Findings and Lessons Learned from an Evaluation of the Clean Mobility Options (CMO) and the Sustainable Transportation Equity Project (STEP) Programs

California Air Resources Board Contract 19MSC006

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Abstract

The California Air Resources Board's (CARB) is the lead agency for climate change programs and oversees all air pollution control efforts in California to attain and maintain health-based air quality standards.

The University of California, Berkeley, Transportation Sustainability Research Center (UCB), was contracted by CARB under research contract 19MSC006 to: 1) identify the best method to evaluate CARB's clean mobility pilot projects; 2) identify community and researcher-preferred indicators and metrics and those important to CARB's Low Carbon Transportation reporting; 3) conduct an evaluation of CARB's clean mobility pilot projects and identify lessons learned; and 4) develop policy recommendations on successful clean transportation project elements to inform future transportation equity funding.

This report is the Task 6 deliverable; a summary of key lesson learned from the evaluation of implementation projects, baseline assessments, and future planning and capacity building projects. Policy recommendations are also included. The report provides a synthesis of findings from an independent evaluation of the Clean Mobility Options (CMO) and Sustainable Transportation and Equity Project (STEP) programs funded by CARB. Included is an overview of the methodology and evaluation framework employed for conducting the evaluations. Cross-cutting findings about the institutional factors that influenced project development and outcomes are discussed. In select cases, data analysis on user impacts of projects are also explored. Considerations for future demonstration programs are also included. Collectively, this report provides an overview of the impacts of CARB's CMO and STEP programs, and provides recommendations for streamlining grant administration, strengthening financial sustainability of demonstrations, refining grant eligibility criteria and program administration, strengthening evaluation reporting, improving procurement, addressing insurance challenges, and expanding stakeholder and community engagement as part of future grant initiatives.

Executive Summary

Background

The California Air Resources Board (CARB) is a state agency that is charged with protecting the public from the harmful effects of air pollution and developing programs and actions to fight climate change. To this end, CARB has developed a number of programs to help achieve emissions reductions and follow state legislative direction that investment programs benefit California's low-income, disadvantaged, and tribal communities. CARB's Clean Transportation Incentives are made up of funding from various sources, including: 1) Low Carbon Transportation Incentives appropriated from the Greenhouse Gas Reduction Fund; 2) Air Quality Improvement Funds for the Air Quality Improvement Program (AQIP); 3) Funding from the State General Fund for specific projects or project categories; and 4) Proposition 98 General Funds for specific projects or project categories. In Fiscal Year 2023-24, the funds appropriated for Clean Transportation Incentives are allocated to several programs, including $140 million appropriated for clean transportation equity programs[1]; $455 million appropriated for heavy-duty vehicles, including $80 million for zero-emission drayage trucks and $375 million for zero-emission public school buses; and $28.6 million designated for the Air Quality Improvement Program (AQIP). CARB's clean mobility options (CMO) equity programs, including regional, legacy projects and the Statewide Clean Mobility Options Voucher Pilot Program are intended to improve clean transportation access and to increase zero-emission mobility choices for disadvantaged and low-income residents. CMO provides funding for community-driven mobility projects that increase residents' access to key destinations by providing various clean transportation options. The program also previously provided funding for community transportation needs assessments to support communities in assessing unmet transportation needs and develop community-driven strategies. After conducting needs assessments, eligible applicants are better situated to apply for and receive funding for electric carsharing, carpooling, human powered and electric bikesharing, scooter sharing, vanpools, demand-response transit services/microtransit, fixed route transit, and other clean mobility options that best suit their communities.

Another program, the Sustainable Transportation Equity Project (STEP) funds a variety of clean transportation and supporting projects, such as public transit and shared mobility services, active transportation infrastructure, land use planning and housing policy, workforce development, and clean transportation planning and education. Funded projects are intended to work together within low-income and disadvantaged communities to increase transportation equity.

[1] This includes $80 million for the broad suite of statewide transportation equity programs established under the Charge Ahead Initiative, SB 1275 (De León, Chapter 350, Statutes of 2014), including but not limited to the Clean Cars 4 All Program (CC4A), plus $60 million specifically for STEP which increase access to zero-emission mobility in disadvantaged and low-income communities, reducing vehicle miles traveled (VMT) and air pollution.

Broadly, CMO and STEP fund an array of approaches including the development of trip planners, shared mobility, and active transportation infrastructure.

Evaluation Objectives and Principles

This independent evaluation sought to understand:

- Social equity and environmental impacts of projects;
- Demonstration and institutional lessons learned;
- Recommended policies;
- Most successful business and community partnership models; and
- Scalability of innovations considering a variety of context-specific variables (e.g., built environment, geography, etc.).

Evaluation Methods

The evaluation planning process included the development of a site-specific evaluation framework in partnership with grantees and other stakeholders of the demonstrations. This phase included the development of an evaluation plan. Based on the project-specific goals, evaluation hypotheses for each site were developed. Across all the evaluations, the topics covered by these hypotheses explored include:

- Mobility, equity, and accessibility to key destinations;
- Greenhouse gas (GH) emissions and vehicle miles travelled (VMT);
- Financial sustainability/cost effectiveness;
- Socioeconomic impacts and benefits; and
- Lessons learned and best practices from project activities.

While the hypotheses were tailored to the specific projects, selected examples of hypotheses from selected evaluation plans are presented as examples of the types of topics explored and their wording:

1) Users of different demographics within the carsharing system report improved mobility and accessibility as a result of access to carsharing.
2) Net VMT of the user group and the resulting GHG emissions would have been higher in the absence of carsharing.
3) The carsharing system is able to generate enough revenue to cover operating costs, capital costs, or both combined.
4) Participants of different demographics within the e-workforce development program report improved access to high quality job opportunities.
5) Users of different demographics within the electric bikesharing systems report improved mobility and accessibility as a result of access to expanded services.
6) The EV technology improves vehicle performance and reliability, reduces GHG emissions and criteria air pollutants, and demonstrates a financially sustainable system, when compared to conventional vehicle technology.

These and other hypotheses were established to frame the analysis and data needs for individual projects within the evaluation portfolio. Some hypotheses had to evolve with changes in project scope and objective, but the general subject matter of the hypothesis usually stayed the same.

Building on the drafted hypotheses, site specific performance metrics were developed in coordination with each grantee based on the project goals and hypotheses during the development and revision of the project's logic model. Several evaluations employ a multi-method quantitative and qualitative approaches comprised of user and traveler surveys; interviews with project partners; institutional (i.e., stakeholder) focus groups; vehicle telematics, and other data sources. These methods are briefly described below:

User and Traveler Surveys: User and traveler surveys included people using the applications and services being developed, augmented, and/or deployed by the project teams. The site-specific evaluation plans detailed the population to be surveyed, the necessary steps required to conduct the survey, and the general analytical approach to be taken with the data. Surveys were proposed for the population that were directly impacted by the demonstration project.

Ridership and/or User Data: Ridership and/or user data consists of ridership using a mobility service or users using a trip planning app. Data were requested from agencies in cases where impacts on ridership/number of users can be measured. Where feasible, a general population survey was conducted to provide information on the travel behavior and mobility needs of a community, which included non-users. In other cases, the objective of several evaluations is to understand how the user population is impacted by the system.

Energy Data: Energy data were collected to help measure environmental impacts. This includes petroleum fuel usage and/or kWh consumed by vehicles. These energy metrics can be converted to estimates of GHG emissions.

Activity Data: Activity data cover a wide variety of data types. The most common type of activity data is traveler activity data, which describes the movements of people recorded on smart phone apps or by a mobility service. These data, while anonymized, provide high resolution information on movements that may be translated into mode used, travel times, wait times, and other data.

Expert Interviews: Interviews with grantees and other stakeholders (n=72) were conducted between April 2023 and April 2025, and covered lessons learned from their experience planning and implementing CMO and STEP projects. The interviews were conducted with at least three project stakeholders to gain their perspective of what worked well and what could have performed better.

The methodological approach of the evaluation focused on assessing the behavioral, equity, and environmental impacts of the projects as they were deployed. The independent evaluation team analyzed each hypothesis within the logic model framework and determined the degree to which it was supported (e.g., mostly supported, partially supported, not supported, or inconclusive).

Institutional Focus Groups/Small Group Discussions: The researchers also conducted a limited number of institutional focus groups (n=5) and small group discussions (n=4) with CARB

staff, the grant administrators Shared-Use Mobility Center and CALSTART, and grantee stakeholders. These focus groups explored opportunities, challenges, and recommended strategies for improving CMO and STEP. The institutional focus groups provided a semi-structured and interactive forum for stakeholders to share their perspectives. The insights gathered from these focus groups helped inform a number of the strategic planning and policy findings in this report.

Evaluation Findings

Evaluation plans were completed for six CMO demonstrations and three STEP projects. The scope and complexity of evaluations for CMO and STEP projects varied significantly, largely due to the unique phases of each project within its planning and deployment timeline. Projects in the early planning stages typically required different evaluation approaches than those already in active deployment. In many cases, site-specific evaluation plans created in consultation with project partners in early phases of the project were later modified to account for unanticipated changes to a project's scope, or to the availability or format of data required to conduct the planned evaluation. In these cases, the best feasible evaluation alternative was employed, and changes to the original evaluation plans were documented in subsequent evaluation plan addenda. A selection of notable findings from the data analysis and from interviews conducted with project partners are highlighted below.

Lessons Learned from Project Partners

A number of cross-cutting findings related to institutional and other lessons learned were identified during interviews and institutional focus groups conducted with CMO and STEP grantees. These findings highlight common challenges and offer insights into improving program design, administration, and community impact. An overview of these findings is summarized below:

- **Resources needed to scale and replicate demonstrations.** Resources such as staff support and standardized materials are needed to help scale and replicate CMO and STEP programs. A number of grantees emphasized the need for CARB to provide contracting templates to facilitate subawards, budgeting, data sharing, and reporting for grantees from smaller organizations that lack experience working with CARB and private sector vendors.
- **Partnerships with community-based organizations can expand outreach to underserved communities.** Across both CMO and STEP programs, numerous grantees shared success stories of how public-private partnerships with community-based organizations (CBOs) and staff dedicated as community liaisons were instrumental in reaching underserved communities.

  The evaluation team found that dedicating more resources to stakeholder and community engagement activities can help CARB build meaningful relationships, foster trust, and create positive impacts in communities that may lack resources and experience working with state agencies. Additionally, engaging with stakeholders and communities can demonstrate CARB's commitment to transparency, accountability, and inclusivity.

Moreover, stakeholder and community engagement activities provide opportunities for CARB to gain valuable insights, perspectives, and feedback by listening to diverse voices. In doing so, CARB has the potential to leverage these engagements to make more informed decisions and develop strategies that better reflect the interests of underserved communities. Finally, continuous engagement throughout a grant program's performance can help CARB to identify and mitigate risks, anticipate potential issues, and address concerns before they escalate.

- **Several CMO and STEP grantees requested that CARB simplify and streamline administrative processes.** Several grantees expressed concern about burdensome requirements that make it difficult for smaller and less experienced agencies to participate in demonstrations, and also make it difficult for projects to adapt to changing community needs.
- **Digital poverty and un/under banked access can be barriers to equitable access.** Several grantees implemented strategies that may only be available to users with a smartphone and/or a credit/debit card. Future grants should consider ways to expand program access to digitally impoverished and un/under banked households. Some strategies that future grant programs can consider include:
    - Omni-channel booking options: Offering multiple booking channels beyond smartphone apps, such as phone calls, text messages, or web-based platforms accessible via computers or feature phones. This allows users without smartphones to access the service using alternative communication methods.
    - Call Centers or hotlines: Establishing dedicated call centers or hotlines staffed with customer service representatives who can assist users in booking rides, accessing information, or resolving issues over the phone. This provides a personalized and accessible way for users without smartphones to interact with the service.
    - Kiosks or physical booking locations: Setting up physical kiosks or booking locations in high-traffic areas such as mobility hubs. These kiosks can be equipped with touchscreens or operated by staff to facilitate booking rides and providing assistance to users without smartphones.
    - Prepaid Cards or Vouchers: Introducing prepaid cards, vouchers, or tokens that users can purchase and use to access shared mobility services without needing a smartphone. These cards can be sold at retailers or partner locations, providing a convenient payment option for users without access to digital payment methods.
    - Partnering with Community Organizations: Collaborating with community-based organizations, nonprofits, or social service agencies that serve populations with limited smartphone access. These organizations can help distribute information and provide assistance with booking mobility services.
    - Promoting digital literacy: Offering training opportunities to educate users without smartphones on how to access and use shared mobility services through alternative

channels. This can provide education and outreach about mobility services, and how to use them.

- **Many of CARB's Current Demonstrations in CMO and STEP May Not Be Self Sustaining:** Many grantees explained that CARB's seed funding was instrumental in providing seed funding for clean mobility options in historically underserved and rural communities. Several grantees do not believe many of these projects would have been possible without CARB monetary and non-monetary support. Several stakeholders interviewed felt that CARB should require or encourage projects be financially self-sufficient versus funding projects that require ongoing public subsidy.

Considerations for Future CARB Programs

The evaluation reveled several key takeaways and respective recommendations for future CARB grant programs. These key findings and recommendations are summarized in Table 1 below:

Table 1. Key Findings of the CMO and STEP Program Evaluations and Recommendations

Key Findings	Recommendation
Advance Planning Gaps: **Many grantees require additional support to refine project concepts before applying for funding.**	**Expand Pre-Grant Planning Assistance:** Offer technical assistance or planning grants to help applicants develop robust, feasible project proposals. Provide templates and best practices to streamline project design
Application & Administration Barriers: **Current processes may be cumbersome; a pre-qualification stage could expedite selection and funding distribution.**	**Implement a Two-Stage Application Process:** Introduce a pre-qualification phase to vet project viability before full proposal submission. Fast-track funding for pre-approved applicants with strong concepts.
Lack of Flexibility in Project Execution: **Without clear adaptive guidelines, grantees may struggle to respond to unforeseen challenges.**	**Establish Adaptive Project Guidelines & Periodic Reviews:** Allow for scope adjustments to accommodate unexpected challenges. Conduct regular project assessments to ensure alignment with goals while enabling necessary pivots.
Stakeholder & Community Engagement Deficiencies: **Insufficient engagement early and throughout the project lifecycle can hinder project effectiveness and community trust.**	**Mandate & Fund Community Engagement:** Require continuous stakeholder engagement activities as a condition of funding. Allocate dedicated resources to ensure grantees engage communities early and consistently.

Refining Eligibility Criteria Enhances Impact: **Focusing on projects with clear environmental, equity, and sustainability benefits ensures resources are directed toward high-priority initiatives.**	**Strengthen Eligibility Criteria to Align with Core CARB Priorities:** Prioritize projects with clear emission reduction, equity, and long-term sustainability goals. Develop a scoring system that more closely weights projects based on their alignment with these priorities.
Pre-Defined Project Parameters Improve Accountability: **Establishing measurable benchmarks helps ensure that funded projects deliver tangible outcomes.**	**Define Minimum Performance Benchmarks for Funding:** Require projects to meet environmental, economic, and social impact thresholds. Use standardized metrics to track performance and ensure comparability across projects.
Phased Funding Reduces Risk & Supports Scalability: **Starting with smaller grants allows projects to prove feasibility before receiving larger investments.**	**Adopt a Phased Funding Approach:** Start with small pilot grants to assess feasibility and impact before scaling. Require projects to demonstrate early success before qualifying for additional funding.
Evaluation Participation Strengthens Program Learning: **Some grantees resist evaluation, limiting insights into program effectiveness and best practices.**	**Make Evaluation Participation a Funding Condition:** Require grantees to participate in program evaluations to improve data collection and decision-making. Offer incentives such as extended funding opportunities for projects that actively engage in evaluation processes.
Procurement Delays & Cost Variability: **Grantees struggle with vendor reliability and price fluctuations, leading to delays and budget overruns.**	**Develop a Pre-Approved Vendor List for Streamlined Procurement:** Establish an on-call vendor database with pre-negotiated pricing and terms. Offer an expedited contracting process for grantees using approved vendors.
High Insurance Costs & Market Instability: **Limited insurance availability in California increases costs and creates financial barriers for grantees.**	**Create a Statewide Pooled Insurance Model for Demonstration Projects:** Explore a shared-risk insurance pool across CARB-funded initiatives. Negotiate bulk insurance policies to lower costs and ensure coverage availability.
Lack of Long-Term Financial Planning:	**Require Financial Sustainability Plans for Project Approval:**

Many projects lack a roadmap for financial sustainability post-demonstration, increasing reliance on continued subsidies.	Mandate long-term funding strategies in grant applications. Provide technical assistance for grantees to develop sustainable business models.
Unclear Roles Create Inefficiencies: **Overlapping responsibilities between grant administrators, technical support providers, and evaluators can lead to redundancy and accountability gaps.**	**Establish Clear Role Definitions & Boundaries:** Define distinct scopes for grant administration, technical support, and evaluation. Develop guidelines outlining the specific responsibilities and limitations of each role.
Risk of Conflicts of Interest: **Without safeguards, third-party organizations involved in grant administration may gain an unfair advantage in future funding opportunities.**	**Implement a Cooling-Off Period for Third-Party Organizations:** Introduce a time-limited restriction on organizations transitioning from administrative roles to grantee roles. Ensure fair competition by rotating third-party providers periodically.
Need for Transparent Third-Party Administrator Selection: **A more competitive selection process can ensure that the most qualified organizations are chosen while minimizing favoritism concerns.**	**Enhance Competitive Selection Processes for Third-Party Administrators:** Strengthen bidding and evaluation criteria to prioritize expertise, performance history, and cost-effectiveness. Increase transparency by publishing selection methodologies and rationale for contract awards.

In particular, the evaluation found that most of the CMO and STEP initiatives lacked post-demonstration funding or funding plans, placing the future of several of these investments in jeopardy. The evaluation recommends that CARB reviews and scores the fiscal side of proposed grants to ensure that grantees have a plan to continue successful demonstrations after CARB funding concludes. At present, post-demonstration funding is by-in-large not taken into consideration when an applicant applies for initial funding. This can be critical to ensuring the longevity of CARB's climate investments and return on investment for state grant funding (Steer, 2023). Future CARB grant programs should weigh prioritizing projects that can self-sustain post-demonstration versus projects requiring ongoing public subsidy. Potential tradeoffs in these approaches are summarized in Table 2.

Table 2. Tradeoffs Between Self-Sustaining and Subsidized Projects Post Demonstration

	Advantages	Challenges
Self-Sustaining Projects **In this approach, a project aims to become financially self-sustaining after an initial**	• Promotes financial and long-term sustainability.	• Requires notable upfront investment and time to develop sustainable revenue sources.

demonstration period. The focus is on developing revenue streams, cost-saving measures, or other financial mechanisms that allow the project to cover its operational expenses without relying on external subsidies.	• Encourages innovation with respect to identifying business models and/or revenue sources. • Reduces dependence on external funding and subsidies, which may not be reliable or sustainable in the long run.	• Success is not guaranteed, and there may be risks associated with the viability of a selected business model. • May limit the scale or scope of the project initially until financial solvency is achieved.
Ongoing Subsidy Projects **In this approach, the project relies on continuous financial support or subsidies from external sources to cover its operational expenses indefinitely. The focus is on providing mobility and/or GHG reductions without the immediate need to generate revenue or achieve self-sustainability.**	• Provides financial stability and ensures the project's continuity, especially in cases where revenue generation may be challenging or insufficient. • Allows for greater flexibility in project design and implementation, as there is less pressure to generate revenue or cut costs. • Can be particularly suitable for projects with mobility or environmental objectives where financial returns are not the primary concern.	• Dependence on external subsidies may create vulnerabilities, especially if funding sources are unstable or subject to change. • May lead to complacency or inefficiency if there is no incentive to optimize resource use or seek alternative funding sources. • Long-term sustainability may be questioned if ongoing subsidies are not guaranteed or if they are not aligned with the project's objectives.

The choice between self-sustaining post-demonstration and ongoing subsidy should be informed by careful consideration of the project's context, objectives, stakeholders' needs, and available resources. In some cases, a combination of both approaches or a phased transition from a subsidy model to self-sustaining may be the most viable strategy.

I. Introduction

Overview of CARB's Clean Mobility Options (CMO) and Sustainable Transportation Equity Project (STEP) Programs

The California Air Resources Board (CARB) is responsible for protecting the public from the harmful effects of air pollution and developing programs and actions to fight climate change. To this end, CARB has established a number of grant programs intended to improve access to clean mobility options, advance workforce development, increase zero-emission vehicle adoption, reduce vehicle miles traveled, support transportation equity, and improve local air quality. Two notable programs include CARB's Clean Mobility Options (CMO) and Sustainable Transportation Equity Project (STEP) programs. Each of these programs are introduced in greater detail below.

Clean Mobility Options (CMO)

CARB's clean mobility options (CMO) equity programs, including regional, legacy projects and the Statewide Clean Mobility Options Voucher Pilot Program are intended to improve clean transportation access and to increase zero-emission mobility choices for disadvantaged and low-income residents. Grant funding is available for project deployments and for community transportation needs assessments. Needs assessments are essentially planning grants that help under-resourced communities identify and develop community-driven strategies that address their unique transportation needs. CMO projects employ zero-emission mobility strategies, such as shared mobility services that fill a community's transportation gaps and provide access to key destinations. Eligible projects must be located in a community that meets one of three qualifications: 1) a disadvantaged community as defined by California Senate Bill 535, (De León, Statutes of 2012); 2) a low-income community as defined by California Assembly Bill (AB) 1550, (Gomez, Chapter 369, Statutes of 2016); or 3) within federally or non-federally recognized tribal land or tribal property in California within AB 1550-designated low-income communities or a California Senate Bill 535 designated disadvantaged communities.

In its inaugural year, the Statewide CMO Voucher Pilot Program awarded Mobility Project Vouchers worth $20 million with approximately $18 million going to eligible under-resourced communities and $2 million set aside and awarded specifically to Native American tribal governments. Of the 21 project awards, six were selected by the research team for evaluation under this contract. Due to data and other limitations, technical reports were produced for four of these six, including the CV Community Shuttle, BlueLA Carsharing Pilot Project, Redding Bikeshare, and Our Community CarShare Sacramento Pilot Project. However, qualitative findings were drawn from the experiences of all projects. The selected projects represent diverse geographical areas within the state, and reflect urban, rural and tribal disadvantaged and low-income communities. The projects originally selected for evaluation are identified in Table 3.

Table 3. Overview of CMO Awarded Projects

Location	Project	Description
Calexico, CA	Calexico Mobility On Demand	Imperial County Transportation Commission will use the Clean Mobility Options Mobility Project Voucher to fund the city of Calexico's first zero-emission, microtransit program, powered by Via, which will provide seniors, low-income and youth populations with transportation using three plug-in hybrid electric vehicles. The voucher is funding infrastructure and driver labor costs. The City of Calexico has chronic air quality problems. Calexico Mobility On Demand will provide a clean and safe travel option, improving quality of life and increasing opportunities for residents by expanding affordable, on-demand travel options while reducing health harming and planet warming pollution.
Chula Vista, CA	CV Community Shuttle	The City of Chula Vista will use the Clean Mobility Options Mobility Project Voucher funding to launch an on-demand community shuttle service in northwest Chula Vista focused on the local senior community using four electric vehicles, one of which will be ADA accessible. The new program will make mobility easier, smarter, safer, more affordable and fun and focus on trips to and from healthcare, grocery, senior living facilities and centers, city and community service, retail, social and entertainment, public transportation stops and hubs, and other locations as identified as important to the community.
Fresno, CA	Expansion Of E-Bike Services in Fresno	The Fresno Metro Black Chamber Foundation will use the Clean Mobility Options Mobility Project Voucher funds to expand its existing bikesharing program to serve the entire City of Fresno, supporting the infrastructure, maintenance, upkeep and sustainability of the entire fleet of library and shared e-bike programs while adding 107 e-bikes with seven funded by the voucher. Support for these programs will increase mobility access for disadvantaged communities across Fresno and cultivate walkable and bikeable communities with options for quality food, entertainment, business, arts,

		and culture all provided by and supported by the residents of the neighborhood.
Los Angeles, CA	BlueLA Carsharing Pilot Project	The BlueLA Carsharing Pilot Project includes construction and installation of 40 carshare stations with 200 charge points and operation of an electric vehicle carshare program with 150 electric vehicles in disadvantaged communities within the City of Los Angeles.
Redding, CA	Redding Bikeshare	The McConnell Foundation will use the Clean Mobility Options Mobility Project Voucher to fund Downtown Redding's first bikeshare program to provide affordable housing and community residents with 70 bikes and stations for an affordable, convenient and reliable way to get around. The neighborhood will be well-served by greater connectivity options for residents to access jobs, recreation, errands and more. Downtown GoBike will provide a clean and safe travel way to get around. This improves quality of life and increases opportunities for residents by expanding affordable, on-demand travel options that are designed with climate in mind.
Sacramento, CA	Our Community CarShare Sacramento Pilot Project	Our Community CarShare Sacramento Pilot Project (CarShare or OCCS) provides subsidized EV carsharing for low-income residents living in affordable housing communities within Sacramento's disadvantaged and low-income neighborhoods. Phase 1 of the project included the development of 4 sites and deployment of 8 electric cars and onsite chargers; Phase 2 included 3 additional sites with six electric cars and onsite chargers; Phase 3 included a mobility hub and two additional community sites with access to six electric cars and a combination of onsite and mobile chargers; and Phase 4 is involved continuation of services at the Phase 1 through 3 sites.

More information about the CMO program can be found at: https://cleanmobilityoptions.org/

Sustainable Transportation Equity Project (STEP)

STEP funds a variety of clean transportation and supporting projects, such as public transit and shared mobility services, active transportation infrastructure, land use planning and housing

policy, workforce development, and clean transportation planning and education. Funded projects are intended to work together within low-income and disadvantaged communities to increase transportation equity. STEP focuses on projects that attempt to address some of the complex transportation and land use challenges identified in CARB's 2022 California's Sustainable Communities and Climate Protection Act Progress Report, and incorporates key recommendations from CARB's Final Guidance Document for the Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents. Grants have flexibility to fund many different types of clean transportation and supporting projects in a single community, such as capital infrastructure and vehicle investments, transportation planning and community capacity building, active transportation, land use and housing, and workforce development and education.

STEP aims to address community residents' transportation needs with an emphasis on reducing VMT, GHG, and criteria pollutant emissions. Even with improvements in clean vehicle technology and fuels, reducing driving is necessary to meet California's climate and air quality commitments. STEP also acknowledges the intersection of climate, transportation, housing, and equity policy, and aims to establish new and strengthen existing partnerships between these policy areas.

Using Fiscal Year 2019-20 funds, CARB released the first STEP solicitation for $19.5 million on June 4, 2020. CARB partnered with the Strategic Growth Council to provide technical assistance on application development to all interested applicants. Initially, CARB awarded three Implementation Grants, totaling $17.8 million, to the San Joaquin Council of Governments, the City of Commerce, and the Los Angeles Department of Transportation (LADOT). Each of these projects are described in greater detail in Table 4. All three STEP projects were selected for evaluation under this contract. However, given the size and complexity of these projects, the researchers and CARB staff identified specific project elements for qualitative and quantitative evaluation.

Table 4. Overview of STEP Awarded Projects

Location	Project	Description
Commerce, CA	Commerce Moving Forward	A multi-dimensional project funding bike lanes, tree planting, electric buses and shuttles, transit-oriented development (TOD) planning, and community engagement.
Los Angeles, CA	South Los Angeles Universal Basic Mobility Pilot Program	A multi-dimensional project funding mobility wallets, e-bike library, on-demand electric shuttle, EV carsharing, charging infrastructure, cargo e-bikes, and quick-build active transportation improvements (inclusive of infrastructure supporting first- and last- mile connections).
Stockton, CA	Stockton Mobility Collaborative	A multi-dimensional project funding EV carsharing, e-bikesharing, Vamos trip planner, e-Workforce development, and incentives for

	shared mobility and public transportation.

More information about the STEP program can be found at:
https://ww2.arb.ca.gov/resources/fact-sheets/sustainable-transportation-equity-project

Synthesis Report Overview

This independent evaluation sought to understand:

- Equity and environmental impacts of projects;
- Lessons learned;
- Recommended policies;
- Most successful business and partnership models; and
- Scalability and replicability of innovations considering a variety of contextual variables (e.g., built environment, geography, etc.).

This report presents a synthesis of the findings and results of the independent evaluation of a subset of CMO and STEP demonstrations. The report is organized into four sections. The first section summarizes the methods employed as part of the independent evaluation. The second section summarizes notable findings from the site evaluations which were mostly obtained through the quantitative analysis of the BlueLA EV Carsharing, Sacramento Carsharing, Commerce Moving Forward, South Los Angeles Universal Basic Mobility Pilot Program, Stockton Mobility Collaborative, Chula Vista Community Shuttle, and Redding Bikeshare. The third section describes lessons learned from conducting interviews and institutional focus groups with grantees and project partners. The fourth section provides considerations for future CARB programs.

II. Evaluation Methodology and Framework

A site-specific evaluation framework for each demonstration project was developed through interaction and coordination with CARB, grantees and other stakeholders. This interaction and information-gathering phase informed the development of a logic model (a conceptual model that links the demonstration activities to outputs, outcomes and impacts). Each evaluation plan is comprised of the following components:

- Project background;
- Project goals;
- Evaluation hypotheses;
- Performance metrics used to measure hypotheses;
- Data sources required to evaluate demonstration hypotheses; and
- Qualitative and quantitative methods of evaluation.

This phase included the development of an evaluation plan with a logic model (a conceptual model that links the demonstration activities to outputs, outcomes and impacts). Based on the project-specific goals, specific hypotheses for each site were developed. These hypotheses are generally grouped according to the following three broad categories:

- User impact hypotheses that measure changes to behavior, decisions, commute, or lifestyle of travelers;
- System operational hypotheses that evaluate system operations and/or cost; and
- Institutional hypotheses that evaluate lessons learned and best practices from projects stakeholders.

Site specific performance metrics were developed by the evaluation team based on the project goals and hypotheses during the development and revision of the project's logic model. The evaluation plan was provided to the project team for review and feedback and then finalized. The evaluation plan also proposed data structures for all data types needed to address the hypotheses and produce the metrics. Because projects were still under development, these data structures were proposed without advance knowledge of the data that would be available or its eventual structure. As such, certain components of the evaluation would occasionally deviate from the plan to address limitations or changes to the data and/or project that would occur after plan finalization. A number of the longest running demonstrations employed multi-method quantitative and qualitative approaches comprised of user and traveler surveys; interviews with project partners (i.e., expert interviews); and analysis of data from various sources. A general summary of the data types collected for these technical reports is summarized below. Project specific details on the data types collected, sample sizes obtained, analyses conducted, and key findings from these analyses are given in the separately submitted technical reports for each project. Cross-cutting findings as derived from expert interviews and institutional analyses, as well as high level findings from the technical analyses are further described and presented in the subsequent sections of this report.

User and Traveler Surveys: User and traveler surveys consisted of surveys of people who are using the applications and services being developed, augmented, and/or deployed by the project teams. The site-specific evaluation plans detailed the population to be surveyed, the necessary steps required to conduct the survey, and the general analytical approach to be taken with the data. Surveys were proposed for the population that were directly impacted by the demonstration project. Metrics derived from surveys would include changes in travel behavior, mobility, vehicle ownership, accessibility, demographics among others.

Ridership and/or User Data: Ridership and/or user data consists of ridership using a mobility service or users using a trip planning app. Data were requested from agencies in cases where impacts on ridership/number of users can be measured. Metrics derived ridership data would include trip counts, user counts, and derivates such as trips per day, users per month, among others.

Energy Data: Energy data were collected to help measure environmental impacts. This includes petroleum fuel usage and/or kWh as consumed by vehicles. These energy metrics can be converted to estimates of GHG emissions. Metrics derived from energy data included energy consumption and emissions.

Activity Data: Activity data can cover a wide variety of data types. The most common type of activity data is traveler activity data. This consisted of data describing the trip activity of vehicles used by the mobility service. These data, while anonymized, provided high resolution

information on movements that may be able to be translated into travel times, wait times, and other critical evaluation data that provide exceptional insights into system performance and travel behavior. Information derived from activity data can include distribution metrics of origins and destination, trip purpose information, miles traveled, among other measures.

Expert Interviews: Interviews with grantees and other demonstration stakeholders played a key role in the evaluation. Between April 2023 and April 2025, the researchers conducted semi-structured interviews (n=72) covering lessons learned from their experience planning and implementing a CMO and STEP projects. The semi-structured format combined predetermined questions with flexibility for the interviewer to explore topics in more depth or ask follow-up questions based on the interviewee's responses. This format allowed for a more conversational style of interviewing that in some cases can lead to richer qualitative data. The interviews were conducted with at least three project stakeholders per grantee to gain their qualitative perspective of what worked well and what could have performed better. While subjective in nature, some of the most important lessons learned emerged from talking to those responsible for implementing the project.

In general, the vast majority of interviews were conducted in-person. In-person interviews are preferred for their ability to build rapport and facilitate more nuanced communication through non-verbal cues like body language. This format allows for a more personal interaction and can help the interviewer and interviewee establish a connection. In a handful of cases, in-person interviews were not possible. In these cases, interviews were conducted over the phone and video conference.

The methodological approach of the evaluation focused on assessing the behavioral, equity, and environmental impacts of the projects as they were deployed. The independent evaluation team analyzed each hypothesis within the logic model framework and determined the degree to which it was supported (e.g., mostly supported, partially supported, not supported, or inconclusive).

Institutional Focus Groups/Small Group Discussions: The researchers also conducted a limited number of institutional focus groups (n=4) and small group discussions (n=5) with CARB staff, the grant administrator (i.e., Shared-Use Mobility Center and CALSTART), and grantee stakeholders. These focus groups explored issues, concerns, and opportunities relevant to the CMO and STEP programs. The institutional focus groups provided a semi-structured and interactive forum for stakeholders to share their perspectives. The insights gathered from these focus groups helped inform a number of the strategic planning and policy findings in this report.

III. Notable Findings from the Site Evaluations

This section summarizes notable findings from the CMO and STEP site evaluations which includes data obtained through surveys, activity data analysis, expert interviews, and institutional focus groups. It is organized into two subsections. The first section reviews findings from the social and behavioral analysis (user impacts) that were generally obtained through surveys and activity data analysis. Next, findings from systems operations are reviewed.

User Impacts

The following findings (text identified in bold in each of the bullets in the following sections) from the social and behavioral analysis are provided about user-related impacts across the demonstration projects.

Findings Related to Vehicle Miles Traveled (VMT) and Greenhouse Gas (GHG) Emissions Challenges

EV carsharing programs funded by the CMO Voucher Pilot Program are designed to improve access to clean and affordable transportation in low-income and disadvantaged communities. These programs aim to reduce greenhouse gas emissions, improve air quality, and address mobility needs in areas that traditionally lack affordable and sustainable transit options. These programs introduce electric vehicle carsharing fleets in underserved areas, allowing community members to rent or borrow EVs at low or no cost. It is hypothesized that by promoting the use of zero-emission vehicles, CMO carsharing programs help reduce harmful emissions and improve local air quality. As part of this study, the independent evaluation team conducted a travel behavior and environmental study of the users of two CMO EV carsharing programs in Los Angeles and Sacramento. The findings of these evaluations are summarized below:

EV Carsharing in Los Angeles Resulted in Reductions in VMT and GHG Emissions

- In 2021, Standard members (general population) traveled a total of 407,000 miles and Community members (low-income qualified) traveled 362,000 miles using BlueLA vehicles. In 2022, the total distances driven by Standard and Community members increased to 594,000 miles and 689,000 miles respectively, which can be attributed to the growth in the user base.
- For 2021, BlueLA charging produced 56 metric tons of GHG emissions for Standard members (e.g., general population) and 51 metric tons for Community members. These emissions increased in 2022, reaching 102 metric tons for Standard members and 117 metric tons for Community members, which can be attributed to the observed increase in VMT.
- Overall, evaluation findings show an estimated net reduction in VMT and GHG emissions of 463,845 miles and 656 metric tons respectively.

- When disaggregating impacts by BlueLA member type, our findings show a net reduction in GHG emissions of 234 metric tons for Standard members and 371 metric tons for Community members.
- Among Standard members, 988 users were active in 2021 while 1,299 users were active in 2022. The split for Community members is 644 and 822 active users in 2021 and 2022 respectively.
- Using matched vehicle ownership survey data and trip frequency distributions from activity data for 81 active users, the research estimates weighted shares of 4% getting rid of a personal vehicle, 30% suppressing the purchase of a personal vehicle, and 10% reducing their personal vehicle driving due to BlueLA.

Sacramento Carsharing Reduced Emissions, Improved Travel Flexibility, and Reduced User Costs for Transportation.

- The project EVs (Chevrolet Bolts) avoided approximately 70% of the CO2 emissions that would have otherwise occurred had they been gasoline vehicles.
- Users reported greater flexibility in travel time (88%), faster travel times (88%), and an expanded travel range (67%) due to the carsharing system.
- The revenue generated from the cost-sharing model (introduced as of January 2022, at a rate of $4 per hour) covered about 30% of the operating costs.
- Around 82% of survey respondents used the Transit Incentive Card (TIC) at least once a week.
- The majority of respondents reported an increase in accessibility to essential destinations such as schools (75%), grocery shopping (71%), and health care (69%).
- The TIC was found to lower monthly transportation expenses as the number of users spending less than $50 per month on transportation rose from 35% to 41% post adoption.
- Almost all users (95%) within the survey sample reported that the TIC resulted in at least some transportation cost savings.

Electric Buses and Shuttles in Commerce Improved Access and Reduced Emissions

- Between July and September 2024, two electric fixed-route buses operated by the City of Commerce recorded 407 charging sessions. Charging primarily occurred during off-peak hours, with 35% of energy delivered during the 1 AM hour.
- Estimated CO_2 emissions from electric buses were nearly four times lower than emissions from diesel and CNG buses for the same distance traveled.
- Charging these electric buses generated approximately 2 metric tons of CO_2, compared to an estimated 7 and 7.7 metric tons for CNG and diesel buses, respectively.
- A survey of 43 fixed-route bus riders conducted between August 2024 and March 2025 found that 93% reported the service improved their accessibility within the city, and 55% rated their experience 5 out of 5.
- A general population survey (n = 639), conducted in May 2023, showed that 83% of respondents would use the Dial-A-Ride service if expanded to evenings, and 46% would use it on weekends.

- 80% of Dial-A-Ride users reported being able to travel longer distances, 82% said they could reach destinations faster, and 86% indicated greater flexibility in travel time.
- The project also planted 400 trees and installed 2.31 miles of bike lanes, though these components were not evaluated quantitatively.

San Joaquin E-Workforce Development Program Increased Job Confidence and Supported Underserved Participants

- In the After survey, 77% of participants (n=26) rated their satisfaction with the program a 10 out of 10.
- 31% of participants reported securing employment following program completion, and all respondents—regardless of employment status—felt the program improved their chances of securing a job.
- The Outcomes survey showed an increase in jobs obtained post-program, though only 27% of these jobs were self-reported as directly related to the training received.
- Despite limited direct alignment between job titles and training content, participant feedback suggests that the program improved general skill sets and job readiness.
- Overall, findings indicate the program played a supportive role in improving employment outcomes and perceptions of employability among minority and underserved groups in San Joaquin County.

LA E-Bike Library Improved Short-Trip Mobility, Reduced Costs, and Lowered Emissions

- Evaluation of user activity data shows that e-bikes were primarily used for short and quick trips, with a median distance of 2.27 miles and a median duration of 23.24 minutes.
- Some trips spanned significantly longer distances, demonstrating the system's ability to support both short and extended mobility needs across the LA metropolitan region.
- The e-bike lending program led to an average fuel savings of $8.21 per user over a 3-month period. Individual savings ranged from $0.0015 to $16.69, depending on usage levels.
- E-bike trips produced an average of 13 grams of CO_2, compared to 1,117.9 grams for equivalent trips made by gasoline vehicles. This represents a 60-fold reduction in emissions per trip.
- These results indicate that the program has reduced greenhouse gas emissions while supporting local travel needs.
- While cost savings were modest on average, they highlight the potential financial benefit for regular users.
- Overall, findings suggest that the LA E-Bike Library contributed to improved accessibility, lower transportation costs, and emissions reductions, especially for short-distance travel.

Chula Vista Community Shuttle Improved Equitable Access and Reduced Emissions

- Since its launch in 2022, the free electric shuttle service has completed over 29,000 trips for more than 275 users, providing door-to-door mobility for both ADA and non-ADA passengers.

- Pre-launch survey data showed 61% of respondents lacked transportation independence, and 45% faced financial barriers, highlighting strong baseline transportation challenges among seniors and low-income residents.
- Operational data revealed a median wait time of 7.4 minutes and a median ride time of 7.5 minutes, demonstrating the system's overall efficiency and reliability.
- Approximately 47% of trip origins and destinations occurred within underserved communities, reinforcing the program's alignment with equity and access goals.
- 71% of all rides lasted under 10 minutes, showing that the shuttle primarily supported short-distance travel needs, often tied to essential services.
- The system effectively integrated ADA-compliant vehicles, with wait times for ADA users only slightly longer than for non-ADA riders.
- The shuttle's electric operations emitted an estimated 6.2 metric tons of CO_2e, which is 47% lower than emissions from a comparable gasoline-powered service.
- Overall, findings indicate that the Chula Vista Community Shuttle increased mobility for underserved populations and delivered environmental benefits.

Redding Bikeshare Improved Mobility and Reduced Emissions While Showing Potential for Increased Revenue

- Between launch and the end of the 17-month evaluation period, Redding Bikeshare served 2,631 unique users, with an average of 5.57 trips per user.
- The system enabled micromobility access across key locations in downtown Redding, with high activity around Diestelhorst Bridge and Sundial Bridge.
- The program is estimated to have prevented approximately 16,047 vehicle miles traveled (VMT) in personal vehicles, avoiding 4.26 metric tons of CO_2 emissions. Based on trip patterns, this equates to roughly 8.4 kg of CO_2 emissions avoided per day.
- The system showed consistent use across seasons, with slightly higher activity on weekends and regular weekday usage. Approximately half of users made multiple trips, indicating ongoing engagement.
- A revenue analysis based on trip activity (excluding membership fees) found that a $0.05 increase in the per-minute rate after the free hour could raise trip-based revenue by 37%, while a $1 fee for trips ending at high-demand stations could boost revenue by 62%.
- These minor pricing adjustments are projected to improve revenue generation without significantly reducing demand, offering opportunities to enhance the system's financial sustainability.
- Overall, the evaluation finds that Redding Bikeshare contributed to mobility and emissions benefits in the city and could improve financial viability through modest fare structure changes.

Findings Related to Improving Access for Underserved Communities

EV carsharing requires on-boarding and driver training for a positive user experience. CARB funded several EV carsharing programs as part of the CMO and STEP programs in various locations across California such as Sacramento, Stockton, and Los Angeles. These programs are often the first exposure users have to electric vehicles in underserved communities. In many cases, this can also be users first exposure to pooled transportation and novel technologies to access vehicles through smartphone applications and other access devices (e.g., key fobs, smart cards, etc.). New user onboarding and training is critical to teaching users how to access and use the carsharing vehicles, and to address the unique needs of older adults and those with less experience using smartphone applications. Grantees emphasized the importance of providing hands-on traveler support to help quickly respond to user challenges and address any concerns that they may have accessing or using mobility services.

Grantees emphasized that public agencies and CBOs looking to start EV carsharing should consider providing education for the:

- Familiarization with EV Features: Grantees discussed how many users may be new to electric vehicles and may not be familiar with their unique features, such as regenerative braking, charging, and range limitations. They discussed how on-boarding and traveler support can provide an opportunity to educate users about these features, helping them feel more comfortable and confident when using EVs.
- Understanding Charging Infrastructure: Grantees explained that EV carsharing users need to understand how to access and use charging. They discussed the importance of on-boarding to review the location of charging stations, how to initiate charging sessions, and how to manage charging times to optimize vehicle availability and range.
- Promoting Eco Driving: Grantees discussed how proper driving techniques can notably impact the energy efficiency and range of EVs. Grantees hypothesized that driver training sessions could educate users on eco driving techniques such as smooth acceleration, coasting, and regenerative braking, which can help maximize range and reduce the energy consumption of EVs.
- Addressing Range Anxiety: Range anxiety, or the fear of running out of battery charge before reaching a destination, is a common concern among EV users. Grantees indicated that on-boarding can address this by providing tips for route planning, accessing charging infrastructure along the way, and understanding the vehicle's range capabilities.
- Troubleshooting and Support: Onboarding and driver training can also cover troubleshooting procedures for common issues that users may encounter while using EVs, such as charging failures, range estimation discrepancies, or vehicle malfunctions. Grantees emphasized the importance of providing users with the knowledge and resources to address these concerns to enhance their satisfaction with EV carsharing.

Systems Operations

The following findings are provided about impacts related to systems operations across the projects.

Findings Related to Rolling Out Integrated Mobility Platforms

Sites developing mobility apps and mobility wallets emphasized the need for CARB to greatly streamline the contracting and funding processes. Grantees discussed notable delays that caused partners to roll out services at disparate times making it difficult to deploy a complete trip planning app and mobility wallet. Grantees expressed concern that the inability to deploy services at the same time may have reduced the intended effectiveness of the demonstration.

Findings Related to Infrastructure Siting and Installation

Difficulty siting charging and shared mobility services. Grantees discussed a number of challenges securing approval from property owners, non-governmental organizations, and other public agencies to install chargers and locate carsharing and micromobility services. A few grantees discussed how elected officials sometimes intervened to limit the siting of CARB-funded mobility services in neighborhoods due to concerns about the loss of on-street parking. Grantees also expressed concern that they would not be able to install charging infrastructure quick enough to comply with actual or perceived grant requirements, given the extensive coordination required for intergovernmental and public-private sector coordination, public notice requirements, and other legal requirements to ascertain utility easements. Grantees said that current processes can take 12 to 18 months to obtain permitting approval.

CARB should work with other agencies to reexamine certification requirements for EV charger installation. In California, under AB 841 (Ting, Chapter 372, Statutes of 2020), EV charging stations funded or authorized by state agencies must be installed by a licensed contractor. At least one electrician on each installation must hold an Electric Vehicle Infrastructure Training Program (EVITP) certification. Electric utility companies are exempt from this requirement. This requirement creates an obstacle for municipalities to install their own EV chargers, particularly when municipal public works departments already manage electric infrastructure (e.g., street lights). Additionally, municipal employees are often required to dedicate personal time to acquire the certification resulting in the delay of EV charger installations.

Resident feedback proved invaluable for Los Angeles' EV charging siting, however there can be a disconnect between what residents want and what is technically feasible. In Los Angeles, the city relied heavily on public feedback for identifying suitable charging locations. However, there can sometimes be a disconnect between what is technically feasible and what community members want. For example, Los Angeles' public works described situations where residents wanted an EV charger on a particular lamp post or block. Unfortunately, due to the number of lampposts on a single electrical line, EV charger installation might have to occur in another location to use existing infrastructure, or require significant infrastructure upgrades to place the charger in the community-desired location. More education and outreach are needed to help convey these opportunities and limitations to the public.

Additionally, CARB may consider allowing grant funding to be used for electric line and utility upgrades to enable EV charging in more preferred locations.

The existence of supportive infrastructure (or lack thereof) may influence the adoption of shared mobility. For example, in Redding, interviewees noted the importance of bike lanes in promoting the use of bikeshare. Similarly, public EV charging is needed to support EV carsharing operations and user adoption.

Findings Related to System Operations in Underserved Communities

Vandalism and safety concerns are presenting challenges and limiting program effectiveness in a number of underserved communities. A number of grantees expressed concerns about ongoing theft and vandalism of micromobility devices, EVs and chargers that inhibit deployment and disrupt services in some neighborhoods. One grantee discussed vandalism costing the agency upwards of tens of thousands of dollars per a month to fix charging stations that had copper wire removed, cords cut, screens broken. One grantee discussed how CARB and the California Public Utilities Commission (CPUC) can play an important role addressing these risks by encouraging more durable and resilient charging equipment, such as “Bring Your Own Cord” designs that integrate into existing lamp posts. Grantees also reported homeless individuals breaking into and sleeping in carsharing vehicles. Another grantee noted that bikesharing services had to be discontinued due bicycle theft. Grantees said they would like CARB to allow the installation of lighting at demonstration locations to hopefully limit vandalism and address safety concerns. While this is an allowable expense, several grantees believed that lighting to address these concerns was not an allowable expense. CARB could provide clarity on this issue as part of future grant solicitations.

Findings related to the Institutional hypothesis category are described in the following section.

IV. Cross-Cutting Institutional and Programmatic Lessons Learned Across Sites

This section summarizes lessons learned from the CMO and STEP programs. Topic areas covered include findings related to: 1) demonstrating new concepts; 2) forming and managing public-private partnerships; and 3) outreach to underserved communities. . Considerations for future programs and projects are also provided based on feedback from grantees and other stakeholders.

Findings Related to Demonstrating New Concepts

Case studies are critical to demonstrating impacts and service viability. To enhance the scalability and replicability of innovative mobility services, grantees and program partners expressed an interest in having a CARB resource library with case studies of previous projects and recommended practices for future demonstrations. This resource library and case studies would serve as a guide offering insights from past grantees. As projects are completed, it is anticipated that CARB and/or the grant administrator may develop these resources materials for use by future grantees.

Contract templates and data sharing agreements are needed to streamline delivery of grant programs. A number of grantees emphasized the need for CARB to provide contracting templates to facilitate subawards, budgeting, data sharing, and reporting for grantees from smaller organizations that lack experience working with CARB and private sector vendors, as well as institutional knowledge for participating in large multi-dimensional grant programs. It was also suggested that CARB should explore ways to expedite the disbursement of grant funds.

Findings Related to Forming and Managing Public-Private Partnerships

Community partners are key to building trust among stakeholders and reaching underserved communities. Most grantees interviewed expressed the critical need to build trust among project partners and the community through stakeholder and community engagement efforts such as site visits, one-on-one meetings, community town halls, word-of-mouth messaging, and other efforts. For example, in Sacramento, designating Breathe, an established community organization, as the outreach leader for the EV carsharing program played a critical role in direct outreach and language translation services. Similarly, in Redding, community leaders began building partnerships with the community stakeholders many years prior to their application for CMO funding.

Working with the private sector may present a number of unforeseen risks. Projects with a notable technology component (e.g., trip planning apps, fare payment integration/mobility wallets, etc.) can present notable risks due to the time and cost required to integrate software and hardware. CARB and grantees have a responsibility to ensure that grant awards are sufficient to support the project scope with funds in contingency to address unforeseen costs.

Additionally, in a handful of cases, projects took upwards of two to five years following the issuance of a request for proposals (RFP) to initiate service, often due to prolonged contracting and permitting process. Some interviewees recommended that grantees establish “tiger teams”

- groups of experts brought together to solve a specific problem to remove silos and approach demonstrations from multiple perspectives.

Finally, another grantee discussed how mergers, acquisitions, and changes in partners contributed to delays, changes in partners and program design, and in some cases cost overruns (e.g., installing new charging infrastructure and developing new backend software). These types of disruptions can present unforeseen risks to grantees, and contribute to various forms of service disruptions (e.g., participants having to create new accounts, download different apps, etc.).

Findings Related to Outreach to Underserved Communities

Partnerships with community-based organizations can expand outreach to underserved communities. Across both CMO and STEP programs, numerous grantees shared success stories of how public-private partnerships with CBOs and staff dedicated as community liaisons were instrumental in reaching underserved communities. Although the effectiveness of this outreach is difficult to measure from an evaluation standpoint, its recommended that CARB continue and expand investments in outreach efforts to underserved communities. Additionally, while the evaluation team did not receive feedback on whether CBOs felt that they were adequately compensated for their time, the evaluation team did hear more broadly that the CMO and STEP programs need to provide additional resources (i.e., funding) to support grantee oversight and administration of the grant programs.

Community involvement during the planning phase of projects is critical. A few grantees admitted that they underinvested in the outreach and marketing of their services. Several grantees emphasized the critical importance of early community engagement to ensure that projects align with community needs. Some interviewees recommended balancing bottom-up (outreach) and top-down (grant administration) approaches to project planning to foster deep collaboration, trust, and community empowerment. In a top-down approach, decisions regarding the grant originate from higher levels of authority or management and are then disseminated downward. The process may begin with overarching goals, priorities, or guidelines set by the lead grantee or even the grant administrator or grantor (e.g., CARB). Conversely, a bottom-up approach involves grant decisions being initiated at lower levels, with ideas and proposals originating from grassroots or local sources, such as CBOs. Bottom-up approaches tend to emphasize decentralized decision-making and the empowerment of community stakeholders whereas top-down approaches are characterized by centralized management emphasizing consistency and alignment with grant objectives. While top-down approaches may overlook local or specialized needs and perspectives, bottom-up approaches may also stray from intended outcomes of the grant.

It was also suggested by some interviewees that CARB should require all grant submissions to go through a required planning phase (e.g., planning grant component) that ensures community outreach as part of the project planning and design prior to the submission of an implementation grant.

Digital poverty and un/under banked access can be barriers to equitable access. A number of grantees implemented strategies that may only be available to users with a smartphone and/or a credit/debit card. For example, BlueLA's carsharing service is available

only to customers who own a smartphone, are 18 years or older, have a driver's license, with data access and a credit or debit card. Previously, BlueLA payments could be made with a Los Angeles Metro TAP fare card, however this functionality was removed during a change in carsharing operators. Given that the program is intended to provide clean mobility for underserved (low-income) communities, this may pose a notable barrier to using the service. Future grants should consider ways to expand program access to digitally impoverished and un/under banked households.

V. Considerations for Future CARB Programs

Based on the findings from the independent evaluation of the CMO and STEP demonstrations, the project team identified eight key considerations for deploying similar programs in the future:

Streamlining Grant Submission, Approval, and Implementation

To reduce administrative bottlenecks and expedite project implementation, CARB should consider:

- **Advance Planning Support:** CARB could encourage early project planning by providing resources for potential grantees to develop concepts and objectives ahead of funding opportunities. This proactive approach would reduce last-minute resource strain when funding becomes available.
- **Simplified Application Processes:** Creating pre-qualification stages for grantees with well-developed concepts could accelerate project selection. CARB should also minimize the number of approval layers for grants to reduce delays in contract execution and funding disbursement.
- **Standardized Contracting and Funding Templates:** Developing standardized templates, guidelines, and procedures for contracts with mobility service providers would promote consistency, reduce administrative burdens, and expedite funding approvals.
- **Pre-Approved Vendor List:** CARB could pre-vet vendors for frequently required services, conduct background checks, and negotiate standardized contract terms to reduce the time and complexity of vendor selection. Monitoring vendor performance against pre-defined metrics would ensure accountability and adherence to service agreements.
- **Flexible Project Scoping and Adjustments:** Establishing clear guidelines for scope modifications would allow grantees to adapt to unexpected challenges while maintaining project objectives.

Strengthening Financial Sustainability of Demonstrations

To ensure that projects continue beyond the demonstration phase, CARB should:

- **Require Financial Sustainability Plans:** Grant applicants should demonstrate how they will sustain projects post-demonstration, whether through alternative funding sources, partnerships, or revenue generation.
- **Prioritize Self-Sustaining Projects:** CARB should evaluate proposed grants based on their long-term viability, balancing funding between projects that can generate revenue and those requiring ongoing subsidies.
- **Phased Funding Approach:** Initial exploratory grants could be used to test project feasibility before committing to larger investments. This would allow CARB to scale up projects that show early indicators of success.

Refining **Eligibility Criteria for Greater Impact**

CARB could refine eligibility requirements to focus on projects that offer the highest return on investment in terms of emission reductions, community benefits, and financial sustainability. Key recommendations include:

- **Targeted Selection Criteria:** Prioritizing projects with demonstrated potential for long-term success and measurable social, economic, or environmental benefits.
- **Adaptive Guidelines for Emerging Needs:** Establishing periodic review cycles to ensure funding criteria remain responsive to evolving technologies and community priorities.

Clarifying the Role of Third-Party Organizations

To prevent conflicts of interest and ensure transparency in grant administration, CARB should establish clear distinctions between third-party roles, such as:

- **Defining Scopes and Boundaries:** Clearly delineating responsibilities for grant administration, technical support, and evaluation to avoid overlap.
- **Time-Limited Eligibility:** Implementing a cooling-off period for organizations involved in grant administration to prevent grant administrators from immediately applying for funding opportunities.
- **Competitive Selection Processes:** Introducing more rigorous bidding processes for third-party administrators to enhance accountability and ensure the best-qualified organizations manage program administration.

Strengthening Evaluation and Reporting Requirements

To ensure funded projects achieve their intended outcomes, CARB should:

- **Require Participation in Evaluations:** Some grantees opted out of environmental impact assessments, limiting CARB's ability to measure emissions reductions. Making evaluation participation a funding condition would improve oversight.
- **Clarify the Roles of Evaluators:** Grantees reported confusion about whether evaluations were conducted by independent reviewers or grant administrators. Clearly defining these roles would improve transparency and reporting.
- **Streamline Reporting Requirements:** Smaller agencies found CARB's reporting process burdensome. Simplifying reporting or allowing automated data sharing could reduce administrative strain.

Improving Contract and Procurement Processes

Grantees reported challenges related to CARB's rigid contracting processes, vendor selection, and insurance requirements. Recommendations for improvement include:

- **Flexible Contract Terms:** CARB should simplify administrative processes to encourage participation from smaller and less experienced agencies.
- **Pre-Approved Vendor List:** To address supply chain challenges and fluctuating costs, CARB should negotiate on-call vendor contracts with pre-set pricing.
- **Clear Guidance on Prevailing Wage Adjustments:** Ensuring grant budgets can accommodate wage changes would prevent funding gaps.

- **Vendor Due Diligence Support:** CARB could develop a risk assessment framework to help grantees evaluate potential partners and avoid unreliable vendors.

Addressing Insurance and Liability Barriers

Many grantees struggled with high insurance costs and limited provider availability. In response, CARB could:

- **Develop Pooled Insurance Options in Partnership with Other State Agencies:** Establishing a shared insurance model for state-funded demonstration programs could reduce costs.
- **Identify Mobility-Focused Insurance Providers:** CARB could assist grantees by compiling a list of providers that offer coverage for shared mobility services.

Expanding Stakeholder and Community Engagement

Community engagement is essential for project success but is often underfunded. CARB could address this by:

- **Requiring Community Engagement Plans:** Ensuring early and continuous stakeholder engagement would improve project alignment with community needs.
- **Providing Dedicated Funding for Outreach:** Many grantees underestimated the resources needed for engagement, so CARB should allocate specific funding for this purpose.

Potential Pathways for Additional Research

Further research can help to better understand functional dynamics and impacts of sponsored systems, including but not limited to:

- Metrics for measuring and predicting success of shared mobility programs in non-urban settings.
- Time-of-Charging energy profiles of EV mobility systems and their associated emissions.
- Long-term costs of continued operation, capital, maintenance, and overhead for systems relative to revenue potential.
- Influence of systems on travel behavior and decisions regarding household assets such as personal vehicles.
- Methods and business models to extend the financial sustainability of systems that deliver important mobility benefits within likely revenue potential.
- Cost impacts associated with the substitution of retired technology and system operations in response to new system designs and upgrades.
- Emissions impacts of system in consideration of behavioral impacts as well as operations and maintenance practices.
- Dynamics of improvements and impacts to mobility and accessibility as distributed within the population receiving services.