatives nationwide
3. Outreach and engagement with key workforce, education, economic development, and employer/industry interest representatives to understand the regional clean transportation workforce, education, and economic ecosystem(s)
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<sup>2</sup> See <https://oehha.ca.gov/calenviroscreen/sb535> for definition of disadvantaged community.

Upon completing the first phase of the project, the WestEd team released an interim report on November 13, 2024, summarizing findings and providing preliminary recommendations for integrating the STEP workforce program into the broader clean transportation training and workforce ecosystem. The report also includes considerations on how SJCOG might foster workforce development in clean transportation and related sectors. In addition to delivering the interim report, the WestEd team presented findings to the Stockton Mobility Collective (SMC) steering committee on October 3 and to the San Joaquin Regional Climate Collaborative (RCC) Community Advisory Board on October 16, with representation from Lodi, Stockton, and Tracy. Other stakeholders were invited to provide feedback and input on the interim report, which the WestEd team used to inform the refinements reflected in the subsequent plan.

Phase two activities built on the first phase through strategic meetings with education and training providers to integrate SJCOG training programs into regional educational pathways. The WestEd project team engaged with several institutions, including the Manteca Education and Training Center, Stockton School for Adults, Delta College, and the Green Economy Lab, to explore implementation opportunities for E-bike, EV maintenance and repair, and EV carshare training programs. These discussions centered on developing Integrated Education and Training (IET) and Integrated English Literacy and Civics Education (IELCE) modules that would combine basic skills instruction with specialized clean transportation technology training, including recognized industry credentials, to support participants facing language barriers and foundational skill needs.

## **Developing a Thriving Clean Transportation Workforce Ecosystem**

The 2023 article<sup>3</sup> “Rethinking the Workforce Development Ecosystem: Grow the Economy by Bridging the Skills Gap” offers a compelling alternative to the traditional workforce development model. It suggests that while the term “ecosystem” is commonly used to describe workforce development systems, these systems often operate more like linear processes that concentrate on specific outputs rather than nurturing a thriving workforce ecosystem. The article argues that participants in the workforce system frequently function in isolation, leading to a significant disconnect between job-seeking individuals and the various systems designed to support them.

This fragmentation is evident in the way employers network with other employers, government officials engage with their peers, and educators connect with fellow educators. Meanwhile, talented individuals — particularly those from disadvantaged communities — struggle to showcase their

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<sup>3</sup> O’Leary, J., Overley, N., and Datar A. (2023), “Rethinking the Workforce Development Ecosystem: Grow the Economy by Bridging the Skills Gap.” [https://www2.deloitte.com/content/dam/insights/articles/us176053\\_cgi-workforce-development-ecosystem/DI\\_Workforce-development-ecosystem.pdf](https://www2.deloitte.com/content/dam/insights/articles/us176053_cgi-workforce-development-ecosystem/DI_Workforce-development-ecosystem.pdf)

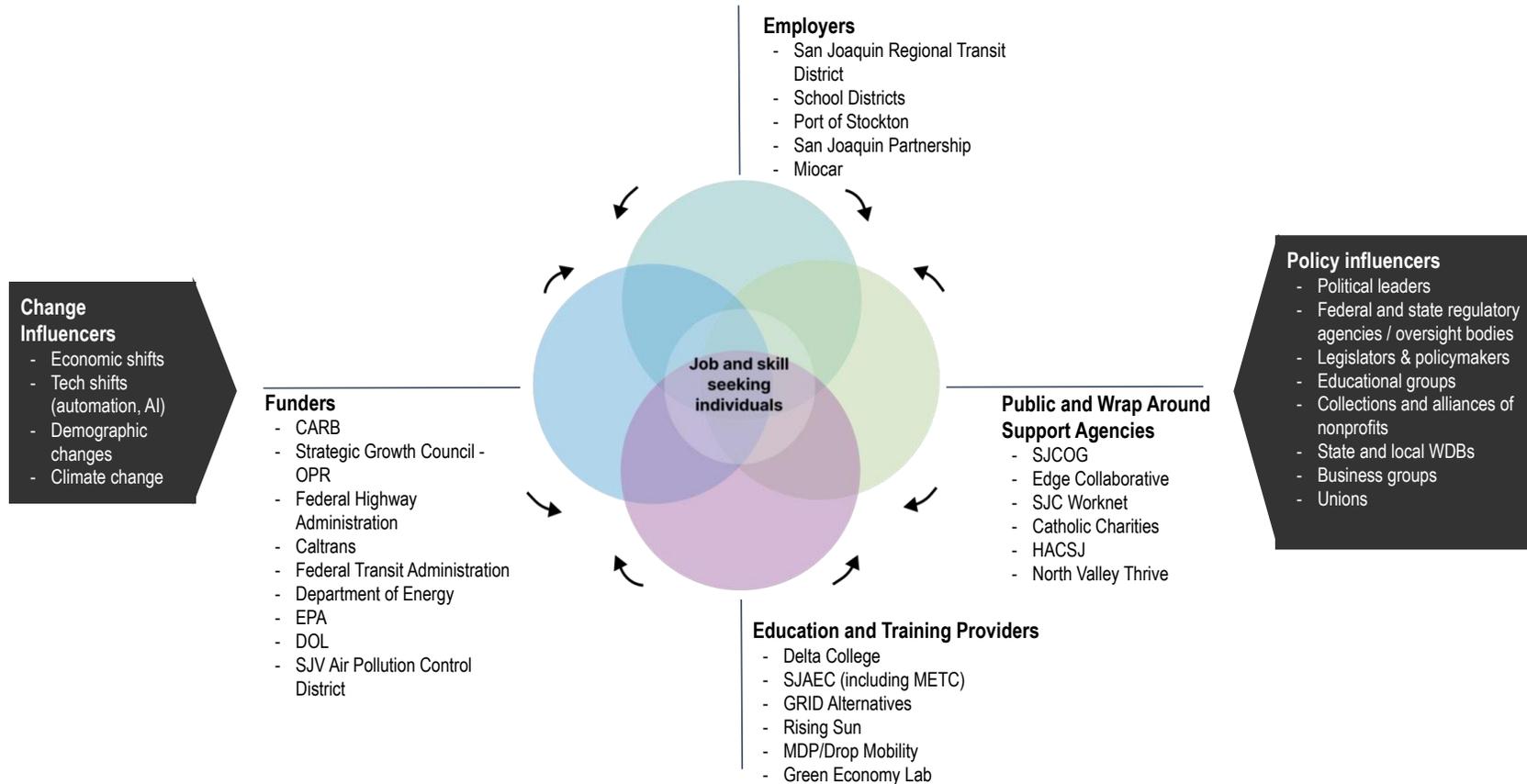
abilities to potential employers because clear pathways for connection do not exist. Rather than benefiting from diverse perspectives that could drive innovation and improvement, these siloed conversations often reinforce existing assumptions and approaches that fundamentally undermine the ecosystem's ability to adapt and evolve.

The impacts are significant. When training providers interact with employers only minimally, they cannot plan for emerging skills needs or quickly adapt their programs to meet changing workforce needs. Similarly, when government agencies are not closely connected to training providers and job seekers, resources may not flow effectively to where they are needed most. The result is a system that does not optimally serve either job seekers or employers.

To tackle these challenges, ecosystem participants need stronger connections and better-aligned incentives that naturally encourage collaboration instead of isolation. This is particularly crucial in emerging fields like clean transportation, where workforce needs and essential skills are evolving rapidly.

Ultimately, the San Joaquin region's clean transportation workforce goals cannot be sustainably achieved through isolated programs or single-agency solutions. Instead, they will require coordination and integration within the broader workforce development ecosystem—that is, the interconnected network of employers, educational and training providers, government and workforce development agencies, community organizations, and job seekers that collectively shape workforce outcomes. Figure 1 below illustrates what a thriving clean transportation workforce ecosystem might resemble within the context of SJCOG's training programs.

**Figure 1. Thriving and Connected Clean Transportation Workforce Ecosystem<sup>4</sup>**



*Adapted from Deloitte Insights*

<sup>4</sup>CARB=California Air Resources Board; DOL= Department of Labor; EPA= Environmental Protection Agency; HACSJ= Housing Authority of the County of San Joaquin; OPR=Office of Planning and Research; MDP= Mobility Development Partners; METC= Manteca Education & Training Center; SJAEC= San Joaquin Adult Education Consortium; SJC= San Joaquin County; SJCOG= San Joaquin Council of Governments; SJV= San Joaquin Valley; WDB= Workforce Development Board

## The Role of the Council of Governments in the Workforce Ecosystem

The San Joaquin Council of Governments (SJCOG) is set to significantly influence the clean transportation workforce ecosystem through strategic investments and workforce development efforts. With its role in integrated transportation and land use planning, access to diverse funding sources, and expertise in regional data analysis, SJCOG is ideally situated to coordinate across public agencies, educational institutions, private employers, and community organizations to facilitate efforts to address gaps in the clean transportation ecosystem. Furthermore, Senate Bill 375, enacted in 2008, requires entities like SJCOG to create a "Sustainable Communities Strategy" (SCS) that aligns transportation, land use, and housing policies to achieve local emissions goals. Even before SB 375 was enacted, SJCOG had begun implementing a range of programs to promote housing development in the area. This legislation has fostered regional collaboration on transportation, land use, and housing to achieve greenhouse gas emission reduction targets with SJCOG as the regional facilitator.

## Clean Transportation Investment Landscape

Although federal funding under the current administration remains uncertain, California's investment in emerging sectors and federal priorities for infrastructure and technology development seems likely to continue. Given the substantial current and planned investments in clean transportation in the state and the region, SJCOG may be positioned to convene and lead regional efforts around related initiatives, programs, and partnerships for the clean transportation workforce.

In a brief titled "Unprecedented Opportunity: Meeting the Workforce Demands of New Clean Energy, Manufacturing, and Infrastructure Investments," the National Skills Coalition and BlueGreen Alliance estimated that the roughly \$2 trillion in federal investments from the Inflation Reduction Act, Bipartisan Infrastructure Law, and CHIPS and Science Act programs are projected to create an average of 2.9 million jobs annually. This will stimulate growth in middle-skill job opportunities that offer a living wage and do not require a four-year degree.

Similarly, at the state level, the UC Berkeley Labor Center analyzed the 2022-26 California state budget and noted a projected \$32 billion in climate investments, including \$9 billion for Zero-Emission Vehicle product funding programs for cars, trucks, boats, and infrastructure.

The 2022 SJCOG Regional Transportation Plan/ Sustainable Community Strategy found that regional investments would create the equivalent of 6,277 jobs annually, primarily in construction and local transit roles. As clean transportation investments continue to grow, these numbers may be reflected

in the 2026 Regional Transportation Plan, which is currently being developed and is expected to be adopted in June 2026.

Regionally, significant investments are already generating immediate opportunities to expand the clean transportation workforce:

- The Port of Stockton obtained \$110 million through the EPA's Clean Ports Program to expedite the deployment of zero-emission equipment, including electric cargo handling equipment, charging infrastructure, and shore power systems.
- The state's Equitable Building Decarbonization Program provides nearly \$640 million to facilitate building decarbonization efforts.
- SJCOG will manage a \$15 million Charging and Fueling Infrastructure grant to install 74 Level-2 and 40 DC fast chargers at 20 locations throughout the county, prioritizing disadvantaged communities.

Currently, SJCOG oversees a portfolio of \$30 million in secured funding aimed at supporting the development of clean transportation options, including carsharing, shared mobility, and EV chargers. As of the writing of this report, SJCOG is awaiting updates on funding applications valued at approximately \$2 million and is considering applying for opportunities totaling nearly \$5 million. Grant funding opportunities have significantly increased in recent years, requiring dedicated staff resources to track opportunities, apply for them, and subsequently manage implementation. Table 1 below identifies various clean transportation-related funding agencies and programs that SJCOG may consider to expand its capacity for future workforce development.

**Table 1. Clean Transportation Workforce Development Funding Opportunities**

Funding Agency Type	Funding Agency	Programs
<b>Federal Government</b>	U.S. Department of Transportation (DOT)	Zero Emission Vehicle Infrastructure and Advanced Vehicle Grants Alternative Fuel Corridor Grants Community Alternative Fuel Infrastructure Grants
	U.S. Department of Energy (DOE)	Public School Energy Program
	U.S. Joint Office of Energy and Transportation	National Electric Vehicle Infrastructure (NEVI) Formula Program
	<i>Other Federal agencies with potential funding programs include: Department of Labor (DOL), Environmental Protection Agency (EPA), Federal Highway Administration (FHWA), Federal Transit Administration (FTA)</i>	
<b>State Agency</b>	California Energy Commission (CEC)	Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE)
	California Air Resources Board (CARB)	Low Carbon Fuel Standard Carl Moyer Program
	<i>Other State agencies with potential funding programs include: Caltrans, CalSTA, California Clean Transportation Commission, Strategic Growth Council - Office of Planning and Research</i>	
<b>Utility</b>	Pacific Gas & Electric	Empower EV EV Charge Network EV Fleet
<b>Air District</b>	San Joaquin Valley Air Pollution Control District	Charge Up! Electric Vehicle Charger Incentive Program
	BAAQMD - Administrator for Statewide Program	Volkswagen Mitigation Trust Programs

# Landscape Analysis

The SJCOG Sustainable Transportation Equity Project supports workforce development in the City of Stockton by (1) reducing transportation barriers to training and employment for residents and (2) providing opportunities for skills development and exposure to green career pathways. This section provides the research support and justification for recommendations that follow in this plan. It is organized into three sections:

1. **Labor Market Assessment** reviews current labor market data involving industries and occupations within the clean transportation sector;
2. **Content Review** provides a content analysis of relevant literature produced under the aegis of the STEP program and relevant national examples of similar initiatives;
3. **Key Interest Holder Perspectives** details research and input collected from STEP program participants, regional employers and training providers on project operations and activities.

## Labor Market Assessment

### Overview

Since the Federal Bureau of Economic Analysis and the Bureau of Labor Statistics do not categorize data by "green" or "clean" occupations or industries, regional economic analyses of labor market demand cross-reference industry sectors and occupational clusters involved in the production and maintenance of "clean" technology, specifically "clean" transportation and related subsectors. In San Joaquin County, the leading industry sectors outside of government and retail are Transportation & Warehousing and Manufacturing, with both sectors experiencing growth over the past five years at rates of 66% and 18%, respectively. While most of the growth in this sector comes from warehousing, there will also be parallel growth in electric vehicle (EV) delivery and transportation. Tesla's expansion in the region has heightened the demand for labor in these sectors and created potential career pathways for clean transportation-related occupations in automotive maintenance and repair, electrical and electronic component production, and the maintenance of electrical and electronic powerhouses, substations, and relays, including charging stations. Many occupations within these sectors show projected demand alongside regional living wages (according to the [MIT Living Wage Calculator](#)) and benefits. Tables 2 and 3 provide projections for the identified sectors and related occupations, respectively.

**Table 2. STEP Related Industry Sectors in San Joaquin County**

NAICS Code	Industry	2018 Jobs	2023 Jobs	% Change in Jobs	2023 Employment Concentration	2023 Earnings Per Worker	2023 GRP
48	Transportation and Warehousing	29,542	48,927	66%	3.59	70,986	4,990,951,399
31	Manufacturing	20,201	23,822	18%	0.99	85,000	3,919,868,611

Table 3 below provides information on wages, necessary entry-level education, and data points for occupational demand. In total, about 6,876 new jobs are projected across occupations engaged with energy infrastructure, electrical and electronic product manufacturing, and auto mechanics over the next five years in San Joaquin County. These occupations total a little under 700 job openings each year and slightly over 600 annual replacement jobs.

**Table 3. Employment and Wages in Clean Transportation Occupations in San Joaquin County**

Occupation	2025 Jobs	2030 Jobs	2025 - 2030 % Change	Avg. Annual Openings	Annual Replacement Jobs	Typical Entry Level Education	Median Hourly Earnings	Pct. 10 Hourly Earnings	Pct. 75 Hourly Earnings
Electrical and Electronic Engineering Technologists and Technicians	80	92	15%	11	8	Associate's degree	\$36.30	\$22.25	\$42.70
Counter and Rental Clerks	1,227	1,290	5%	158	146	No formal educational credential	\$18.19	\$15.55	\$22.81
Electricians	1,336	1,408	5%	133	119	High school diploma or equivalent	\$35.42	\$18.73	\$45.36
Electrical and Electronics Installers and Repairers, Transportation Equipment	<10	<10	Insf. Data	1	Insf. Data	Postsecondary nondegree award	Insf. Data	Insf. Data	Insf. Data
Electrical and Electronics Repairers, Commercial and Industrial Equipment	288	304	6%	28	25	Postsecondary nondegree award	\$37.44	\$29.65	\$38.34
Automotive Service Technicians and Mechanics	1,599	1,657	4%	148	137	Postsecondary nondegree award	\$26.99	\$15.45	\$30.65
Farm Equipment Mechanics and Service Technicians	224	223	(1%)	18	18	High school diploma or equivalent	\$23.61	\$18.10	\$30.28
Outdoor Power Equipment and Other Small Engine Mechanics	85	87	2%	9	8	High school diploma or equivalent	\$23.17	\$17.22	\$32.46

Occupation	2025 Jobs	2030 Jobs	2025 - 2030 % Change	Avg. Annual Openings	Annual Replacement Jobs	Typical Entry Level Education	Median Hourly Earnings	Pct. 10 Hourly Earnings	Pct. 75 Hourly Earnings
Bicycle Repairers	55	58	4%	7	6	High school diploma or equivalent	\$17.65	\$16.44	\$24.89
Industrial Machinery Mechanics	982	1,074	9%	97	79	High school diploma or equivalent	\$35.03	\$22.42	\$37.86
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	565	674	19%	86	64	High school diploma or equivalent	\$22.68	\$18.73	\$28.71

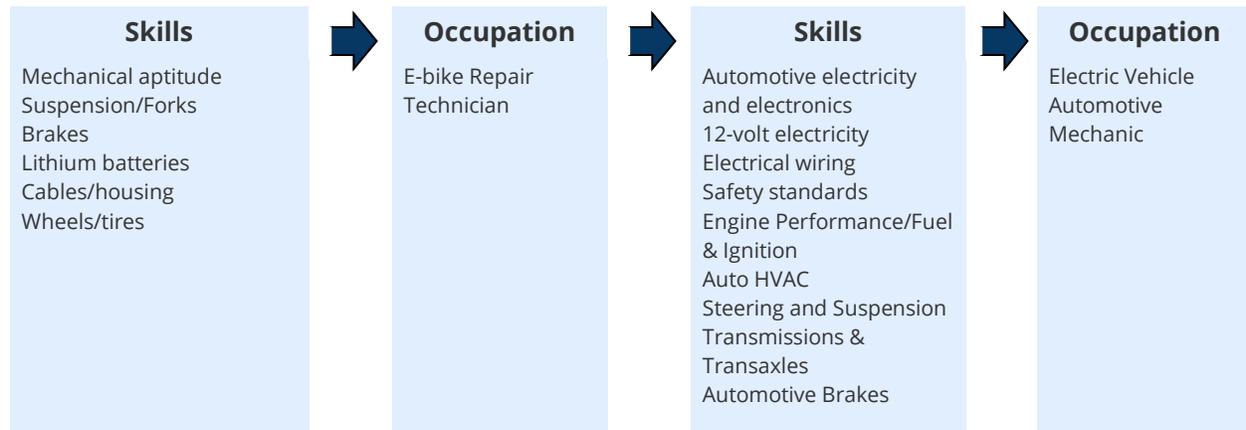
### A Focus on Transferable Skills

Engaging learners in E-bike repair and maintenance offers them a chance to explore their mechanical abilities and gain exposure to a range of educational and career paths that require these skills. Although the demand for E-bicycle mechanics in the region is limited and wages tend to be low, which may hinder economic mobility, the skills developed as an E-bike repair and maintenance technician can apply to various other job pathways, including automotive repair, industrial maintenance, electrical and electronic production, and certified electrician roles. The essential skills acquired in entry-level E-bike mechanic positions—such as general mechanical aptitude, knowledge of safety regarding lithium batteries, and the ability to read schematics or blueprints—can lead to living-wage, middle-skilled jobs in transportation, manufacturing, electrical trades, and digital technology, including the requirements for EV charging station software.

The Skills Spectrum Basic (Fig. 2) below illustrates the continuum of skills from entry-level bicycle mechanics to the more lucrative automotive vehicle repair field. If learners demonstrate proficiency in E-bike repair and maintenance, they can build on those competencies by participating in accelerated training through the Green Economy Lab or entering the automotive program at San Joaquin Delta College to obtain ASE industry credentials (Automotive Service Excellence) and postsecondary credentials.

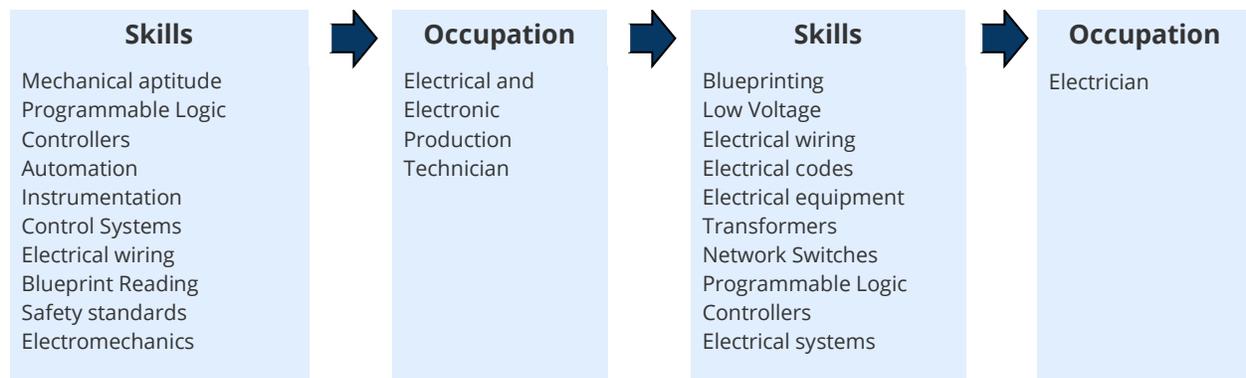


**Figure 2. Skills Spectrum (Basic)**



The Skills Spectrum Advanced (Fig. 3) illustrates the broader career trajectory available once an individual has mastered basic electrical wiring, low voltage electricity, and competencies in electrical and electronic safety protocols. Both electrical/electronic production technician and electrician roles build on these foundational skills along two distinct career pathways; however, they both share additional overlapping skills, such as blueprint reading and knowledge of electrical code and safety standards. Skills required for servicing and maintaining EV charging stations are part of the formal electrician pathway, with expedited training provided through the Green Economy Lab and further training available via the electrician apprenticeship model through the International Brotherhood of Electrical Workers (IBEW), which represents workers in the electrical industry. IBEW offers an earn-while-you-learn opportunity for skill development. This electrician pathway will also cultivate transferable skills for specific career trajectories, including photovoltaic system design, installation, and maintenance. It is also crucial to highlight that the basic electrical and electronic skills gained through these pathways would support additional occupations within industrial machine mechanics.

**Figure 3. Skills Spectrum (Advanced)**



## Clean Transportation Career and Education Opportunity Mapping

To clarify pathways from the SJCOG's training programs into aligned education and training and, ultimately, jobs, the WestEd team developed a Clean Transportation Opportunity Map (Figure 4, Page 16). The Map encompasses the formal education and training offered through the regional community college and trade schools, as well as the accelerated training contextualized for adult learners offered through local project partners such as the Green Economy Lab, Manteca Education & Training Center (Adult School), and the MDP fellowship program.

Research in education and training models for rural, adult communities has identified Integrated Education and Training (IET) models as a highly effective method for workforce development.<sup>5</sup> These models combine three primary components to support adult learners: (1) contextualized basic skills, (2) work readiness skills, and (3) industry-recognized credentials. Consequently, WestEd instructional designers have partnered with organizations involved in the STEP initiative and local nonprofits to incorporate the IET model into the E-Transportation Basics (E-bike maintenance and repair), Transportation Share Operations Agent, EV Mechanic, and EV Charging Station skills-building training programs. E-Transportation Basics and Transportation Share Operations Agent are currently offered through a fellowship model via the STEP partner MDP. Both occupations require relevant skills that can lead to upward career movement within the clean transportation sector, although they only require a high school diploma for employment and represent the lowest earnings on the career path in this sector. Therefore, they are deemed entry-level positions from which learners/workers should progress to the next level of skills-building training and employment.

The fellowship opportunities are currently limited to seven openings and engage technical skills training through mechanics and soft skills training through customer service, with a 40-hour instructional module developed with the support of WestEd that accompanies the on-the-job training provided through the paid fellowship. The customer service training, formally referred to as the Transportation Share Operations, also engages knowledge building in the field of non-profit firms, offering learners the opportunity to understand the fundamental differences in business structures and cultures of nonprofits that operate transportation share programs. These two trainings comprise entry-level job training that may lead to the Skills Building Training at the Green Economy Lab.

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<sup>5</sup> Cronen, S., Diffenderffer, A., & Medway, R. (2023). Linking adult education to workforce development in 2018–19: Early implementation of the Workforce Innovation and Opportunity Act at the local level (NCEE 2023-001r). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance; Developing Basic Skills Curriculum for an IET: A Guide for the Pathways to Employment Program" (Feb 2017). Institute for the Study of Adult Literacy (ISAL), The Pennsylvania State University Central Pennsylvania Workforce Development Corporation (CPWDC); Prins, E., Clymer, C., Foreman, S. S., Loa, M., Needle, M., Raymond, B., Toso, B. W., & Ziskind, A. (2018, May). Career pathways for adult learners in Chicago, Houston, and Miami: Final report. University Park, PA: Institute for the Study of Adult Literacy.

The Clean Transportation Opportunity Map, found below, details high-demand specialized skills and shows how these align with job training and employment opportunities in the clean transportation sector in San Joaquin County. The pathways demonstrated by the Clean Transportation Opportunity Map provide adult learners with exposure to accelerated training that encompasses basic skills support and work readiness while providing exposure to higher-level skills that lead to living-wage career opportunities. The map also provides information training and employment career trajectories.

Wage ranges are listed for occupations based on 10th percentile (as proxy for entry-level wages), median, and 75th percentile earnings for each occupation, respectively. Educational and training pathways are categorized into four main types:

1. Job Training available through partner organizations offering a fellowship model
2. Skill Building through local non-profit organizations and Adult Schools offering a short-term training model open to the public
3. Credit Certificates through postsecondary institutions offering a traditional, semester-based credit model, and
4. Apprenticeships offered through the IBEW registered apprenticeship model or Associate's Degrees offered through postsecondary institutions using traditional, semester-based credit models.

Additional information on education and training programs with associated learner completion information derived from the National Center for Education Statistics (NCES) are located in Appendices B and C.



# Opportunity Map SJCOG Clean Transportation

## Specialized Skills:

- Mechanical aptitude
- Suspension/Forks
- Brakes
- Lithium batteries
- Cables/housing
- Wheels/tires
- Automotive Electricity and Electronics
- 12-volt electricity
- Electrical wiring
- Safety standards

- Engine Performance /Fuel & Ignition
- Auto HVAC
- Steering and Suspension
- Transmissions & Transaxles
- Automotive Brakes
- Programmable Logic Controllers (PLC)
- Automation
- Instrumentation
- Control Systems
- Blueprint Reading
- Electromechanics
- Low Voltage
- Electrical codes
- Electrical equipment
- Transformers
- Network Switches
- Electrical systems

**\$15-24/hr.**

Bicycle Repairers  
Counter and Rental Clerks

**\$15-26/hr.**

Electrical and Electronics Installers and Repairers, Transportation Equipment

- Automotive Service Technicians and Mechanics
- Electrical, Electronic, and Electromechanical Assemblers

**26/hr.-\$37**

Automotive Service Technicians and Mechanics

- Electrical and Electronics Installers and Repairers, Transportation Equipment
- Electrical and Electronics Repairers, Commercial and Industrial Equipment
- Electrical, Electronic, and Electromechanical Assemblers
- Industrial Machinery Mechanics

**\$26-45/hr.**

Senior/Supervisor Automotive Mechanic

- Electrical and Electronic Engineering Technologists and Technicians
- Electricians

**Job Training**

MDP:  
E-Transportation Basics  
Transportation  
Share Operations



- Skills Builders**
- Green Economy Lab:*  
EV mechanic Bootcamp  
EV Charging Station – Installation & Maintenance  
Customer Service  
Electrician Certificate Program
- Manteca Education & Training Center:*  
Logistics, Industrial Maintenance, & Manufacturing  
Basic Welding  
Forklift Safety Certification Series



- Credit Certificates**
- Delta College:*  
Electromechanical/Electromechanical Engineering Technology/Technician  
Electrician  
Electrical/Electronics Equipment Installation and Repair Technology/Technician, General  
Heavy Equipment Maintenance Technology/Technician  
Industrial Mechanics and Maintenance Technology/Technician  
Automobile/Automotive Mechanics Technology/Technician



- Apprenticeships, Associates, & Bachelors**
- IBEW Local 595 Electricians Apprenticeship  
San Joaquin Electrical Training Institute
- Delta College:*  
AAS Electromechanical/Electromechanical  
Engineering Technology/Technician  
AAS Electrician  
AAS Heavy Equipment Maintenance  
Technology/Technician  
AAS Automobile/Automotive Mechanics  
Technology/Technician

## Clean Transportation: An Opportunity for Equitable Pathways

Focusing on vulnerable populations benefits both individuals and the ecosystem by broadening the available talent pool and enhancing community resilience through increased workforce participation and economic mobility. Additionally, it lessens the strain on public assistance systems and helps guarantee that employer demands for skilled workers may be met from within the region.

A review of occupational participation by race and ethnicity revealed that 50% to 67% of aligned occupations analyzed are currently filled by workers from historically underrepresented populations, including Hispanic/Latino, Black/African American, Asian American/Pacific Islander, and American Indian.

An analysis of gender distribution within the target occupations and pathways reveals ongoing disparities that necessitate targeted interventions. While electrical and electronic technicians and repairers show relatively higher female representation at 17% and 24%, respectively, these figures still fall far short of gender parity. More striking are the statistics for automotive technicians and electricians, where women represent only 2% and 4% of the workforce, respectively. Given that women constitute about half of the overall workforce, their low representation in these occupations suggests that structural and cultural barriers continue to hinder female involvement in these traditionally male-dominated technical fields. Addressing these disparities presents both a social equity and economic advancement opportunity. To enhance access to these pathways, SJCOG can implement the recommendations from this report to boost female participation in these programs.

## Content Analysis

To establish context for the analysis and recommendations, the WestEd team conducted a literature review and content analysis of documents related to this project, those suggested during stakeholder interviews, and other relevant case studies of similar programs throughout the United States to inform SJCOG's STEP project and the recommendations made by WestEd staff. Although the shared mobility field is relatively young, numerous programs exist across the nation, including over 50 docked bike systems, 60 dockless systems, and 194 E-scooter systems in cities nationwide.<sup>6</sup> Information on carsharing, particularly systems using electric vehicles, is limited. However, data from Statista indicate that carsharing is becoming increasingly popular, with expected users surpassing 6 million across the United States by 2029.<sup>7</sup> The same report noted that due to consumer

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<sup>6</sup> U.S. Department of Transportation. "Bikeshare and E-scooter Systems in the U.S." July 20, 2024.

<https://data.bts.gov/stories/s/Bikeshare-and-e-scooters-in-the-U-S>

<sup>7</sup> Statista. Car-Sharing - United States. Access February 27, 2025. <https://www.statista.com/outlook/mmo/shared-mobility/car-sharing/united-states>

demand for sustainable transportation, carsharing services are increasingly shifting towards electric vehicles. Incentive programs have expanded, demonstrating both government commitment to e-mobility options and consumer buy-in: as of August 2024, there were nearly 150 incentive programs across the United States for E-bikes, along with federal and state government tax credits for purchasing electric or hybrid vehicles. As indicated in the case studies, regions across the country are advancing clean transportation initiatives to reduce environmental and infrastructure impact, qualify for grant funding in workforce development, and address equity considerations.

While numerous clean transportation initiatives and pilot programs exist across the U.S., they often focus on consumer uptake. Metrics highlighted by governments and program proponents tend to zero in on ridership, miles traveled, and the continued use and expansion of these programs, but not necessarily on the jobs created, which was the focus of the WestEd team's analysis. Among the myriad programs identified, only a few were both successful commercially and featured successful workforce development programs.

Below are the summaries of the Precedents Study from MDP and Edge Collaborative's Memo, which specifically focus on the STEP grant project in San Joaquin County. A later section includes case studies of noteworthy initiatives in the EV-space. A table at the end of this section details the structural elements of each program that contribute to the successful implementation of these initiatives, which may help bolster implementation and sustainability of SJCOG's E-bikeshare and E-carshare programs. The full content review can be found in Appendix A.

## Regional Recommendations

### MDP Precedent Study

In 2022, Mobility Development Partners (MDP) conducted a study on the shared mobility workforce environment in the greater Bay Area, Central Valley, and Los Angeles regions to inform the Clean Mobility Workforce (CMW) project by highlighting both emerging and existing programs for lessons learned and best practices. By interviewing experts experienced in workforce development within the broader transportation industry and reviewing 12 workforce development programs with a special focus on overcoming barriers in the clean economy, MDP put forth seven recommendations for the project, emphasizing the need for strong pathway planning and network pipelines, as well as a program that is responsive to workforce needs and community engagement in marginalized areas Stockton.

The recommendations advocate for targeted recruitment among Stockton's most vulnerable populations, creating a two-tier program structure that combines foundational and specialized training leading to a certificate, and providing professional development support to help participants

advance in their careers. Additionally, MDP suggested that the program engage participants in delivering shared mobility services, fostering hands-on learning and community investment. A curriculum that integrates environmental, economic, and mobility justice was recommended to ensure the program addresses skill development and acknowledges and alleviates the historical and systemic inequities that have influenced transportation access in Stockton. The goal was to ensure that the workforce program met immediate employment needs and contributed long-term to the workforce and community transportation requirements.

### Edge Memo

In a detailed memo from Edge Collaborative, a civic incubator dedicated to addressing challenges with the greatest potential for fostering economic resilience, key recommendations were presented to MDP aimed at enhancing the workforce training program. These recommendations were informed by a holistic review of the budget, implementation strategies, and analyses of similar initiatives nationwide, complemented by Edge Collaborative's extensive understanding of Stockton's local workforce development ecosystem. Edge Collaborative emphasized the initial hiring of five staff members for the E-bikeshare and E-carshare programs, all of whom would also qualify for the training program. Staff roles included management, systems operations, customer service, and marketing/community relations.

Edge Collaborative emphasized the importance of equipping participants with relevant skills in emerging sectors suitable for various positions within e-mobility operations, especially considering the limited job creation expected within the E-bikeshare and E-carshare programs. The memo from Edge Collaborative referenced the Sacramento EV Blueprint, highlighting that inadequate workforce training could impede large-scale EV adoption. Edge Collaborative's recommendations suggested that MDP partner with the Housing Authority of the County of San Joaquin (HACSJ), which has existing funding to implement training for careers specific to EVs.

The proposed partnership with HACSJ for EV mechanics, the bike share program operator for e-bike technicians, and other local organizations was identified as crucial for providing technical assistance, case management, and community engagement with groups already embedded within target communities. Additionally, the memo advised on developing an industry-vetted curriculum and certification, cross-project collaboration to eliminate transportation barriers, comprehensive monitoring and data collection for program refinement, and budget recommendations focused on removing financial barriers for participants. These align with structural elements for success identified in other case studies and research.

## Workforce Development Structural Elements for Success

WestEd also conducted a literature review to identify proven and promising strategies for transportation share programs across the country. Three key success factors from evaluations of similar programs nationwide include the following:

1. Strategic integration with an established community bike shop with an existent youth training program to administer the E-bike program and provide maintenance with new E-bike curriculum (BEEP)
2. Sustained community outreach and robust interagency collaboration (Biketown, Portland, Oregon)
3. Consultation with industry and education partners to ensure curriculum and apprenticeship standards were met (Santa Clara Coach Apprenticeship)

Table 4 below lists the workforce development structural elements that lead to successful outcomes in the projects explored above, including recommendations from the MDP study and Edge Collaborative Memo. The complete summary of the scan may be found in Appendix A.

**Table 4. Workforce Development Elements within Transit Share Programs**

Program	Interagency Collaboration	Robust Plan that's Part of Greater Initiative	Accessibility & Equity in Staffing Program	Community Involvement, Education & Awareness	Workforce and Curriculum Development
<b>BEEP</b>	City of Berkeley, Waterside, GRID	Partnership between city and Waterside (a tenant of the city) through Pilot Climate Equity Fund	Staffing through Waterside Works' youth program for underserved and at-risk youth	No activity	Interns trained at Waterside using training from E-bike specialists to provide maintenance for program participants
<b>BIKETOWN</b>	PBOT, Nike, Lyft, various community groups	Contracts with strong workforce development proposal, contracts, partners through the High Road plan; yearly assessment of program and reporting to determine success and continued support	Recruitment from marginalized communities using various workforce development partners; provide internal opportunities for advancement	BIKETOWN ambassadors are hired from within the community to lead educational outreach. Ambassador applicants with lived experience as a person of color, living with a disability, low income, and older adult are prioritized	Partner with workforce development agencies focused on recruitment from marginalized communities, must meet 30% employment from underserved communities via High Road Standards
<b>SCV Coach</b>	VTA, ATU, Mission College	CAI initiative formalized VTA's existing partnership with Mission College and ATU training program	The apprenticeship pathways provide transparency for employees, and internal opportunities for career advancement to help employees move out of entry-level roles	Mission College engaged industry professionals familiar with the transportation landscape to help guide creating the apprenticeship and curriculum	Built curriculum with Mission College, standardized pathways for internal promotion

Program	Interagency Collaboration	Robust Plan that's Part of Greater Initiative	Accessibility & Equity in Staffing Program	Community Involvement, Education & Awareness	Workforce and Curriculum Development
<b>Recommendations from MDP and Edge Collaborative</b>					
<b>MDP</b>	Connect participants to existing programs and jobs based off cross-sectional skills	N/A	Embed program recruitment in vulnerable populations	Provide ongoing support for program participants such as resume and job search assistance; involve program participants in planning, procurement, and community engagement to teach further skills	2-tier curriculum Pre-apprenticeship with basic curriculum in car and bike share industries. Second tier is apprenticeship which provides upskilling and management skills
<b>Edge</b>	Formally partner with Housing Authority of County of San Joaquin (HACSJ), and Shared Mobility, Inc. Collaborate with other orgs such as Miocar, Edge, and other Stockton workforce stakeholders	N/A	MDP should recruit Stockton residents with at least a high school diploma, with STEP program residents as the first priority. Participants should receive free transportation services, and the cost of training should be covered. A stipend should also be offered.	Partner with local community organizations to facilitate community capacity and utilize existing partnerships and programs. Program structure should be reviewed and revised by community members to align with needs	Curriculum should be developed with HACSJ and Shared Mobility, Inc. It should be a two-step program: first participants complete operations or OJT, and pursue technical training. MDP should aid with job placement and pipeline into similar clean transportation careers

## Key Interest Holder Analysis

To gain a better understanding of the education and clean transportation ecosystem, the WestEd team engaged with regional education and workforce entities that are directly or indirectly connected to the San Joaquin Council of Governments' (SJCOG) Clean Transportation Workforce project. The aim of the interviews was to collect insights on regional programs and services related to clean transportation education and training, evaluate relevant competencies and industry credentials, explore existing education and training partnerships and workforce pipelines, identify key challenges and opportunities in clean transportation workforce development, and discuss future pathways.

In partnership with SJCOG, the project team identified 25 individuals for interviews from 22 agencies. The organizations included industry partners, workforce system representatives, community training organizations focused on clean transportation initiatives, and education providers. Among the agencies selected for interviews, WestEd successfully conducted interviews with 16 individuals representing 14 distinct organizations across education and training providers, economic development and workforce agencies, as well as public and support service providers.

All interviews were conducted via Zoom, attended by two or more WestEd team members, recorded, transcribed, and analyzed for relevant themes. The following summarizes key themes extracted from interviews, with direct quotes from participants where applicable to exemplify or elucidate themes. Findings are organized by provider type to better illustrate the perspectives and roles of different stakeholders within the clean transportation workforce development ecosystem.

### Key Insights

Throughout the interviews, the WestEd team found clear support for the value proposition of exposure to EV technologies and entry-level technical training, particularly among populations facing systemic barriers to success, despite the limited direct job opportunities in specific roles such as E-bike repair or EV charger installation.

Interviewees, especially those from community-based organizations and workforce development agencies, highlighted the importance of providing points of entry into emerging technologies and the green economy. They contended that this exposure could stimulate interest, boost confidence, and create opportunities in various career paths that participants may not have otherwise considered.

Many emphasized that the foundational skills gained through these entry-level programs—such as basic electrical knowledge, troubleshooting skills, and familiarity with green technologies—are highly

transferable. Workforce development and social service agencies were particularly vocal about this. These interviewees noted that the skills developed in programs like E-bike and E-carshare can prepare individuals for career paths in related fields such as industrial maintenance, goods movement, and automotive technology. Participants also underscored the importance of soft skills development and work experience, especially for individuals with limited employment histories and educational backgrounds.

## Education and Workforce Ecosystem

### Education and Training Partners

Conversations with education and training providers revealed a diverse landscape of training programs aimed at addressing infrastructure challenges and related sectors, such as automotive, logistics, industrial maintenance, and electrical. Key participants the team spoke with in the regional training ecosystem included Delta College, Manteca Education and Training Center (METC), the Green Economy Lab (San Joaquin Housing Authority), Rising Sun, IBEW-NECA / Electric Vehicle Infrastructure Training Program (EVITP), and the Machinists Institute. Programs offered by agencies include:

- **Delta College:** Automotive, diesel, electrical, industrial maintenance, agricultural mechanics programs, and a Caterpillar apprenticeship. Credit and noncredit accelerated options.
- **Manteca Education and Training Center (METC):** Logistics, industrial manufacturing, maintenance (electrical, welding, forklift), and automotive (operational January 2025);
- **Housing Authority:** EV charging station installation, EV car mechanic training; customer service training
- **Rising Sun:** Youth Climate Careers program (House Calls to improve energy /water efficiency), adult pre-apprenticeship construction training (MC3) (in the Bay Area but not yet in the Valley);
- **Machinists Institute:** Apprenticeship programs in industrial machinery and maintenance in the Bay Area; they are working on forming a closer relationship with Delta College so their members can take advantage of Delta's programs;
- **WorkNet / SJC Economic Development Agency** does not provide training itself; instead, it keeps lists of WIOA-approved training providers and programs in several areas, including forklift operation, electrical work, and welding.

- **IBEW-NECA (EVITP):** Training and certification for installation of electric vehicle supply equipment (EVSE) for electricians

The team identified a promising opportunity with Stockton School for Adults to offer evening classes at the Weber Institute of Applied Sciences & Technology, potentially enabling dual enrollment in Career Technical Education (CTE) programs and partner-led instruction in Downtown Stockton. Most agencies have formed partnerships with one or more regional education and training providers. Delta College emerged as a central partner and hub within the Stockton training network, establishing connections across nearly all educational providers interviewed. At the time of the interviews, Delta actively collaborated with the Housing Authority to provide not-for-credit EV installation training. All METC's career and technical education programs are designed to lead to Delta programs without duplication. Delta and the Machinists Institute are discussing ways to increase union members' access to the Caterpillar apprenticeship and diesel/heavy-duty truck programs. Finally, Rising Sun is in discussions with Delta College (and adult schools) to implement an MC3-based pre-apprenticeship program in construction.

### Employer Partners

When asked about partnerships with education and training providers in the region, employers noted a mix of agencies ranging from K-12 institutions, community-based organizations (CBOs), workforce training agencies, and college partners. The employers interviewed were the Port of Stockton, San Joaquin Regional Transit District, and Miocar. Training programs and partnerships noted by employers included the following:

- **San Joaquin Regional Transit District:** Delta College Apprenticeship program, collaboration with California Transit Works (CTW) on training programs, CALSTART, various OEM vendors, and future collaborations with AC transit and other agencies
- **Miocar:** Partnerships with Rising Sun for workforce development and internships, San Joaquin housing authority, Delta College on EV technician training, and part of the Stockton Mobility Collective with SJCOG and other partners

Regarding education and training providers, partnerships with Delta College were noted across all employers the team spoke with. All employers were involved in the STEP grant and are currently partnering with the SJCOG to advance its clean transportation initiatives.

### Situating E-Bikeshare Maintenance / Carshare Training Programs into the Larger Workforce Ecosystem

The interviews were intended to focus on finding long-term "hosts" for the E-bike share and EV carshare workforce development programs. The EV charger installation program was also discussed

throughout partner inquiry to better understand how it can fit within the larger workforce training ecosystem given its essential role for long-term project sustainability.

When asked about how the SJCOG's training programs might be incorporated into the regional training landscape, partners advised that the best way for the programs to continue and for the trainees to move to the next step were similar: the programs (and the trainees) should be integrated or lead into established clean transportation programs or related fields, such as automotive, electrical/electronic production, industrial mechanics, transportation/logistics, or construction. All agreed that there will be greater demand in the future for electrification in the economy and, therefore, associated skills in the workforce.

### Misalignment of Training Programs to Labor Market Demand

Several interviewees, particularly those in workforce and economic development, highlighted a mismatch between the training programs administered by the SJCOG as part of the STEP grant and labor market demand for E-bike / carshare / charger installation occupations. According to interviewees, there is little need for these occupations from a labor market demand perspective. In the case of the E-bike/carshare programs, outside of the businesses providing the OJT, there are very few directly aligned jobs.

"[M]ost likely E-bikes are going to create one or two jobs. I think that's again, what is the larger picture to actually do true community economic investment along these lines of stuff that will actually lead the career pathways. A lot of those skill sets [needed] to actually fix E-bikes, might be a good primer in this, but most likely it's focusing on creating training pathways of things that already exist that's going to be needed in connection to a lot of the carbon reductions happening within manufacturing plants, either advanced or old school manufacturing within the region, or even just maintenance in general. And mapping out what those jobs are and what career pathways already exist so what can be built in connection to the COGs."

"And I know it's a big thing for students to be able to come out with that knowledge before they go into, even if they go into and work for Tesla or whoever they go to work for, just to have the knowledge where they can come in and say, "Yeah, I know what you're talking about." Even if they get trained by the specific company they're going to work at. That's kind of what our charge is, too. We know we can't train them for specific companies they might work for, but we can certainly give them that background knowledge that's going to give them the step up so they know."

Conversely, in the case of EV-charger installation, according to one interviewee, there is already an overabundance of trained electricians to handle the expected demand, with an estimated 4,500 EVITP-certified electricians, approximately five times the estimated need through 2030. For some, this seemed not uncommon in the space, namely, community-based organizations or small companies identify funding opportunities and plan to the source of funds rather than the labor

market need. One participant described this as “train and pray,” and this sentiment was echoed among the workforce and economic development group.

Participants also emphasized the potential harm to individuals who invest time and effort into training programs only to find that the expected jobs are not yet available. This disconnect between training and workforce needs can create real challenges for the training system and workers.

"So there's a lot of people with a lot of misinformation. They think, 'Oh, there's going to be all these EVs, and there's going to be thousands and thousands of jobs with these charging stations.' The reality is that people have been trained for this already."

"[W]hether it's photovoltaic training, or water conservation and meter reading, or these new generations of clean energy jobs, [workforce boards] are incentivized to train and to scaffold these programs sometimes, unfortunately, before the jobs are actually identifiable and ready for these workers. And so that creates real harm, not just in the system, but to an individual worker who's just spent weeks, months of their time and then we aren't able to find them a job."

Despite a shared recognition of the limited demand for skilled workers in E-bike share / bike maintenance / repair, EV carshare operations, and EV charger installation, participants acknowledged other benefits of these training programs. In general, participants highlighted the value and importance of providing exposure to clean transportation technologies and, by extension, potential career paths. Education and training partners, in particular, underscored the value of work experience and the technical and soft skills garnered through shared mobility and EV charger programs.

Indeed, interviewees across role groups were uniform in their emphasis on equipping trainees with a diverse set of skills rather than providing narrow, specialized training. “The critical thing,” in the words of one participant, “is that people have to be trained for a diversified career [...] If you don’t have a diverse set of skills, you’re going to be in trouble.” For employers, “trainability” was paramount, and having even a small set of transferable technical skills in new technologies can have a notable effect on workers’ future job prospects:

“Not knowing a lot about it, there's a lot of win-win in that space, particularly if the jobs are going to emerge later. Because they could learn this skill and then they could be placed at a mechanic shop or something where there's an adjacency and they show up as the one kid that knows how to work on these bikes. And they become incredibly valuable to that auto mechanic shop. And as more of that market develops, they're able to use more and more of that skill.”

### Pathway Integration

None of the education and training partners the WestEd team spoke with immediately offered a home for the two shared mobility training programs. Delta College could not immediately identify a destination for the content within its offerings, as there are several pathways where the content could potentially fit. METC was interested in participating in conversations about what pathways would need to be built/expanded that could include the EV/E-bike content. Rising Sun representatives recognized the synergy between their household energy efficiency work and the transportation-based knowledge the EV/E-bike content provided. However, as a lean non-profit, they could not easily pivot to adopting it. One of the union representatives echoed a sentiment many others also expressed: high-demand training needs to begin with a mapping process of the required skill sets. Then, pathways that introduce the basics and provide ladders to further training (including entrees for incumbent workers) can be created. The key for the SJCOG programs will be to link them to existing pathways, perhaps by creating novel entrees into more traditional sectors like automotive, mechanics, and electrical—including agricultural applications.

### The Role of the COG in Fostering Workforce Development

Interviewees from workforce and economic development noted the unique position of the SJCOG within the workforce development space to serve as an “anchor institution” bringing together diverse stakeholders from workforce development, education, industry, and community organizations. While not traditionally involved in workforce development, as a Metropolitan Planning Organization (MPO), the SJCOG is positioned to advance workforce initiatives in the current environment given their purview and eligibility for additional funding. Likewise, participants emphasized the SJCOG’s administrative capacity to apply and implement federal grants at scale and its status as a trusted partner in both public and private sectors.

Interviewees also noted that the SJCOG’s entry into workforce development presents an opportunity to leverage its core competencies to support economic development through workforce training and transportation using the EV car share program.

Key to the success of the SJCOG in this capacity will be the quality of its relationships with other interest holders, as evinced by the example of the San Joaquin Housing Authority, which one participant called a “North Star” for its success leveraging partnerships in the administration of the EV car share and EV charger installation training programs.

“I talked about some institutional partnerships. I think that the CBO partnerships could be really powerful there and trust building, community ownership. And then the mechanics of the money I think matter a lot there too, because SJCOG has that kind of administrative backbone to hold those larger investments, how that comes down into communities so that they have the capacity to engage in altogether new activity of

educating people on shared mobility. I think that matters. And then funneling every cent of those workforce dollars to an agency that is equipped to program them really well I think is also really important, where they can hold all of this other strategic component of building out the transportation infrastructure and so on. I think that I'm noticing, referring to my comments, is basically just the strong partnerships with SJCOG as that center of the spoke."

One participant suggested the SJCOG might focus on "enabling the environment" for clean transportation / green energy technologies by working with stakeholders and businesses to help them understand the market opportunities and leverage policies to expand their businesses and build their internal capacity to hire and train new workers. Rather than directly setting up training programs, the SJCOG might convene stakeholders to educate them on the technology and market trends and equip them to adapt to the changing market demands.

"[I]f I'm a bike shop owner, I'm probably swimming in a lot of information about the growth of E-bike sales and things like that. But I think a convening of those to help really understand what the market opportunity is in that space, and then helping those small business owners who are running on super thin margins understand the business model of what it would take to add a new person. You know what I mean? Like, what has to happen in order for them to maybe in some cases hire their first employee, or their second employee, these really small shops. And then if I was thinking about the best way to get that training to that worker, it would be to focus on the bike shop owner and make sure that they understand everything so that they're able to train. So it's almost like a train the trainer model, in my mind. You know what I mean?"

"And then what's great about that is it's institutionalized. It's there, and they're able to continue to train. Or identifying someone within that network of bike shop owners who is a super user or ... You know what I mean?"

## Findings & Recommendations

The following section summarizes key findings and recommendations based on research and outreach conducted by the WestEd team and informed by ongoing discussions with the SJCOG. Findings and recommendations, along with the performance metrics to support program scaling, are organized into the following key areas:

1. **Curriculum and Pathway Design (CPD):** Instructional design and curriculum considerations, including skill development, certifications, and credential progression. (Education and Training Partners, Employers)
2. **Participant Engagement and Navigation (PEN):** Considerations for participants, including recruitment, placement, program support, referrals, and transitions. (CBOs, other workforce partners)
3. **Partnerships and Program Integration (PPI):** Structural program considerations to guide ongoing SJCOG Workforce Development efforts and their integration with the broader Clean Transportation Workforce Development Ecosystem. (SJCOG)
4. **Project Feasibility and Local Infrastructure (PFLI):** Considerations for ensuring the feasibility of program implementation relative to infrastructure to support it. (SJCOG)

Most recommendations fall within the Partnerships and Program Integration (PPI) area, as the SJCOG is well-positioned to lead these activities. It should also be noted that the findings and recommendations were informed by analyses of a student focus group held in November 2024.

### Curriculum and Pathway Design

#### Findings

- **The current fellowship model functions as on-the-job training with little formal instruction.** In their current forms, both SJCOG's training programs are primarily implemented as on-the-job training initiatives without formal curricula and minimal focused instructional time. While beneficial as a job, the program does not inherently lead to further education and training in technical fields or customer service / operations. However, it has provided opportunities for self-directed and problem-centered learning, two of the four pillars of classic andragogy, and does so within a paid environment, which students identified as essential for their learning.
- **Separating technical from operational skills training could enhance adult learning outcomes.** Regarding instruction and skills development, the fellowship aims to enhance technical and non-technical skills related to E-bike mechanics and transportation share

operations. Although cross-functionality is essential in today's workforce, separating technical training from operations training may better serve adult learners. Adults tend to learn more effectively through targeted training that reduces cognitive load<sup>8</sup> and allows for deeper processing of specific skills before integration. Furthermore, the principles of deliberate practice suggest that skill development is maximized when learners can concentrate on specific components before attempting to integrate them.<sup>9</sup> This approach aligns with Knowles' andragogical principles, which emphasize adults' preference for learning experiences that are immediately applicable and problem-centered, rather than diffuse content spanning multiple domains.<sup>10</sup> This separation facilitates more targeted skill development, as technical skills often require hands-on practice and repetition, while operational competencies may benefit from scenario-based learning.

In response to the above findings, WestEd developed 40-hour training programs for E-bike Mechanics and Transportation Share Operations on behalf of the SJCOG. WestEd also created a formal instructional design incorporating andragogical best practices for the EV Mechanic and EV Charging Station training offered through the Green Economy Lab.

## Recommendations

- Identify and delineate the technical and operational competencies within the fellowship model and finalize formal curricula to ensure a structured and focused approach to skill development, with clearly defined student learning outcomes and benchmarks, and onramps to additional training opportunities with area adult schools or colleges and jobs.
- Ensure training aligns with (and optimally leads to) third-party industry credentials, especially Automotive Service Excellence (ASE) credentials related to hybrid vehicles, electrical systems, engine repair, and smog inspection.
- Consider expanding the Skills Builder Training at the Green Economy Lab to include Delta College's 40-hour noncredit Advanced EV boot camp. Delta's noncredit boot camp builds upon the EV Mechanic Bootcamp and provides a pathway to industry credentials. The program at Delta College offers ASE certifications (ASE 6 for electrical systems and ASE Mechanic), has been successfully piloted with 30 incumbent workers, and utilizes an accelerated hybrid learning model ideal for working adults. This creates a clear progression

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<sup>8</sup>Sweller, J., van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*, 31(2), 261–292. <https://doi.org/10.1007/s10648-019-09465-5>

<sup>9</sup> Ericsson, A., & Pool, R. (2016). *Peak: Secrets from the new science of expertise*. Houghton Mifflin Harcourt.

<sup>10</sup> Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The Adult Learner. The Definitive Classic in Adult Education and Human Resource Development* (8th ed.). Oxon: Routledge.

to Delta College's Automotive Certificates with various specializations that can be completed in an accelerated format (15 credit hours per semester), with options to further advance through credit-bearing certificate programs, associate degrees, or specialized training through IBEW Local 595 at the San Joaquin Electrical Training Institute.

- Consider adopting a cohort model to develop a learning track and assess, compare, and contrast learner experiences and outcomes. This model would onboard cohorts of learners through entry-level training and on-the-job activities every 9 to 12 months, thereby extending the program's reach to more potential participants.

## Participant Engagement and Navigation

The WestEd team's analysis revealed that successful participant engagement and navigation depends on three critical factors: strategic recruitment approaches, accommodations for varied participant readiness levels, and the development of integrated educational and career pathways that maximize both learning opportunities and earning potential. Key findings are as follows:

### Findings

- **Recruitment methods could be more effective if strategically scaled and diversified.** Current recruitment methods are first-step strategies. For example, fellows noted learning about the opportunity from a program partner who visited a class they took or through an online job platform (i.e., Indeed.com). These strategies are helpful for providing some program information or advertising to potential participants, however, their reach is limited, and they could be scaled for broader outreach through diversification (e.g., multiple communication efforts and platforms) and formalizing outreach efforts (e.g., through marketing channels, with adult education / community college counselors and instructors, etc.) A scaled approach is also conducive to a cohort based training and work-based learning model that would serve the same number of learner-workers once every 9-12 months.
- **Participants enter the program with diverse levels of readiness and barriers.** Prospective participants can and do enroll with various barriers and needs. This presents challenges from a program perspective, as learners may enter with differing levels of academic or professional readiness. Some may be ready for traditional training through the postsecondary system, whereas others may require support in basic skills such as mathematics, writing, communications, introductory technical skills, or English language proficiency, in addition to the financial and transportation challenges the grant is designed to help mitigate. Leveraging braided funding through established service providers like Delta College or the San Joaquin America's Job Center of California (AJCC) could strengthen the

program's ability to connect students with comprehensive wrap-around services essential for academic and professional success. For example, co-enrollment with the San Joaquin AJCC could provide additional support services, including access to funds for purchasing auto mechanic tool sets—an important consideration since owning personal tool sets qualifies workers for California's higher minimum wage requirement of \$22 per hour, allowing participants to move into positions at a wage commensurate with the one provided while in the training program.

- **Integrated pathways and co-enrollment maximize learning opportunities and earning potential.** Pathways that integrate training through Community-Based Organizations, Adult Schools, Postsecondary noncredit, and Postsecondary credit certificates and degrees offer the greatest variety of opportunity for community members to engage in skills development and further employment. Framing the various trainings as stepping stones to additional fields opens possibilities for learner and program growth and helps to communicate the importance of upskilling and related possibilities.

## Recommendations

- Align and embed outreach within additional courses and through an education partner, conduct a marketing campaign, and coordinate with local partners.
- Build on the preliminary Opportunity Map (page 16) provided by WestEd to showcase possible trajectories that training can lead to and make these maps accessible to students and interested parties (e.g., partnering colleges, employers, community organizations, and members).
- Conduct pathway mapping to delineate program pathways into related programs and jobs within the clean transportation workforce ecosystem.
- Ensure that program design integrates multiple on-ramps and off-ramps for adult learners and provides referrals or direction access to needed wraparound support services to support student persistence.
- Combine fellows' success stories and positive experiences with the program to inform both targeted improvements based on challenges they identify and refine outreach messaging that emphasizes the aspects current fellows find most interesting or essential.
- Incentivize and provide additional training and articulation opportunities outside the program for certification, badging, or professional learning events to bolster student experience and employability.

## Partnerships and Program Integration

### Findings

The analysis by the WestEd team revealed weaknesses in the workforce training partnership ecosystem that, if addressed, could help ensure the longevity of SJCOG's training programs and support future program development. Key findings are as follows:

- **Partnering with community-based organizations to provide education and training is most sustainable when implemented in conjunction with traditional educational institutions and workforce systems.** There is an inherent tension between two types of partners: community-based organizations (CBOs) and independent training providers on one side, and established institutions like regional community colleges, adult schools, and America's Job Centers on the other.

While CBOs and third-party training providers often have specialized area expertise, strong community connections, and can respond quickly to funding opportunities, they may lack organizational capacity, experience developing formal training programs, and resources needed for long-term sustainability following the grant period. Conversely, established educational entities bring valuable expertise in curriculum development and pedagogy but may face structural challenges that limit their adaptability to emerging workforce needs.

These challenges include competing priorities, state and federal reporting requirements, lengthy program approval processes, and competing priorities related to student outcomes. Both systems have a role to play in the clean transportation ecosystem, and the most effective workforce development strategy would leverage the strengths of each. Put simply, partnering with emerging and even some established community-based organizations to provide education and training is most sustainable when implemented in conjunction with traditional educational institutions and workforce system programs that can provide supportive services and supplementary training. Such an approach would help to address the immediate needs of industry, while building toward sustainable programs that provide participants with recognized credentials and clear career advancement opportunities.

- **Agencies like SJCOG benefit from specialized technical assistance to effectively design and implement training programs integrated into the workforce ecosystem.** Technical support would help ensure that SJCOG and similar organizations may effectively create programs that effectively bridge the gap between community-based providers and established institutions and help to realize the sustainable training ecosystem described earlier in this report.

## Recommendations

- Consider engaging an external technical assistance provider for future initiatives to support program design and implementation.
- Develop a partnership framework for engaging potential partners that incorporates coordinated instruction, support, and onramps with regional educational institutions and articulates clearly defined expectations around each partner's deliverables and roles.
- Compile an integrated table detailing agency types and their core focus areas. This table would serve as a planning tool to help foster cross-agency dialogue and collaboration.
- Explore options for convening a multi-agency working group dedicated to the ongoing alignment and integration of work streams and programs focused on addressing infrastructure workforce development pathways.
- Identify topics for the workgroup, such as how to get listed on the Eligible Training Provider List (ETPL). Providers listed on the ETPL are eligible to receive Workforce Innovation and Opportunity Act (WIOA) Title I funds to pay for training services provided to eligible individuals (out-of-school youth aged 16-24, adults, or dislocated workers) via their Individual Training Account (ITA).

## Project Feasibility and Infrastructure

Analysis of the workforce development program revealed several structural elements that affect program design and delivery to participants. Key findings include:

### Findings

- **Transportation infrastructure needs improvement to support program uptake and e-bike utilization.** A core challenge for the Bike Stockton program is that several areas of South Stockton are not safe places to bike. Until structural improvements are made to implement Complete Streets and infrastructure to support active transportation, all programs will struggle to increase participation and broader community uptake. The City of Stockton's Active Transportation Plan and Bicycle Master Plan identified the need for key improvements that will proceed the broader uptake and use of E-bikes.
- **Project area boundaries are limiting.** The CARB-funded program specified a geographically defined project area for recruitment and use of funds. This focus required staff resources dedicated to compliance rather than the higher-value work of structural integration with the broader workforce ecosystem, which affects reach and impact.

Broadening the geographic service area while retaining the program's core focus on populations facing systemic barriers would extend the reach of the initiative while continuing to serve the intended populations.

- **Leveraging local businesses could enhance local impact and engagement.** The COG has contracted with an outside vendor that provides purchasing and replacement parts for the E-bike fleet. Historically, bicycle share programs hosted through the hospitality sector, including national parks, have engaged local small businesses to purchase and maintain bicycles, including E-bikes. Purchasing through local firms and contracting for maintenance and replacement parts of transportation modalities keeps funding local, creating a multiplier effect in the regional economy and spurring greater local employer engagement for training and employment purposes. There may be an opportunity to partner with a local bicycle shop on this aspect of the project.

### Recommendations

- Incentivize and encourage local biking infrastructure development in alignment with regional plans and programs.
- Report to CARB on the restrictive nature of project boundaries and the need for technical assistance to support project grantees. Technical assistance may include initial resources and planning time to ensure programs meet their objectives and align with the overall intent of the funding.
- Engage local and regional businesses in expanding the transportation share program. Connecting this initiative to local businesses will garner greater buy-in, increase economic impact, and align with local and regional priorities to support small business owners. The COG is encouraged to engage local owners in the field to better understand interest and opportunities to retain dollars in the local community and expand local employment opportunities through apprenticeship programs.

### Recommendations and Leading Indicators

The table below delineates recommendations with approximate timelines to fully build out the Clean Transportation workforce ecosystem in San Joaquin County (these may be expanded to include greater detail informed by COG operations.) Sample performance metrics (PM) that operationalize the output and outcomes of workforce development activities listed in the Recommendations Table to Scale Efforts are also included. Some performance metrics are binary, requiring a simple yes or no for completion, while others involve critical questions that fully

operationalize the activity or goal. Indicators that reflect the impact of functions over time would include items such as (1) employment levels in clean transportation (2) changes in overall poverty level (3) economic impact analysis, and (4) air quality metrics.

**Table 5. Recommendations and Performance Metrics to Support Program Scaling**

Area	Recommendation	Leading Indicator	Completed <i>Yes / No</i>
<b>Short-Term (&lt; 3 months)</b>			
CPD	Finalize formal curricula for E-bike mechanics, Share Operations, and EV mechanics	Curricula completion and implementation	
PPI	Finalize STEP program Deliverables, Roles, and Responsibilities by partner	Project logic model/digital schematic that identifies connectivity across roles and responsibilities.	
PPI	Compile an Integrated table with agency type and their core focus to serve as a planning tool that can foster cross-agency dialogue and collaboration	Design/update of regional ecosystem schematic similar to Figure 1. Thriving and Connected Clean Transportation Workforce Ecosystem	
PPI	Compile an integrated database of clean transportation funding opportunities of significance	Quarterly updates to funding opportunities database with dissemination to partners	
PPI	Explore options for convening multi-agency working group dedicated to the ongoing alignment and integration of work streams and programs addressing climate and infrastructure workforce development pathways	Annual or semi-annual convenings	
PPI	Engage regional business in the expansion of the transportation share program.	Quantity of local contracts for program operations.	
<b>Medium-Term (&lt; 6 months)</b>			
CPD	Develop clearly articulated pathways for entry into climate-related careers including non-traditional and traditional models of education training to ensure access and equity.	Does the training pathway provide multiple on-ramps and off-ramps for learners? Does the training pathways include accelerated skills development with basic skills offered	

Area	Recommendation	Leading Indicator	Completed Yes / No
		through CBOs, Adult Schools, and postsecondary non-credit and credit formats?	
PEN	Design support systems for pathways to transition learners from one training/education level to the next and into employment in living wage clean transportation occupations.	Does the project engage employers directly, the workforce system or other partners as career navigators or employment placement specialists?	
PPI	Develop work plans to integrate 1-time state funds with structural funds dedicated to addressing and supporting workforce development efforts in infrastructure and climate	Using the project digital schematic, can one-time funding be readily placed within the activity and outcome roles?	
PPI	Develop / create structural participation in ongoing multi-agency collaborative focused on workforce, economic and community development	Is the project logic model/ digital schematic maintained and flexible enough to add or subtract partners as they come and go? Is there a redundancy created for certain roles to ensure sustainability?	
<b>Long-Term (1 year)</b>			
PPI	Maintain an integrated database to track ROI of various state and locally funded programs <ul style="list-style-type: none"> <li>• Include metrics related to employment outcomes, etc.</li> </ul>	Development of database	
PPI	Coordinate staff activities and roles to leverage expertise and information sharing	Has the COG conducted an organizational structure review to integrate workforce development activities across planning projects?	

Area	Recommendation	Leading Indicator	Completed <i>Yes / No</i>
PPI	Develop rubric to evaluate potential program partners including topics such as existing partnerships with education and training providers, staffing capacity, technical expertise, financial sustainability	Development of a regional asset inventory based on the results of this analysis and aligned to the regional ecosystem schematic.	
PPI	Support synergies across workforce development partners including CBOs, Adult Schools, Community College, Apprenticeships, University, and the workforce system to support evolving job demand and skills needs in this sector.	Is there at least one representative from each type of organization present and actively engaged at convenings and in project work plans?	

# Appendix

## Appendix A. Clean Transportation Case Studies

**Key Success Factor:** strategic integration with an established community bike shop with an existing youth training program to administer the E-bike program and provide maintenance with new E-bike curriculum

### The Berkeley E-Bike Equity Project

The Berkeley E-Bike Equity Project (BEEP) was a pilot program located in Berkeley, CA that distributed E-bikes to qualifying low-income participants. This initiative was part of the city's broader efforts under the Pilot Climate Equity Fund, which commenced in 2022 to reduce greenhouse emissions and support those most affected by infrastructure challenges. Additional funding for the project came from UC Berkeley's Chancellor's Community Partnership Fund. The initiative aimed to rectify the imbalance where low-income communities disproportionately bear the brunt of environmental degradation, despite contributing less to greenhouse emissions, by improving their access to E-bikes for better mobility and resilience. The project ran between late 2022 and early 2024, with E-bikes being distributed in mid-2023. Data was collected over 10 months by the project administrator, Waterside Workshops, and a report is due for release by September 2024.

Waterside Workshops was established in 2007 to provide a non-traditional education space for youths interested in alternative education pathways. Working with schools and partner organizations in the Bay Area, Waterside provides job training and outdoor programs to youth in bicycle maintenance, wooden boatbuilding and outdoor education, serving over 300 youth each year.<sup>11</sup> Qualifying youth participate in paid internships programs, such as the BEEP initiative. Waterside Workshops is also a staple in the community, providing free workshop space, bike giveaway programs, and also features a youth-run café through their barista training program.

A key component of the project was providing E-bike maintenance training to youth interns at Waterside. Interns helped assemble the bikes and then provided the routine maintenance checks and repairs, which allowed them to gain hands-on experience in this rapidly expanding segment of the bicycle industry. Staff from Waterside confirmed that while the program didn't offer formal certifications, with the BEEP contract, Waterside modernized its infrastructure and curriculum, adding E-bike training from the U of Q Institute, a now closed bike maintenance program in Colorado. About 25-30 interns participated in the program.

As BEEP was a small-scale pilot project, interns at Waterside Workshops no longer work specifically on this project. However, the legacy of BEEP endures, as the knowledge and experience gained are

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<sup>11</sup>Waterside Workshops. "About." Accessed October 17, 2024. <https://watersideworkshops.org/about/>

now integrated into Waterside's ongoing bicycle refurbishment program. Interns continue to learn about E-bike safety, electronics, troubleshooting, and diagnosis under the guidance of Waterside staff. Staff added that interns at Waterside spend anywhere from 2 months to years within their internship programs; interns are paid via shop sales, state and local grants, and private donors. More information about this program and its outcome should be available in September 2024 after the report is released.

**Key Success Factor:** sustained community outreach and robust interagency collaboration

### **BIKETOWN in Portland, OR**

The BIKETOWN project in Portland, OR was launched in 2016 as a partnership between Portland Bureau of Transportation (PBOT), Nike, and Lyft. While there was little information about the current or ongoing workforce development implications of BIKETOWN, it is a good model for how a shared mobility system can adapt and evolve to meet its user's needs and provide true accessibility options for both those living with disabilities and low-income individuals. Portland appears to have created a promising urban mobility model, balancing operational strengths of large companies like Lyft, while using local orgs (such as Kerr Bikes) and holding town halls and similar community events<sup>12</sup> to ensure the system is tailored to community values and transportation needs.

BIKETOWN is sponsored by Nike, whose company headquarters sit just outside of Portland in Beaverton, OR. Nike initially infused \$10 million for the first 5 years of operations, and in 2020, increased its contribution by \$8 million. Initial funding for the project was through a \$2 million federal grant. BIKETOWN started with 1,000 bikes to rent across a service area of about 20 square miles of Portland, and in 2021, it had doubled in size, with its fleet including 2000 bikes available across 40 square miles of Portland. The fleet was also 100% electric assist as of September 2021. According to BIKETOWN's website, there are more than 3,000 E-bikes and scooters available across 240 stations in Portland (see Figure 1). The BIKETOWN project has had astounding success, tripling its fleet size in eight years, but also by incorporating other initiatives over time to increase accessibility for all.

PBOT launched two measures in order to encourage wide use of BIKETOWN and increase accessibility for all types of users, plus two ways for users to keep costs down or earn credits.

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<sup>12</sup> PBOT. November 17, 2022. "PBOT, Nike and Lyft hosted 70 community events in 2022 alone."  
<https://content.govdelivery.com/accounts/ORPORTLAND/bulletins/3355548>

- **BIKETOWN for All** offers accessibility and affordability in the form of discounted membership for eligible persons.<sup>13</sup> Membership benefits include \$0/month annual membership, free to unlock then 5 cents a minute, monthly \$10 credit for rides, and free helmets. If members don't have a bank account, they are able to use prepaid debit cards, and if they don't have a smartphone, they can receive special key cards in order to access the bikes. This project was made possible by DEQ's Oregon Clean Fuels Program via the PGE Drive Change Fund.<sup>14</sup> BIKETOWN partnered with an organization called Street Trust to onboard community ambassadors who lead group rides, community education, and engaging partners across the city.
- **Adaptive BIKETOWN** is for people living with disability or those unable to ride a traditional two-wheeled bike. PBOT partnered with local organization Kerr Bikes, whose parent organization provides services to those living with disabilities. Through Adaptive BIKETOWN, members can ride free any bikes from the program for up to one hour, or pay \$5 per hour after, after which other pricing applies. Bikes include stable trikes, hand-powered bikes, and electric-assist trikes.<sup>15</sup>
- **Free Parking at Stations.** Park bikes for free at stations or leave them anywhere for a \$1 fee. In deeper East Portland which tends toward low-income, users can leave bikes and scooters anywhere for free.
- **Bike Angels** earn credits toward rides by riding bikes from crowded stations to those that are running low.

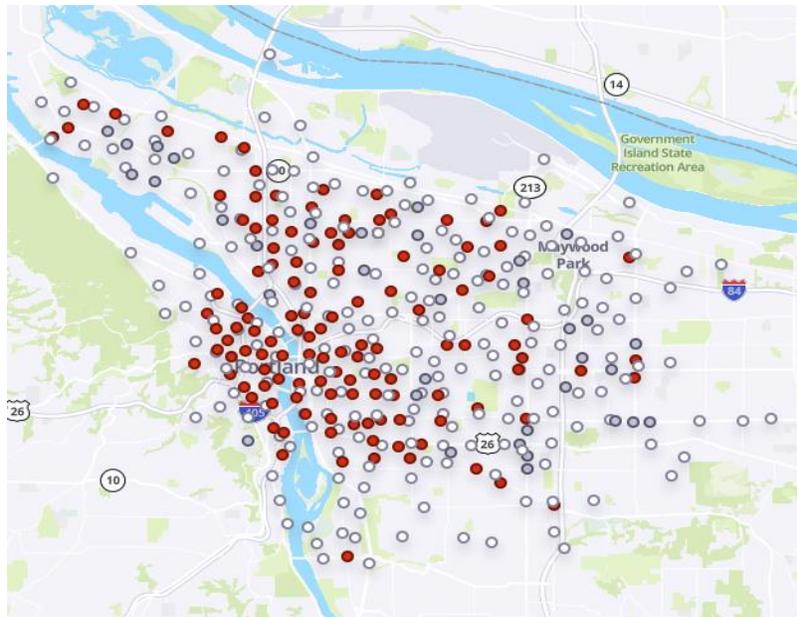
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<sup>13</sup> Individuals 16 and over who qualify for or receive: Pell Grants, SNAP, Low-income heating and energy assistance, affordable housing residents, unemployment, Oregon Health Plan, and more.

<sup>14</sup> Check out this link to learn more about BIKETOWN for All: <https://help.biketownpdx.com/hc/en-us/articles/360035378912-BIKETOWN-for-All-membership>

<sup>15</sup> Check out this link to learn more about Adaptive BIKETOWN: <https://www.albertinakerr.org/support-our-work/kerr-bikes/>

**Figure A1. BIKETOWN Locations for Stations (Red) or Singular E-bikes and E-scooters (Grey)**



Source: Lyft and Nike BIKETOWN 2024

Community outreach was a strong component of the program’s success. As part of the early iterations of BIKETOWN, The Community Cycling Center received a grant from the City of Portland, with matching funding from Motivate, to conduct community outreach, bike safety training, and provide discounted memberships to underserved communities. BIKETOWN continues community outreach through its Ambassador Program run by an organization called Street Trust to increase access across the city. BIKETOWN Ambassadors must be community members with lived experience as either a person of color, living with a disability, older adult, and/or low income to build affinity across communities.<sup>16</sup> In a 2023 budget document,<sup>17</sup> PBOT reported that community partnerships remained a priority, with BIKETOWN participating in or holding over 80 community events in 2022, including ride events, outreach, and education sessions. PBOT releases yearly reports of the program’s metrics and successes, and proposed changes. Community feedback is collected via semi-frequent town halls.

Initially, PBOT partnered with an organization called Motivate to create a workforce development plan named “High Road Standards” as part of the BIKETOWN roll out. The plan aimed to have at least 50% of Motivate’s entry-level workforce and bicycle mechanic staff hours represented by low-

<sup>16</sup> Check out this link to learn more about BIKETOWN Ambassadors: <https://www.thestreettrust.org/programs/biketown-ambassador/>

<sup>17</sup> PBOT. (January 2023). Portland Bureau of Transportation Requested Budget 2023-2024 <https://www.portland.gov/budget/2023-2024-budget/documents/portland-bureau-transportation-fy-2023-24-requested-budget/download>

income individuals, women, people of color, people with disabilities, veterans, formerly incarcerated people, and immigrants or refugees<sup>18</sup> and to provide them with a living wage and training in bikeshare operations. Motivate was also directed to identify and then work with designated training providers. Suggested partners were local organizations whose aim was to provide targeted workforce development services to marginalized communities. Motivate sent job postings out to a roster of a dozen community organizations that worked with disenfranchised communities, and also operated a summer intern program for low-income and youth of color.<sup>19</sup>

The program has undergone many changes since its early years. In 2018, Lyft acquired Motivate, but the company still operated its bikeshare service arm separately under Lyft's jurisdiction. In 2020, PBOT officially contracted with Lyft to extend and expand BIKETOWN for up to 10 years.<sup>20</sup> The High Road Standards remained part of Lyft's contract, and a 2021 budget report from PBOT maintained that Lyft has "consistently surpassed this goal."<sup>21</sup> In 2023, Lyft dropped Motivate as its bikeshare servicer in Portland, and contracted with a new vendor, Shift Transit. Shift Transit already maintained the BIKETOWN system at the Nike World Headquarters nearby, and it would consolidate services under one arm; previously, Motivate had maintained the bicycles while another company did rebalancing (i.e. distributing bikes to docks around the city.)

**Key Success Factor:** Consultation with industry and education partners to ensure curriculum and apprenticeship standards were met

### The Santa Clara Valley Coach Operator Apprenticeship

The partnership described below may be instructive to build on existing workforce development collaborations with the San Joaquin Regional Transit District (SJRTD). Prior collaborations have included funding from the Transformative Climate Communities (TCC) program to train four individuals in a three-year long electric bus mechanic apprenticeship program. Delta College and the SJRTD recently secured funds from the California Apprenticeship Initiative to develop a bus coach operator apprenticeship program in collaboration with the Amalgamated Transit Union (ATU) 256, and California Transit Works (CTW).

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<sup>18</sup> Shared Use Mobility Center. Motivate Contract with Portland. Accessed October 18, 2024.

<https://learn.sharedusemobilitycenter.org/wp-content/uploads/policy-documents-3/MotivateContractPortland.pdf>

<sup>19</sup> NABSA. (September 2019). Workforce Diversity Toolkit for the Bikeshare & Shared Micromobility Industry .

[https://nabsa.net/wp-content/uploads/2019/09/NABSA-Workforce-Diversity-Toolkit\\_September-2019.pdf](https://nabsa.net/wp-content/uploads/2019/09/NABSA-Workforce-Diversity-Toolkit_September-2019.pdf)

<sup>20</sup> Portland.gov (July 16, 2020). PBOT Announces New BIKETOWN Agreement with Lyft.

<https://www.portland.gov/transportation/news/2020/7/16/pbot-announces-new-biketown-agreement-lyft-and-extension-its-title>

<sup>21</sup> PBOT. (January 2021). Portland Bureau of Transportation Requested Budget 2021-2022.

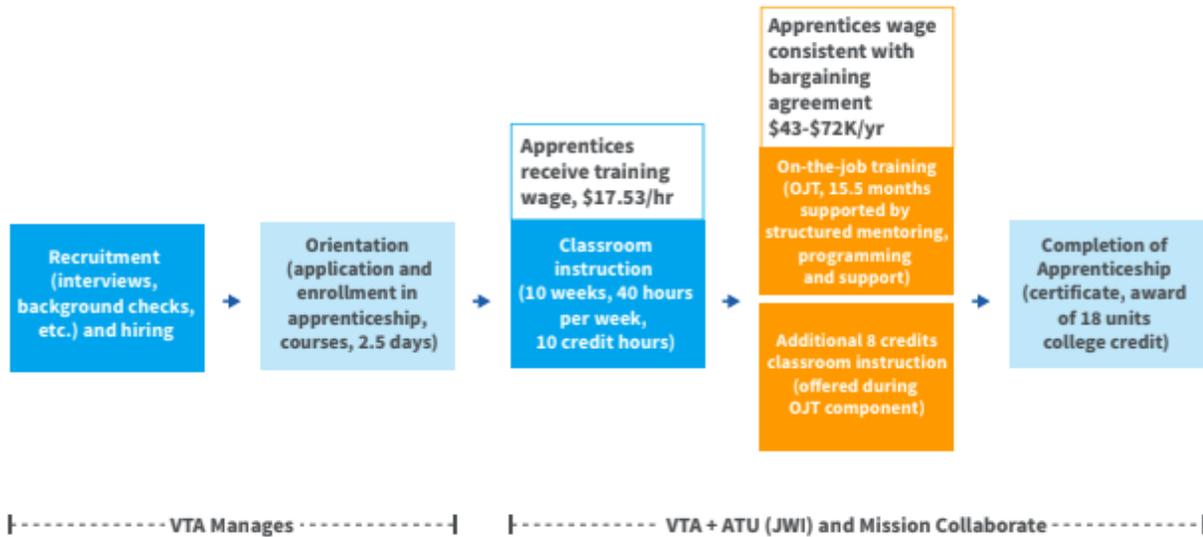
[https://www.portland.gov/sites/default/files/2021/pbot-fy-2021-22-requested-budget\\_final.pdf](https://www.portland.gov/sites/default/files/2021/pbot-fy-2021-22-requested-budget_final.pdf)

In 2016, fewer than 1 percent of California registered apprenticeships were in manufacturing, transportation, and healthcare occupations despite making up nearly 18 percent of the state's workforce. To address this imbalance, and to create more apprenticeship programs in industries where they're rare, the California state legislature developed the California Apprenticeship Initiative (CAI) grant program. One of these grants was awarded to Mission College in collaboration with the Santa Clara Valley Transportation Authority (VTA) and Amalgamated Transit Union (ATU) Local 265 to establish apprenticeship programs in four transportation roles: Coach Operator, Track Worker, Service Mechanic, and Overhead Line Worker. These programs are components of VTA's initiative known as Transportation Apprenticeships for Professional Career Advancement (TAPCA).

Just a decade ago, VTA faced workforce challenges with pending retirements, recruitment challenges in key roles, catching up with new technologies, and more. To help resolve that, VTA and ATU Local 265 launched a mentoring and professional development program in 2007, eventually partnering with Mission College and another partner to institutionalize the training approach. By 2015, a coach operator training program had been developed by VTA and ATU, which served as the basis for the Coach Operator Apprenticeship, which was then registered with DAS in 2016 under CAI. The apprenticeship helped confirm coach operator as a profession, not just a job, and improve worker skills and retention.

All new coach operators participate in the Coach Operator Apprenticeship. Apprentices require about 18 months to complete the program, with 10 weeks of full time classroom training at Mission College and then 15.5 months which are enhanced by mentoring and credit-bearing training. As the apprenticeship is a requirement for any new incoming coach operators, upon hire they are immediately considered both VTA employees and Mission College students. See Figure A2 for the process from onboarding to completion.

Figure A2. Coach Operator Apprenticeship Program



Source: Behind the Wheel: A Case Study of Mission College and Santa Clara Valley Transportation Authority's Coach Operator Apprenticeship Program

To ensure that the college credit portion of the apprenticeship program met educational standards, an industry consultant worked with three Mission College faculty to develop the curriculum and guide it through the college approval process. To do this they built the course outline of record, determined student learning outcomes and course objectives, assigned hours and units, and then built out the actual curriculum. It then went through review by various departments and committees, the college's board of trustees, and finally by the Chancellor's Office. Because this was a brand new apprenticeship, and many of the involved parties (including DAS) were only familiar with construction apprenticeships, there were hurdles, such as confusion with paperwork and the longevity of the entire process.

There were other lessons learned, such as a separate process to enroll apprentices in a cohort as opposed to as individual students, and Mission College adopted a new hiring process in order to enable VTA employees to work as college faculty so the courses they taught were credit bearing. While largely administrative in nature, these challenges required persistence and workarounds.

Between 2016 and 2018, over 400 apprentices went through the program. Apprentices reported that the program helped them in the following ways:

- **Enhanced technical and problem-solving skills**, particularly communication and collaboration, which are paramount to managing interactions with the public, which can be very stressful. Mentorship was especially helpful in this regard, as it helped them develop public engagement skills and strategies, which lead to confidence and professional expertise
- **Connection to career pathways**, mentorship and professional community, and ongoing professional development and advancement
- **Understanding of their own potential**, especially when it came to achieving college credit, and seeing themselves as professionals who are able to advance their careers

## Appendix B. Current Training Programs with Completions

CIP Code	Training Program Title	Institution	Award Level	Completions (2022)
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	UEI College-Stockton	Award of at least 1 but less than 2 academic years	104
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	2
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	San Joaquin Delta College	Associate's Degree	2
46.0302	Electrician	San Joaquin Delta College	Award of less than 1 academic year	45
46.0302	Electrician	San Joaquin Delta College	Associate's Degree	11
47.0101	Electrical/Electronic Equipment Installation and Repair Technology/Technician, General	San Joaquin Delta College	Award of at least 1 but less than 2 academic years	1
47.0302	Heavy Equipment Maintenance Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	5
47.0302	Heavy Equipment Maintenance Technology/Technician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years	13
47.0302	Heavy Equipment Maintenance Technology/Technician	San Joaquin Delta College	Associate's Degree	14
47.0303	Industrial Mechanics and Maintenance Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	2
47.0603	Autobody/Collision and Repair Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	1
47.0603	Autobody/Collision and Repair Technology/Technician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years	4
47.0604	Automobile/Automotive Mechanics Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	15
47.0604	Automobile/Automotive Mechanics Technology/Technician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years	5
47.0604	Automobile/Automotive Mechanics Technology/Technician	San Joaquin Delta College	Associate's Degree	3

CIP Code	Training Program Title	Institution	Award Level	Completions (2022)
47.0605	Diesel Mechanics Technology/Technician	San Joaquin Delta College	Award of less than 1 academic year	7
47.0605	Diesel Mechanics Technology/Technician	San Joaquin Delta College	Associate's Degree	4

## Appendix C. Current Training Programs With No Completions in 2022

CIP Code	Training Program Title	Institution	Award Level
46.0302	Electrician	UEI College-Stockton	Award of at least 1 but less than 2 academic years
47.0104	Computer Installation and Repair Technology/Technician	UEI College-Stockton	Award of at least 1 but less than 2 academic years
15.0000	Engineering Technologies/Technicians, General	San Joaquin Delta College	Associate's Degree
15.0613	Manufacturing Engineering Technology/Technician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years
15.9999	Engineering/Engineering-Related Technologies/Technicians, Other	San Joaquin Delta College	Associate's Degree
46.0000	Construction Trades, General	San Joaquin Delta College	Award of at least 1 but less than 2 academic years
46.0000	Construction Trades, General	San Joaquin Delta College	Associate's Degree
46.0302	Electrician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years
47.0303	Industrial Mechanics and Maintenance Technology/Technician	San Joaquin Delta College	Associate's Degree
47.0604	Automobile/Automotive Mechanics Technology/Technician	San Joaquin Delta College	Award of at least 2 but less than 4 academic years
47.0605	Diesel Mechanics Technology/Technician	San Joaquin Delta College	Award of at least 1 but less than 2 academic years
15.0000	Engineering Technologies/Technicians, General	ITT Technical Institute-Lathrop (not current)	Associate's Degree
15.0000	Engineering Technologies/Technicians, General	ITT Technical Institute-Lathrop (not current)	Bachelor's Degree
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	ITT Technical Institute-Lathrop (not current)	Associate's Degree
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	ITT Technical Institute-Lathrop (not current)	Bachelor's Degree
15.0399	Electrical/Electronic Engineering Technologies/Technicians, Other	ITT Technical Institute-Lathrop (not current)	Bachelor's Degree
15.1201	Computer Engineering Technology/Technician	Heald College-Stockton (not current)	Award of at least 1 but less than 2 academic years
15.1201	Computer Engineering Technology/Technician	Heald College-Stockton (not current)	Associate's Degree

## Appendix D. Fellows Analysis – Key Themes

**Program Fellows:** The fellows are a heterogeneous group with different reasons for joining the program. They also had different amounts of tenure in the program. While most people seemed to know each other, they are not a cohort group.

**Consideration:** If the program evolves and fellowship grows, consider establishing a cohort model to build out a learning track, and to be able to track, compare, and contrast learner experiences/outcomes.

**Program Recruitment:** Fellows discussed two main tracks for how they discovered the program:

1. Through partner outreach/information offered during a related topic area course.
2. Through individualized search on a job platform or for jobs.

In the first track, one fellow was introduced to the program through a customer service course taken with a key partner – the Housing Authority. Two fellows learned about it through Delta College’s EV training course. Three fellows found the program through job search activities [one of which also completed the EV course]– two of them through Indeed.com.

In both these tracks, fellows also had follow-up conversations with key program interest holders who served to further support recruitment -- a Housing Authority representative/partner who connected/pushed into the EV training course and with a key program staff member during/after interviews.

**Consideration:** These recruitment methods are first step strategies. Their reach, however, is limited and could be scaled through diversification and formalizing outreach efforts. Examples would include aligning and embedding outreach within additional courses and through an education partner, having a marketing campaign, and further tapping into local partners.

**Attraction to Program:** Fellows were drawn to the program for different reasons. These reasons included:

1. The program presented an opportunity for learning and growth [e.g., an opportunity to do something enjoyable and to connect/contribute to the community through providing a service].
2. The program was attractive because of interest, novelty, and entry into an interesting, future-oriented field [e.g., e-tech, E-bikes, charging stations].

**Consideration:** Leverage and tap into what interests current fellows about the program to target program messaging and outreach. Highlight fellows’ stories and successes, what they find positive

about the program, and learn from them about challenges as a way to target improvements (see findings on positive experiences and challenges).

**Prior-Experiences with EV/Tech/Green?** Fellows' prior experiences with the EV/Green technology field before the training had been limited. Prior experience in the field either came from having taken the EV training course at Delta College or from related electrical job experiences.

**Consideration:** The Delta College course has been serving as a gateway to further training and partner for outreach. Continue to foster the relationship with the college while also considering how to leverage learning opportunities within it. For sustainability, think about expanding partnerships with additional college/training courses.

**Fellows' Goals:** Fellows described goals for joining the program that related to their interests. One of the main goals that fellows had for joining the training program was to gain knowledge about the electric-transportation field. When asked whether they felt the program was helping them meet their goals, most felt that it was.

**Overall Perspectives on the Program [e.g., viewed value add].** Fellows saw the program as a way to prepare and keep ahead of an ever-growing technology field. They viewed it as a stepping stone or gateway into a new field or to another, related field. As one fellow noted, "The world is going tech. So, you better jump on!"

**Consideration:** Viewing the training as a stepping stone to additional fields opens possibilities for learner and program growth. Map possible trajectories that the training can lead and feed into and make these maps accessible for students and interest holders (e.g., partnering colleges, employers, community organizations and members).

Fellows' Positive Experiences and Challenges: For the most part, *fellows expressed positive, personal experiences from participating in the program*. These experiences included:

- **Feeling fulfilled** from the work, which was enjoyable for one fellow, and led to community engagement for a few others.
- **Learning about new technology, which provides an opportunity for entry or growth** within a field.
- Continued participation in the program and seeing it evolve. One fellow noted that the program was starting to gain success.
- A few fellows noted that **the training provided new work experiences**, or as one fellow put it, "a whole different side of the workforce." It had moved some fellows out of warehousing

floor jobs, which are physically taxing, and expanded skill sets. Skills that fellows noted had been expanded and for which confidence had been built included communication [e.g., public speaking, interviews] and networking skills. As one fellow noted, “I don’t know if I could ever go back in the warehouse regardless of this program or the next one, I’m going to have to keep on pursuing stuff like this.”

- Opportunity provided for external training/certification with an introductory bike course to two fellows.
- The program has **exposed fellows to new people**, to the local environment/community, and fostered interpersonal connections/socialization.

Fellows did experience **some initial challenges specifically with the program’s design, offerings, and outreach** which they noted were improving. These initial challenges included:

- A **lack of structured or programmatic training for the repair aspect**, with a feeling that fellows just “had to make the system work” on their own, meaning self-taught. Main program training content came from videos, which were useful. One fellow noted that, “There was nothing there...nothing to grab upon to use.” “We had to kind of develop that as we went along.” Eventually, two fellows began working on a program manual to offer structure and written training [e.g., to walk through a repair, troubleshoot a problem, etc.].
- Likewise, there was **limited support** with fellows having to “figure” problems out. The support was limited both on the program side and on the community, work based learning (WBL) partner side. This led to peer-to-peer support with more tenured fellows helping newer fellows when they arrived. As one fellow noted, “...everything that I learned, I learned by myself, and just with a little bit of assistance from the people back east [SMI, a former program partner], and a little bit of assistance from the people in Drop. But not a lot.” While noting that improvements had been made to supports, that fellow stressed “that most of the time we’re [fellows] having to figure it out.”
- Getting the bikes “to the right people.” Fellows are invested in the program and care about its trajectory. They noted **challenges with getting the bikes securely and safely to users**. Security and continued upward trajectory were predicted if the right users were targeted.
- There’s **limited time**, or a short amount of time, to get all the needed work done, with more official capacity needed. That extra capacity could mean security and protection with bike drop-off, tracking, and pick-up in the field.

On the communications side for working with customer service with the carsharing program, the program design offered a bit more hands-on-training at the beginning with team meetings and learning application, booking, and scheduling processes. In-person and team training were limited after that initial period, primarily occurring when taking vehicles to events.

Fellows on What Would Have been Useful or is Useful:

- ***Having Structure and Guidance Materials [would have been useful and is useful now]:*** Having had more structure at the onset of the program [e.g., manuals such as they now have] could provide step-by-step guidance for repair and service training. Fellows now mention having wisdom and materials which they can impart to others and thus better support training, which was seen as a home-grown positive. As one fellow noted he's seen how far the program has improved from watching videos to having fellow-produced manuals.
- ***Having Incentives [is useful]:*** The ability to learn hands-on and receive training was also seen as valuable, as well as having time to be compensated for that learning. As one fellow said, "Have the ability to train and learn, but also as well be compensated for it, because I don't know anybody who just has the time to sit around and not be compensated for their time."
- ***Opportunity for Additional Training for All:*** Two fellows had the opportunity to get additional training for certification through participation in the program. Having opportunities for additional training for all was seen as a beneficial option for fellows.

**Consideration:** The training program is already addressing improvements by providing structure and materials with the curriculum currently being developed. Looking into incentivizing and providing additional training and articulation opportunities outside the program for certification, badging, or professional learning events can help bolster student experience and employability.

**Skills Gained:** Fellows primarily mentioned three categories of skills that they have gained from program participation: specialized administrative aptitude, specialized mechanical aptitude, and client-facing aptitude.

- ***Specialized Administrative Aptitude:*** Specialized administrative skills gained included operations and logistics, such as how to run a call center and fleet maintenance or logistics. Communication and organizational skills using software also falls within this category to include learning email etiquette and communication, using Excel sheets, Slack, and other specialized software.
- ***Specialized Mechanical Aptitude:*** Specialized mechanical skills gained primarily revolved around working on E-bikes (e.g., to break them down and fix them up), whether the

knowledge was new or was there and then was upskilled. For example, one fellow noted that the program reactivated and honed bike repair skills:

“This actually helped me, because when I was a kid I used to work on a lot of bikes, I'd just pull them apart. But it's kind of got me back into that mode, so it's kind of resonated something in me that I have knowledge of a long time ago, but now even better with the electrical bike.”

- **Client-Facing Aptitude:** Client-facing skills gained from the program included customer service and “durable” or “soft” skills such as effective customer interaction, problem solving, and self-expression. For some these skills were newly acquired from the program while they were already there for others but fine-tuned. As one fellow noted, the program helped shift a mindset:

“I just got to change it up a little bit, make it more PC. It's taught me how to do that, how to change my thought process a little bit of how I deal with either a problem with somebody who's riding the bikes and explain to them, “Hey, this is not the way we” ... However, just be kinder in how I express myself.”

**Suggestions for Additional Skill Preparation:** When offering suggestions for additional skill preparation, fellows noted that the program could provide practicum or case scenarios for dealing with unexpected client and situational difficulties. For example, fellows expressed sometimes being faced with “complex” situations such as rude clients, no-shows for deliveries, or failed payments. Practice for such situations could provide fellows with valuable strategies.

**Fellows’ Perspective on Whether the Training has Helped with Career Interests/Aims:** Fellows that we spoke with noted that the training they received from the program has expanded career interests and aims. For one fellow, this meant furthering interest and possibilities involving customer service work (e.g., the possibility of working remotely, understanding that there were opportunities within the car share industry). For other fellows, the training changed their view about past employment to broaden their perspectives on the types of jobs they no longer wanted to do and other avenues that they could pursue. One fellow looked at the training as a “stepping stone” and opportunity to other growth pathways.

**Fellows’ Suggested Improvements:** Fellows offered a handful of suggested improvements that could support them within the program. These included providing:

- **Learning Tools and Materials:** Fellows noted that a lot of the material had been self-created by fellows themselves and that having more program created resources would be welcomed (e.g., packaged and structured materials as well as hands-on experiences).

- **Opportunities to Dive or Go Deeper into Learning:** Fellows suggested a more in-depth focus, such as for the EV course, that goes beyond “surface” information. Ideas floated included doing deep dives into material/topics and having longer courses (e.g., 12 weeks instead of 8 weeks).
- **Better Work Communication:** Fellows expressed that better communication within the work environment could help with initiating or finishing tasks. Examples of what could be helpful include communicating expectations and more frequent or prompt feedback.