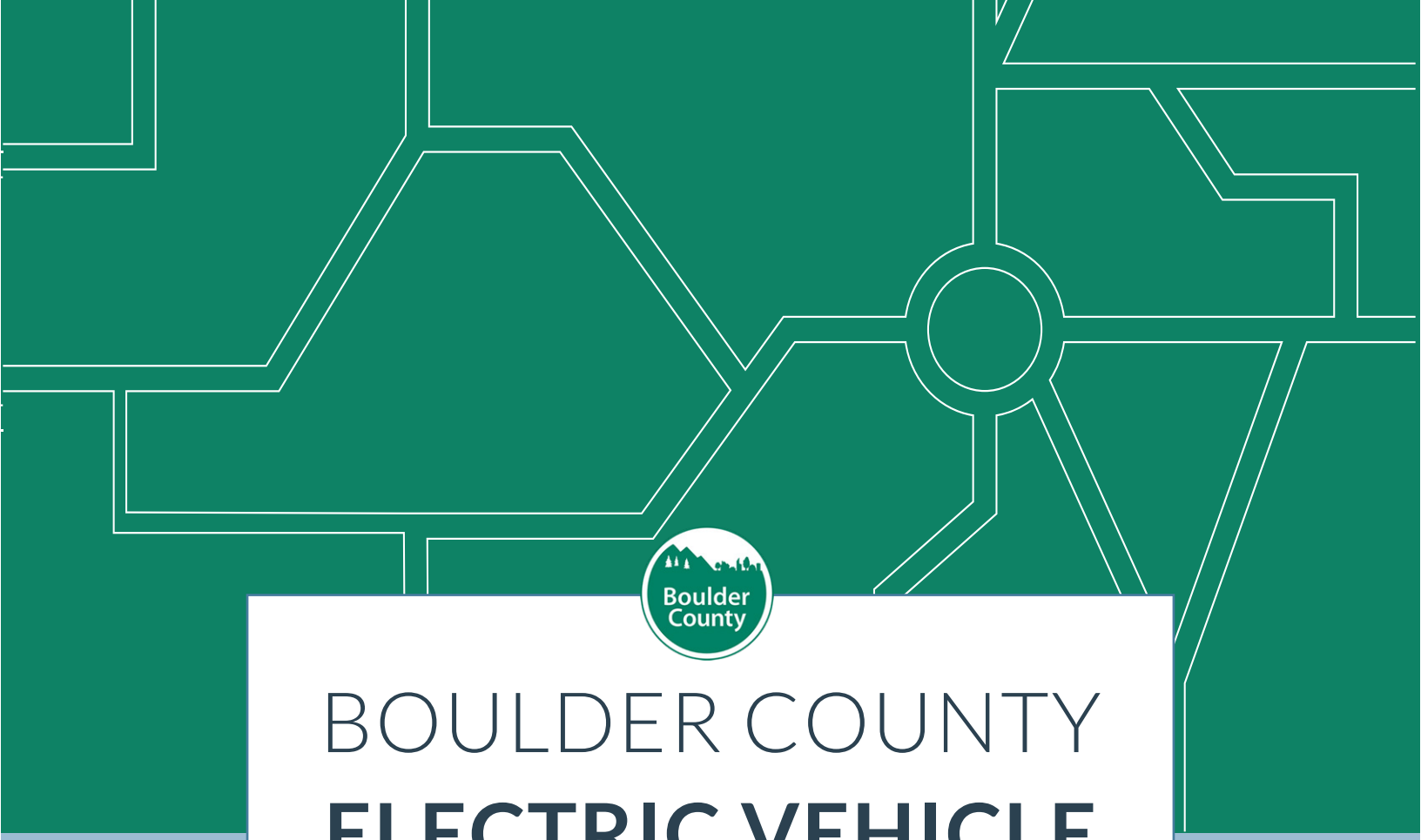


BOULDER COUNTY **ELECTRIC VEHICLE** CASE STUDY

PROJECT CONTEXT

Boulder County is at the forefront of multimodal transportation innovation, not just for the state of Colorado, but nationally. As such, the County requested information and research on latest practices in the field of electric vehicles (EVs). Nelson\Nygaard provided support and assistance to Boulder County with the latest research on EV planning, programs, and finance. The research project built on previous projects Nelson\Nygaard conducted nationwide, so Boulder County benefited from the most recent information in the electric vehicle field. Through the course of the research project, our team developed approximately nine various case studies.

Case study elements included relevant peers and implementable projects for consideration by the County's EV advisory committee. Given that the EV field is constantly changing and fairly new, the team was not able to find every element; however, we did work to document the relevant applicability of each case study for Boulder County. With each case study, or profile, our research team attempted to document the following items:

A Write-up of the Implementation Project

Funding Sources

Implementation & Infrastructure

Challenges & Lesson Learned

Applicability to Boulder County

METHODOLOGY

From December 2020 to February 2021, the project team created an initial list of case studies based on feedback from Mobility for All (M4A) and key stakeholders representing clean energy advocacy organizations, non-profit carshare operators, and county agency staff engaged in multimodal and sustainable transportation planning. Stakeholder interests included carshare programs at affordable housing sites, carshare programs involving non-profit carshare operators, and innovative local and state funding mechanisms providing additional benefits to low-income purchasers. Case studies were assessed based on alignment with stakeholder priorities as well as broader Boulder County goals outlined in the Boulder County Strategic Priorities plan. The team then conducted research and a literature review of former, existing, and planned programs and incentives for promoting alternative fuel vehicle adoption using publicly available information, with a focus on low- and medium-income populations.

Case studies included in this report are listed as follows:

CARESHARE PROGRAMS AT AFFORDABLE HOUSING DEVELOPMENTS

MioCar
San Joaquin Valley, California

Our Community Carshare
Sacramento, California

CITYWIDE CARESHARE PROGRAMS

BlueLA Carsharing Pilot
Los Angeles, California

Twin Cities Electric Vehicle Mobility Network
St. Paul, Minnesota

GRANTS & AFFORDABLE FINANCING

Clean Vehicle Assistance Program
California

California Clean Vehicle Rebate Project
(Moving California)

San Mateo County Used Electric Vehicle Incentive Program

Alternative Fuel Vehicle Tax Credit
District of Columbia

Electric Vehicle Registration Fee Reduction
Connecticut

Míocar

San Joaquin Valley, CA

Many residents living in rural parts of the San Joaquin Valley need reliable transportation but have limited access to clean energy options. Launched in July 2019, Míocar is an electric vehicle roundtrip carsharing program serving residents and community members in the San Joaquin Valley. Currently available in the cities of Arvin, Cutler, Lamon, Orosi, Visali, and Wasco, Míocar enables residents to reserve one of 27 battery electric vehicles for $4 per hour or $35 per day. Included as part of the service is insurance, vehicle maintenance, roadside assistance, and bilingual customer service. Míocar vehicles have access to 34 parking spaces reserved for charging that are located at eight affordable housing complexes.

The program is available to anyone over the age of 21 with a valid driver license[1], relatively clean driving record, and a credit, debit, or bank card. Users can reserve Míocar in advance on a mobile app, the program's website, or with a smartcard available to non-smartphone participants. Users can also request Americans with Disabilities Act (ADA)-adaptive controls to operate the vehicle once the vehicle is reserved.

As of February 2020, there are 300 members and over 600 reservations made since the program's launch.[2] Typical active members are female, younger than 44 years old, live in households with four to six or more people, and earn an annual income between $25,000 and $50,000. A typical reservation lasts eight hours with 50 vehicle miles traveled to and from the point of origin.[3]

Funding Sources

- Clean Mobility Options Voucher Pilot Program (CMO) funded by California Climate Investments ($2.25 million) [4]
- Matching and in-kind funds from partner agencies Tulare County Association of Governments and Kern Council of Governments ($3.8 million)
- Funding from previous contracts with the California Vanpool Authority (CalVans)

Implementation & Infrastructure

Míocar resulted from a joint effort between mobility researchers at UC Davis and leaders of San Joaquin Valley's eight Metropolitan Planning Organizations (MPOs) who conducted a feasibility study on electric vehicle carsharing in rural locales. After winning a grant, UC Davis' Institute for Transportation Studies (ITS) led the study and the MPOs selected concepts and locations for pilot projects based on several factors including access in rural disadvantaged communities, opportunities for improved mobility, potential operating costs, and potential for scaling.

Míocar is now a formalized non-profit collaborative involving non-profit and private entities such as Mobility Development, Self-Help Enterprises, the California Vanpool Authority (CalVans), and the San Joaquin Valley Air Pollution Control District. Program operations are overseen by Mobility Development, a social enterprise that supports planning, deployment, and operations management of carsharing, bikesharing, and volunteer transportation services in disadvantaged communities. Self-Help Enterprises is a non-profit community development organization that provides space for charging stations at several community housing developments. CalVans operates as the fleet manager and

1. Míocar also accepts AB 60 driver licenses.
2. Clean Mobility Options Voucher Pilot Program (CMO), Partnerships with Mobility Providers Presentation, February 12, 2020.
3. CalCOG, "Rural, Electric Car Share? A National First in Miocar," October 2020. Accessed via: https://sumc-public.s3.amazonaws.com/CMO/CMOWebinarPartnershipsWithMobilityProviders.pdf
4. Awarded funds were also used to create a volunteer ride program and a smartphone application that brings together planning, reservation, and payment for travel across cars and buses. Hours can be broken up (e.g., 1 hour in the morning, 1 hour in the evening) but this requires separate reservations

oversees maintenance and repairs. Tulare County Association of Governments and Kern Council of Governments are also supporting the program in various ways, including in-kind support and cash matches. Grant funding from the Clean Mobility Options Voucher Pilot Program enabled the purchase of the vehicles and the installation of 17 dual-port Level 2 charging stations.

Challenges

While Míocar has been successful in securing riders and offering clean transportation options to often overlooked disadvantaged residents, the program has experienced some challenges. Among them are the COVID-19 pandemic and a change within the organization overseeing the procurement and maintenance of Míocar vehicles. The California Air Resources Board's Shared Mobility Program issued a one-year grant to launch and most recently allocated additional funding to support the program through the temporary shutdown of the program in light of the pandemic. Short-term funding is typically a challenge for innovative, out-of-the-box programs that require time and flexibility to expand and scale. As such, longer term investments are needed to sustain the program.

Lesson Learned

Launching a carshare program in rural communities is challenging due to spread out geographics that make the sharing aspect difficult. Strategic siting paired with market research and extensive outreach is therefore key to ensuring sustained adoption and utilization. Part of what makes Míocar feasible is the relatively high densities of the affordable housing communities run by Self-Help Enterprises and the Kern Housing Authority. Each participating affordable housing community primarily consists of multi-unit dwellings that consist of, at minimum 40 units.

Míocar also learned leveraging hybridized public-private-non-profit partnerships with additional resources and funding can help to preserve low-cost operations that enable communities to launch programs in the short- and long-term. As it moves into the next phase of its operations, Míocar is looking to diversify its offerings and increase utilization of its assets. Potential options include extending professional driver memberships where drivers can use the vehicles on a ridehail platform or as a volunteer driver providing rides as part of a volunteer transportation service for community members who are not eligible to drive cars themselves.

Applicability to Boulder County

A top priority amongst the Board of County Commissions Strategic Priorities is affordable living and the supportive and collaborative interventions needed to increase access to affordable housing and all modes of transportation. Expanding electric vehicle carsharing at planned affordable housing developments while leveraging existing partnerships with Boulder County Housing Authority and Colorado CarShare can help to advance these priorities.

Our Community Carshare

Sacramento, CA

Our Community Carshare was one of the first electric vehicle carsharing programs in the nation. The program enables users to reserve zero-emission vehicles for up to three hours a day or a total of nine hours per week [5] and is a free, membership-based service. To be eligible, participants must be residents at any of the nine partner low-income, subsidized housing developments, have a valid driver's license, are at least 21 years old, and have an active email and mobile phone number. A program survey distributed following the initial rollout indicated 61 percent of eligible residents were unemployed, 24 percent have a disability (largely in senior housing communities), and 45 percent of residents do not own a vehicle, indicating the need for alternative transportation options.

As part of the program, residents are also eligible for a free, preloaded Transit Incentive Card. The Transit Incentive Card is a monthly service that connects residents with first- and last-mile transportation options. The card can be used to pay for transit passes and rides with Lyft, Uber, Taxi, Amtrak, Greyhound, and paratransit.

As of December 2018, 113 residents were enrolled in the program and had taken 13,586 trips, equating to 208,802 vehicle miles traveled.[6] Residents drove on average 20 miles per trip and spent two and a half hours per trip. Between July to September 2019 during the Phase II launch, an additional 149 members enrolled and logged 6,255 hours of use.

Funding Sources

- Clean Mobility Options Program funded by California Air Resources Board ($2.36 million in total)[7]

Implementation & Infrastructure

Our Community Carshare is the result of a partnership between the Sacramento Metropolitan Air Quality Management District, Zipcar, and several agencies including the Sacramento Housing Redevelopment Authority (SHRA), Mutual Housing, Sacramento Utility District, and Policy in Motion. The agencies and housing sites provided the infrastructure and permitting to install the EVSE equipment. Zipcar was selected to manage and operate the fleet at each site. SHRA and Mutual Housing identified site locations and hired site managers and supporting staff at each site to assist residents. Policy in Motion developed the overarching structure of the program and oversaw outreach, which included hosting multi-lingual public workshops, training sessions for residents and housing staff, distributing surveys, and creating marketing materials. Breathe California joined as a new partner in August 2018 and played a key role in expanding Phase II participation by managing educational campaigns to connect residents interested in alternative transportation options.

Our Community Carshare was rolled out in phases with Phase I launching in 2017. The project placed two electric vehicles at three affordable housing complexes. In Spring 2018, an additional two electric vehicles were placed the Sacramento Valley Train Depot to make them more accessible to residents at another nearby affordable housing complex. Project administrators used the Clean Mobility Options grant funds to purchase eight BEVs in Phase I and six BEVs and a hybrid minivan in Phase II.

5. Hours can be broken up (e.g., 1 hour in the morning, 1 hour in the evening) but this requires separate reservations

6. *Our Community CarShare Sacramento Case Study*. Shared-Use Mobility Center. February 2020. Accessed via: https://learn.sharedusemobilitycenter.org/wp-content/uploads/Our-Community-Car-Share-Case-Study-Final.pdf

7. Phase I included $1.36 million for program design and early implementation. Phase II expansion grant included an additional $1 million in funding for two additional years of operations, addition of three new sites, and continued funding for operating Phase I sites.

Challenges & Lesson Learned

Despite enabling investments from CCI grant, the project encountered challenges early on with the cost-sharing and in-kind service components of the grant. Some partners had difficulty providing cost-share and in-kind matches, particularly the housing agencies serving low-income residents due to resource constraints. To alleviate the pressure of upfront costs, the cost-share approach changed in Phase II of the pilot by requiring partners to provide matches at the end of the grant term rather than at the beginning.

The project also encountered challenges with the legislative and administrative requirements of the program when delivering matching funds. Many partners leveraged funds from different sources to meet match requirements, and each source had varying timelines, allowable expenditures, reporting requirements, and other administrative requirements to track and manage during project implementation. Reducing the number of different partners involved can help to mitigate these challenges.

Additional challenges include some residents not having access to computers or smartphones, mostly in low-income senior housing sites. To address this barrier, the project team designed kiosks and installed them on site. The program is looking to further upgrade kiosks to be all-weather and to include signage in multiple languages to meet community needs.

Securing proper permits, parking spaces for vehicles, and design for the project was challenging given the multiple agencies involved in the process. These issues caused delays for program launch, which was further exacerbated by weather and EVSE permit technicalities. Collaborating with the various permitting agencies to develop a more streamlined permitting policy and process specific to EV carshare pilots can help smooth project construction and implementation. .

Applicability to Boulder County

The expansion of Our Community Carshare to include subsidies for non-auto-oriented transportation options such as transit, rideshare, and bikeshare aligns with the Board of County Commissioners' priority to increase access to all modes of transportation. While base eligibility requirements allow for up to 2,000 residents to be served across all sites, the program also recognizes the many residents who are unable to access this service (e.g., residents without a valid driver license) or may not be comfortable using a shared electric vehicle. By adopting the approach of this case study such that carshare is integrated as part of a broader ecosystem complemented by affordable, sustainable, multimodal options, Boulder County can introduce a variety of transportation options to marginalized communities while also advancing its mode shift goals.

BlueLA Carsharing Pilot

Los Angeles, CA

BlueLA is a one-way electric carshare pilot project designed to serve low-income residents and reduce greenhouse gas emissions. The program was founded by Blue Solutions, a private company known for producing electrical components for capacitors and for developing batteries and electricity storage solutions. Launched in 2018, members can rent vehicles from any of the 40 hubs located throughout Central Los Angeles by the minute or hour, rather than the usual daily rental. The service is made up of 200 charging stations and 100 battery electric vehicles and is focused in Disadvantaged Communities, which are defined by California as areas which most suffers from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes, as well as high incidence of asthma and heart disease. Stations are primarily sited in the public right-of-way and are designed to yield two parking charging spaces for each BlueLA vehicle. Members can reserve a vehicle on the website, mobile app, or at a station kiosk by logging into their account. Pricing is split into a tiered system: Standard Membership, Community Membership for low-income qualified participants, and trial memberships valid for one month. The income threshold is an annual household income less than $31,550 for individuals or $45,050 for a family of four, defined as very low income by the federal department of Housing and Urban Development.

As of December 2018, there were 1,367 BlueLA members, 920 drivers using the vehicles, 8,253 total trips, and 158,546 total vehicle miles traveled.[8] The program's membership base is nearly evenly split between Standard and Community Members; however, Community Members have taken around 60 percent of all trips. The trial membership, which received few participants in 2018, is no longer offered. Growth in membership, utilization, and GHG reductions is expected to continue as network effects and multimodal connections are further realized.

Funding Sources

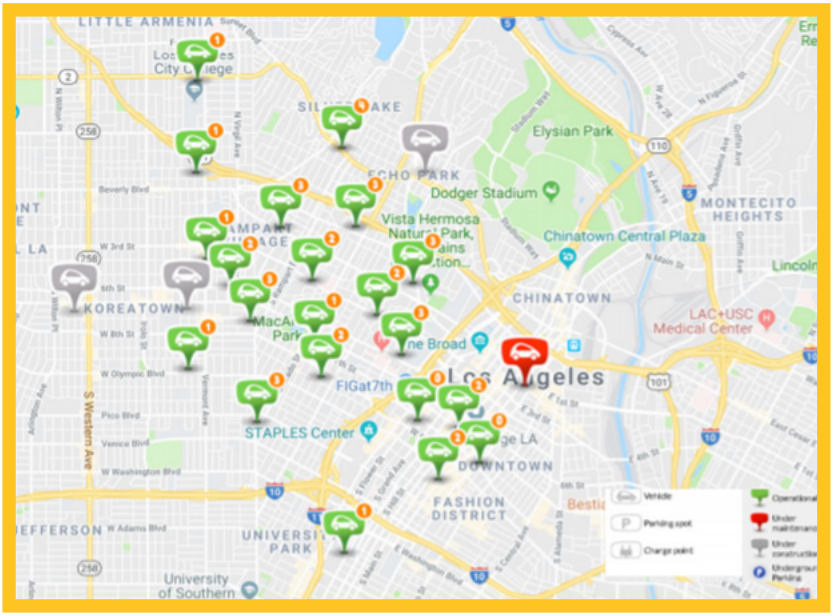
- Low Carbon Transportation Investments provided by California's Air Resources Board ($1.7 million)
- Commitments from City of Los Angeles and California ($2.8 million)
- Private investments from BlueLA ($10 million)[9]

8. Shared-Use Mobility Center. Electric and Equitable: Learning from the BlueLA Carsharing Pilot. April 2019.
9. Costs allocated to the CARB grant include community engagement, SUMC technical services, and parking conversion costs.

Table 1 Breakdown of BlueLA Funding Sources

Purpose	Funding Source	Amount
Vehicles, Charging Stations, and Program Operations		
Fleet, charging stations, installation, maintenance, and program operations (5-years)	Blue Solutions	$10,000,000
Car Share Operations Start-up Support	CARB Grant Funds	$600,000
Technical Advisory Services (SUMC)	CARB Grant Funds	$218,743
Subtotal		**$10,818,743**
Parking and Infrastructure		
Parking Conversion	CARB Grant Funds	$106,000
SPRF (Parking Revenue) Credits	CARB Grant Funds	$252,600
Subtotal		**$358,600**
Outreach and Advertising		
Outreach Manager and Street Ambassadors	CARB Grant Funds	$392,000
Advertising	CARB Grant Funds	$100,000
Sub Total		**$492,000**
Rebates and Incentives		
BOE Street Damage Restoration Fee Waivers	City of LA8	$300,000
LADWP Charging Station Rebates	City of LA	$800,000
LADWP Customer Fee Waivers	City of LA	$80,000
Subtotal		**$1,180,000**
Grant Total		**$12,849,343**

Implementation & Infrastructure



The program is provided through a public-private partnership involving Blue Solutions, the Shared-Use Mobility Center (SUMC), the Los Angeles Department of Transportation, and the Mayor's Office. The nature of the partnership allowed for the pilot program to procure more vehicles and charging units as a result of combined efforts and coordinated funding. Blue Solutions is a private, experienced EV carshare operator responsible for delivering the vehicle fleet, station infrastructure, EVSE equipment, and related fixtures such as reservation kiosks and meter pedestal. SUMC provided technical services and collaborated with the Mayor's Office on concept design and the grant proposal for this project. LADOT oversaw implementation after execution of the CARB grant. LA THRIVES, a local non-profit also provided leadership in early stages of the project by convening a search for a Steering Committee made up of community-based organizations to advise on outreach. The Steering Committee generated culturally appropriate marketing and outreach materials targeted to disadvantaged communities within the project area. Outreach began as early as December 2015 and community-based organizations committed to serving on the Steering Committee signed a letter of agreement with the City outlining their roles and responsibilities.

Numerous city agencies, including the Department of Public Works, Bureau of Engineering, Bureau of Street Lighting, contractors, and construction companies, were also involved during the early phases of the project. Prior to program launch, city agencies met weekly to coordinate on technical aspects of planning, parking conversion, and construction to streamline the permitting process. Dozens of non-profits and local council districts provided feedback on community and business outreach strategies.

The BlueLA service area is based on SUMC's Carshare Expansion Index, based on factors like transit availability and utilization, population and employment density, rates of vehicle ownership, intersection density, and longitudinal employer-household dynamics data. Station sites were identified through a collaborative and iterative approach that integrated community input throughout. Criteria for selecting candidate sites include:

- At least one-half mile from other stations
- Population density above 15,000/square mile within a half mile
- Employment density above 10,000/square mile within a half mile
- Three or more points of interest within walking distance
- Allows for convenient vehicle and charger access (e.g., street lighting, in or near a trafficked area, ample space to enter and exit the vehicle, traffic speeds below 35 mph)
- Visible from a major street
- Walk and transit score above 60
- Points of power and telecom feed are within 80 feet of the proposed station location

LADOT also adapted the public input mapping tool used for bikeshare siting.

Between January 2018 and January 2019, all project partners engaged the community at 136 events that either promoted or featured the project, including community forums, street services, and community events. Events were conducted in both English and Spanish with translation equipment provided. Childcare, snacks, and drinks were also made available for attendees at each event to support household caregivers.

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Challenges & Lesson Learned

A project with so much complexity and coordination benefits from early leadership by key decision-makers such as mayors and councilmembers. Clear commitment from the Mayor's Office ensured strong inter-departmental and inter-agency coordination. The Mayor's Office also played a key role in supporting pilot development and drawing alignment between this initiative and several city efforts that were underway, including the Sustainable City pLAn[10] and the LA Metro and SCAG First/Last Mile Strategic Plan.[11]

In addition, one-way carshare free-floating carshare programs like BlueLA requires more vehicle density and operates best in denser environments. Reaching critical mass is essential not only to meet user demand but to also avoid costly rebalancing measures. The program established housing, population, and employment density criteria as well as many

10. Sustainable City pLAn outlines goals for GHG reductions and includes strategies for addressing disproportionate environmental health impacts.
11. The LA Metro and SCAG First/Last Mile Strategic Plan provides guidelines for improving first- and last-mile connections to and from transit stations

other factors when determining candidate station sites. Regular performance evaluations should be conducted to recalibrate criteria thresholds throughout the pilot period.

Some of the challenges stemmed from revenue constraints due to CARB grant requirements. Funds were restricted to equipment or services for CalEnviroScreen Disadvantaged Communities (DAC) only. This requirement limits uptake among higher-income members who may use the services more regularly and who would pay for them at the Standard Membership rate, while possibly limiting demand among lower-income residents who wish to end their reservations at destinations outside of the DAC area. The project's tiered pricing system seems to have struck the right balance between affordability for low-income users and adequate signaling to manage demand and vehicle availability, however, identifying additional revenue sources remains a focus for Phase II of the pilot. For the pilot to remain a low-cost service for Disadvantaged Communities, it will have to look for sponsorship beyond the CARB grant. One way to do this is by expanding service into more non-disadvantaged areas. Project administrators are also looking to open charging stations to private vehicle owners such that every dual port charging station can serve carshare and the broader public. There is also support for the possibility of selling the stored electricity from vehicle batteries back into the grid.

Setting aside ample budget for outreach is critical, especially during pilot design and development. Too little CARB funding was earmarked to supplement public dollars for a robust outreach process. CARB recognized this gap and allowed more funding for outreach activities for future programs.

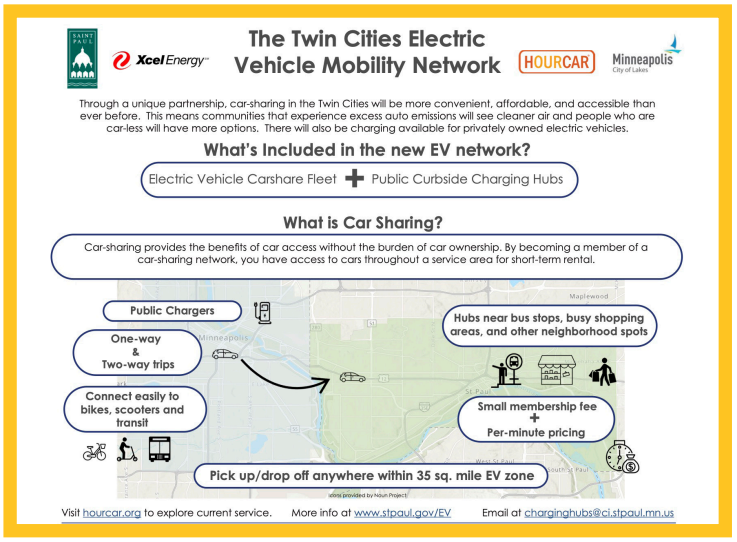
Applicability to Boulder County

Public subsidies that played a key role in helping to launch carshare programs around the national are declining. The lack of available funding is prompting carshare programs that have moved beyond the pilot phase, like BlueLA and Colorado CarShare, to explore different revenue streams. Both programs are dedicated to serving low-to-mixed income communities. Maintaining an element of affordability, however, is becoming increasingly challenging as programs continue to seek out long-term solutions for scaling and sustaining operations. BlueLA is exploring alternative revenue streams adapted from other emerging mobility service options such as station-based or on-vehicle advertising and reselling electricity that many other carsharing programs have yet to explore.

Twin Cities Electric Vehicle Mobility Network

St. Paul, MN

The Twin Cities Electric Vehicle Mobility Network is an electric vehicle carsharing program that connects working class community members to shared EVs. Slated to launch in summer of 2021 and reach full scale operations by mid-2022, the service adopts a one-way, semi free-floating model that allows users to pick up a vehicle, drive where they need to go, and park anywhere within the 35-square mile service area. To be eligible, members must be at least 18 years old, hold a valid driver license, and have at least one year of fully licensed driving experience, no major traffic violations in the past three years, and no violations related to drug and/or alcohol in the past seven years. Members can purchase an annual membership and pay for the hour for use of the service, gaining access to the entire fleet. Multiple membership plans are available with different monthly prices.



Funding Sources

- Advanced Innovative Vehicle Technologies grant from the U.S. Department of Energy ($6.7 million)
- Xcel Energy is investing on public charging infrastructure according to a plan approved by state legislators ($9.2 million)[12]
- Congestion Mitigation and Air Quality Improvement Program federal grant ($4 million)[13]

Implementation & Infrastructure

Twin Cities Electric Vehicle Mobility Network is a collaboration between the City of St. Paul, City of Minneapolis, Xcel Energy, the American Lung Association, and HOURCAR, a Minnesota-based carsharing nonprofit. Xcel Energy is responsible for providing and installing EVSE, HOURCAR serves as the operations and fleet manager, the American Lung Association is the grant administrator, and St. Paul and Minneapolis will provide support for maintenance at charging hubs.

The 35-square mile service area boundaries are designed to overlap with low-income neighborhoods in Minneapolis and St. Paul with low rates of vehicle ownership. Half of all charging hubs will also be sited in Areas of Concentrated Poverty (ACP), where more than half of residents are black, indigenous, people of color.

The program and its 100 vehicle-fleet will be supported by 70 mobility hubs, located curbside, and structured around a 0.6-mile grid. In addition to electric vehicles and charging infrastructure, mobility hubs will also include other modes of transportation, including bike share, e-scooter share, and transit. At most points within the service area, users will be within a five-minute from a mobility hub with access to EVs and charging stations. Each charging hub will have four charging parking spots, two reserved for the carshare program and two for public use, for a total of 280 EV charging spots in the area. Project siting is coordinated with the Mobility Hubs Pilot Program. Factors considered for EV carshare siting include density of residents, transit service frequency, and proximity to existing and planned bike facilities, afford-

12. Xcel program will work to electrify car-sharing and government fleets. Energy News Network. April 22, 2019. Accessed via: https://energynews.us/2019/04/22/midwest/xcel-program-will-work-to-electrify-car-sharing-and-government-fleets/

13. Cities of Saint Paul, Minneapolis to launch new Electric Vehicle Mobility Network in 2021. City of Minneapolis. September 18, 2020. Accessed via: http://news.minneapolismn.gov/2020/09/18/cities-of-saint-paul-minneapolis-to-launch-new-electric-vehicle-mobility-network-in-2021

able housing, multi-family housing units, local businesses, schools, libraries, recreation centers, and bicycle infrastructure. Future sites are also determined based on community input and opportunities to repurpose underutilized curbside allocations such as unmarked loading zones.

The project administrators have launched an extensive outreach and engagement campaign in partnership with local community organizations to gather input on barriers that people may have to accessing carshare as well as how pricing can be structured to minimize barriers to access. Several focus groups have also been held during the project prototyping process. As part of the project, ten community-based organizations co-created the Core Partner Council (CPC).[14] Participants of the CPC focus on issues of livability in their communities, such as housing, jobs, transportation, and community safety. Each organization is also based in a neighborhood comprised of mostly Black, Indigenous, People of Color (BIPOC) community members. These neighborhoods generally have lower car ownership rates per households and higher transit ridership rates than the city average. The CPC created an outreach and engagement plan establishing outreach goals, a roadmap for future engagement activities, and engagement tactics to address specific barriers raised by community members.

Challenges & Lesson Learned

This project is still in its early stages of development however, much can be learned from efforts currently underway. The project leverages the expertise of its partners, namely Xcel Energy and HOURCAR, who have extensive local and national experience with EVSE installation and permitting and carshare operations, respectively. Both partners were able to secure federal and state-level funding to the help fund the project and are coordinating with public agencies to address obstacles with the permitting process early in the project cycle. The project has also benefited from securing support from key decision-makers, elected officials, and climate- and equity-focused organizations, as it strongly aligns with broader local and statewide initiatives such as the Minneapolis Climate Action Plan, the Metropolitan Council Thrive MSP 2040 Plan, and the Mobility Hubs Pilot Project.

Some challenges include launching a massive outreach and engagement effort in the absence of in-person meetings due to the ongoing COVID-19 pandemic. The project team has heavily relied on community-based organizations to assist with outreach and has used different platforms and methods of engagement to share information and collect feedback from community members. Efforts include launching an online survey translated in several languages, conducting focus groups, launching a project website, hosting online meetings, and sharing information on various social media platforms.

Applicability to Boulder County

A key challenge for the Mobility for All CarShare Pilot was the limited uptake by market rate carshare users in Longmont, resulting in substantial public subsidies to keep costs low for low-income users. A tiered pricing structure could enable revenues from market rate trips to subsidize those taken by low-income participants and improve the financial sustainability of the program. In addition, creating a siting framework specific to the Boulder County context that factors population and housing unit densities, proximity to community places of interest, and neighborhood socioeconomic characteristics such as household income and vehicle ownership rates, could be useful to understand comparable rates of anticipated adoption.

14. Twin Cities Electric Vehicle Mobility Network: Community Engagement and Outreach. City of Saint Paul, City of Minneapolis, Hourcar, and Xcel Energy. February 2021. Accessed via: https://www.stpaul.gov/sites/default/files/2021-02/TCEVMN%20CE%20Report_Final%202.0.pdf

Upfront electric vehicle and hybrid vehicle costs are higher than the comparable gasoline vehicle, which creates barriers for adoption amongst low-income consumers. As a result, early adopters tend to have higher incomes, are highly educated, and are part of multicar households.[15] To increase access, federal and state governments have created different types of incentives to encourage the use of alternative fuel vehicles. The most common incentive at the state and local level is a financial rebate that can be offered at point of purchase or mail in for qualified vehicles. Rebate amounts vary depending on battery size, vehicle, price, and consumer income. Some states and local governments have supplemented these incentives with offering parking privileges and financial assistance to fund at-home charging infrastructure.

Voluntary Accelerated Vehicle Retirement Program

California

The Voluntary Accelerated Vehicle Retirement Program (VAVR) program, California's car scrappage and old vehicle buy-back program, provides monetary or other financial incentives to vehicle owners to voluntarily retire their old, more polluting vehicles for new, cleaner vehicles. VAVR programs are administered by local air quality districts, which set requirements for claiming the incentive. Not all air districts administer VAVR programs and many are operated by private businesses contracted to local air districts. At the state level, California's Consumer Assistance Program (CAP) is administered by the Bureau of Automotive Repair and provides $1,000 per vehicle and $1,500 for low-income consumers for unwanted vehicles that have either failed or passed their last Smog Check Test and that meet certain eligibility guidelines, including vehicle condition and age.

Funding Sources

- Carl Moyer Program
- Mobile Source Incentive Fund
- Transportation Fund for Clean Air (TFCA) Grant

Implementation

California Air Quality Management Districts participating in the VAVR program works with contractors, usually used auto-parts stores, who will seek out voluntary sellers of these vehicles, accept vehicles from voluntary sellers, ensure vehicles comply with Air District requirements, and purchase the scrap vehicle.

Challenges & Lesson Learned

Like many VAVR programs, California's program has existed for many years with few changes made to the program structure. Academic researchers have urged policymakers to consider ways to expand, improve, and/or supplement VAVR programs to target households and vehicles that historically have not participated at high rates. California's VAVR program offers additional financial incentives for low-income participants, however, studies have shown it has not significantly impacted certain households with high utilization of much older vehicles. Implementing a targeted, tiered incentive structure may discourage participation from households seeking to dispose of extra, under-utilized vehicles, while offering lower-income households more incentives to purchase a newer, cleaner vehicle.

Applicability to Boulder County

The Regional Air Quality Council (RAQC) incentivizes the replacement and scrappage of pre-2009 vehicles with full electric and renewable natural gas vehicles, however, the program is limited to fleets. Expanding this program to include income-eligible vehicle owners and offering a tiered incentive structure can help incentivize low-income drivers to switch to electric.

15. A review of consumer preferences of and interactions with electric vehicle charging infrastructure. Hardman et al., 2016.

Clean Vehicle Assistance Program

California

Launched in 2018, the Clean Vehicle Assistance (CVA) Program provides grants and affordable financing (8 percent interest or lower) to low- to moderate-income California residents purchase or lease a new or used electric or hybrid vehicle. In addition to grants, the program also provides low-interest rate loans, prepaid charge cards for, and financial and advanced technology training. Recipients who purchased a battery electric vehicle or plug-in hybrid vehicle may also receive funding for home charging stations with installation support. Eligibility requirements include a valid California's driver license, a qualifying income based on 400 percent of the Federal Poverty Level, and receipt of an approval letter. CVA grants can only be redeemed at dealerships included in the program's network dealership list. The program limits its partnerships with dealerships that treats customers fairly.

According to a 2019 adoption survey issued to all CVA participants, nine in ten respondents reported they would not have purchased their clean vehicle without the CVA grant.[16] More than half of respondents (61%) who received a loan from Beneficial State Bank, the program's lending partner, reported they would not have purchased the vehicle without the loan. Saving money was also reported as the most important factor for respondents when considering purchasing a clean vehicle. Since its launch, the program has provided over 1,700 grants, received over 11,000 applicants, and issued $8.3 million in grant funding.

Funding Sources

- California Climate Investments

Implementation

The CVA program is a result of a partnership between the California Air Resources Board and Beneficial State Foundation. Beneficial State Foundation is a lending partner that seeks to advance financial justice and impactful systemic change. It operates as a bank, owner, investor, and practitioner that bridges the work of community-based organizations, policymakers, and the banking industry to increase access to banking. The program also partners with GRID Alternatives, a nonprofit organization focused on increasing access to solar technology and renewable in marginalized communities. GRID Alternatives work with CVA grant recipients interested in at-home charging infrastructure.

The program is structured to provide benefits beyond transportation, specifically economic benefits. All participants participate in an online financial literacy course that provides education on topics like budgeting. The program is also designed to help participants avoid subprime or predatory loans by requiring any loans not issued by Beneficial State Foundation to be below 16 percent.

Challenges & Lesson Learned

Access to charging infrastructure remains a big issue for lower-income consumers who are less likely to have access to alternative charging options at work or in their neighborhoods. According to the 2019 adoption survey, the availability of charging at home was rated as more important than the availability of charging at work by respondents who live in single-family homes. The importance of work and home charging were rated approximately equally by apartment dwellers.[17] To address this barrier, the program decided to offer an additional rebate and installation support for portable charging that resulted in no additional cost for charging for eligible participants.

16. Center for Sustainable Energy. Clean Vehicle Assistance Program Adoption Survey Report. September 2019. Accessed via: https://409x7yggc5ekrbd32lf9ajv2-wpengine.netdna-ssl.com/wp-content/uploads/2020/08/BSF-CVA-Program-Evaluation-Report-2019-Final.pdf

17. Clean Vehicle Assistance Program Adoption Survey Report. Center for Sustainable Energy. September 2019. Accessed via: https://409x7yggc5ekrbd32lf9ajv2-wpengine.netdna-ssl.com/wp-content/uploads/2020/08/BSF-CVA-Program-Evaluation-Report-2019-Final.pdf

Financial incentives tend to disproportionately benefit higher-income consumers who can purchase alternative fuel vehicles without financial incentives. Targeted outreach with dedicated funding is essential in getting communities of interest involved throughout the process. Setting an income cap, which makes higher income consumers ineligible while increasing available funding for lower-income consumers can help to increase participation amongst targeted groups without increasing cost of the program.

The program found success in partnering with organizations whose work is deeply embedded in creating opportunities and serving underserved communities. Partner organizations committed funding to hiring a community engagement coordinator for the program. During the first round of the program, the program leaned on GRID Alternative's deep involvement in the community for outreach. In the second phase of the project, Beneficial State Foundation plans to use consumer data to identify communities of lower incomes and who live in more pollution-burdened areas to create a community burden map of California to conduct more targeted engagement.

Applicability to Boulder County

One of the barriers to electric vehicle purchases is the upfront cost of acquisition. While up to $11,500 combined federal and state incentives are available in Colorado, these are income tax credits that the purchaser does not benefit from until the following tax year. Applying an incentive near the point of sale through a grant program could allow participating purchasers to be cash flow positive from the start of the program, which could then increase adoption rates.

The upfront cost of vehicles may still be high for some low- and medium-income purchasers after the addition of grants, tax credits, and other incentives. While loans are available, high interest rates and issues with credit create additional barriers to vehicle acquisition. Identifying a lending partner with shared values and a willingness to absorb financial risks in service of supporting low-income purchasers could help to mitigate some of these barriers.

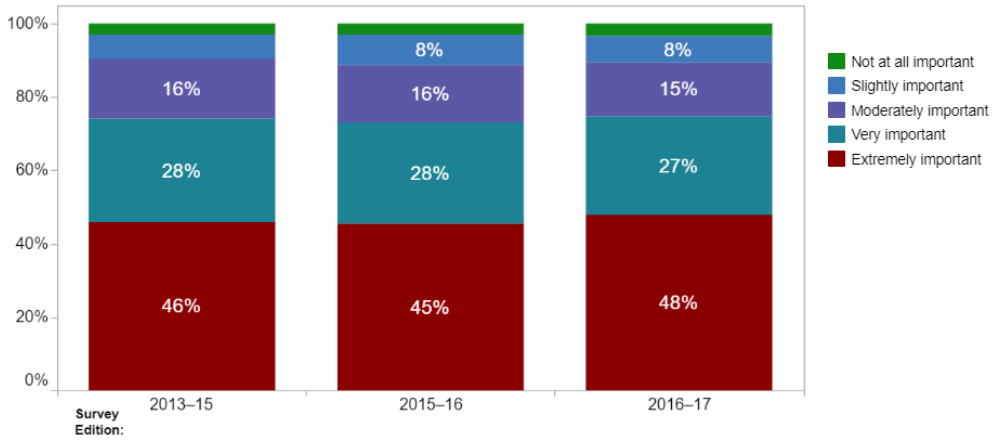
California Clean Vehicle Rebate Project (Moving California)

The California Air Resources Board (CARB) in partnership with the Center for Sustainable Energy (CSE) launched the Clean Vehicle Rebate Project (CVRP) to encourage and accelerate zero- and near-zero-emission light-duty vehicle deployment and technology innovation. The program promotes clean vehicle adoption by providing California residents up to $7,000 for the purchase of lease of new, eligible electric, plug-in hybrid electric, and fuel cell vehicles. Consumers with household incomes less than or equal to 400 percent of the federal poverty level are eligible for an increased rebate amount of up to $2,500.

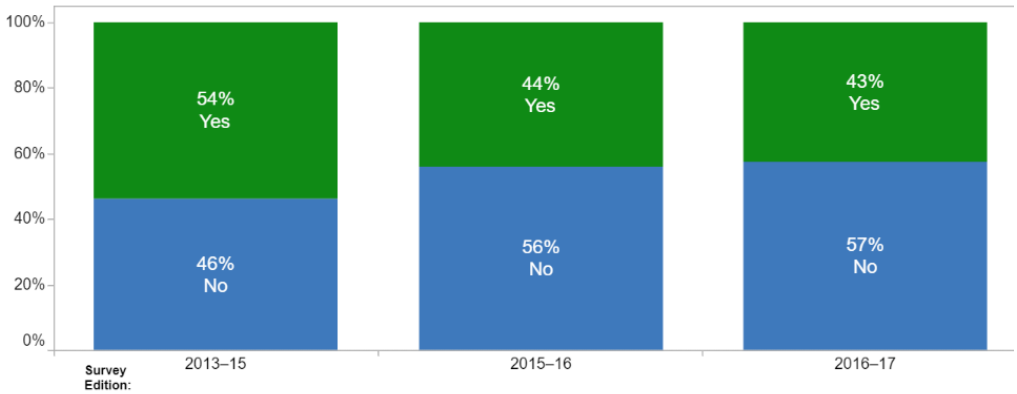
Between 2010 and 2015, the program issued over 400,000 rebates, most of which applied to battery electric vehicles (63.4%) followed by plug-in hybrid electric vehicles (34.4%) and fuel-cell electric vehicles (1.9%).[16] Roughly three-quarters of eligible purchases and leases were rebated.

Importance of Rebate

When asked how important the rebate was in making it possible to acquire a PEV, majority of respondents reported it was very or extremely important.



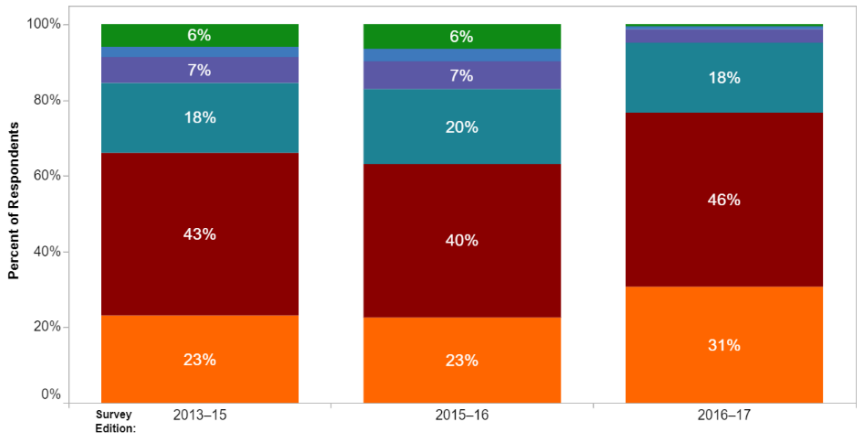
Source: California Clean Vehicle Rebate Project



Rebate was Critical to Purchase

When asked whether they would have purchased or leased their vehicle without the rebate, most of respondents said 'No', indicating the rebate plays a critical role in helping consumers decide whether to purchase a PEV.

18. CVRP Rebate Statistics. Accessed via: https://cleanvehiclerebate.org/eng/rebate-statistics



Source: California Clean Vehicle Rebate Project

Household Income

Majority of respondents have an annual household income that is less than $199,999, followed by households with an annual income of less than $100,000. These results, while aggregated, suggest participation amongst households with lower incomes is expanding.

Funding Sources

- Low Carbon Transportation Investments provided by the California Air Resources Board

Implementation & Infrastructure

The Center for Sustainable Energy (CSE) administers and implements the CVRP on behalf of the California Air resources Board (CARB). Funding for the CVRP is determined as part of CARB's annual funding plan, which serves as a blueprint for expending funds appropriated to CARB in California's budget. The funding plan is developed with public input and approved by CARB.

Challenges & Lesson Learned

The program implemented income caps and increased incentives for low- and moderate-income individuals to prevent subsidizing zero-emission vehicle purchases for high-income individuals, since they have the means to purchase one without assistance. After rebates were increased for low- and moderate-income individuals, the share of rebate recipients with households below $50,000 annually increased from 5 percent in March 2016 to 10 percent in June 2017. The share of rebate recipients with annual household incomes between $50,000 and $150,000 increased as well from 21 percent to 24 percent over the same period.[19]

For incentives to reach target populations, individuals in those populations must be aware of both the qualifying product and existence of the incentive. Outreach and earmarked funding are therefore essential to increase zero-emission vehicle adoption. The Center for Sustainable Energy leaned heavily on partner organizations as well as local community-based organizations to disseminate information across the state. Since 2014, the Center for Sustainable Energy participated in over 1,000 public engagement events, ranging from conferences, cultural events, workshops, presentations, and EV test drive events, with the number of events increasing each year.

Applicability to Boulder County

In December 2020, the Colorado Public Utilities Commission approved a plan aiming to have 940,000 electric vehicles on Colorado roadways in 10 years. As part of the plan, the Colorado PUC has explored the provision of rebates to lower-income residents to purchase new or used electric vehicles. Creating a statewide rebate program that can be stacked with other state- or county-level incentives can further increase the affordability of electric vehicles and encourage the adoption of electric vehicles amongst low-income purchasers.

19. Impacts of the Clean Vehicle Rebate Project's increased rebates for low- and moderate-income individuals on California's ZEV Market. UC Davis Policy Institute for Energy, Environment, and the Economy. May 2019. Accessed via: https://policyinstitute.ucdavis.edu/wp-content/uploads/CVRP_Rebates_0519.pdf

San Mateo County Used Electric Vehicle (EV) Incentive Program

The San Mateo County Used Electric Vehicle Incentive program offers up to a $4,000 incentive to income-qualifying San Mateo County residents who purchase a used plug-in hybrid electric vehicle. The program also provides affordable loans to help San Mateo County residents purchase reliable used vehicles and to strengthen their personal and financial stability. To qualify, applicants must live in San Mateo County, meet the qualifying income requirements which is calculated based on 400% of the Federal Poverty Level, and have access to a charging equipment at home or at work. The program's incentive is stackable with other state-issued income-qualifying electric vehicle programs such as the Clean Cars for All Program and the Clean Vehicle Assistance program.

Funding Sources

- Peninsula Clean Energy earnings

Implementation & Infrastructure

Peninsula Clean Energy (PCE) is a Community Choice Aggregation (CCA) organization and an official electricity provider for San Mateo County. As a community-controlled, not-for-profit joint powers agency, it has flexibility and local control to use innovative options in purchasing and generating electricity for residents and businesses. Earnings are reinvested in the community in the form of new energy projects and programs that further reduce greenhouse gas emissions. PCE partners with Peninsula Family Service, an organization that provides comprehensive services, including financial education, that support individuals and families at various stages of life. PFS also provides affordable interest rates on vehicle loans for those that qualify.

Challenges & Lessons Learned

The Used Electric Vehicle Incentive Program is hyperlocal, which allowed PCE and PFS to leverage its existing relationships with the community to promote and scale the program. The program worked closely with local dealerships to offer discounts on approved vehicles that, along with the PCE and state incentives, can save people up to $10,8000 per purchase. PCE also adopted comprehensive approach to electrifying transportation in San Mateo County, which includes providing an incentive to low-income residents purchasing used electric vehicles, funding the installation of thousands of additional local charging stations over the next four years, and supporting schools and municipalities in electrifying their fleets. The program partners' extensive history within the community has enabled them to push forward the conversation of electric vehicles at the local level while garnering support from local and state officials.

Applicability to Boulder County

Xcel Energy, Boulder's primary electric utility provider, has worked with several Mitsubishi and Nissan dealerships to offer rebates: $3,000 on a 2019 Mitsubishi Outlander PHEV and up to $3,500 off a 2019 Nissan Leaf. These rebates are short-term, apply only to new vehicles, and have proven to be effective. Through October 2019, more than 30 Outlander PHEVs were sold with this rebate while the Nissan rebate accounts for 10% of registered Leaf vehicles in Colorado.[20] While rebates for used cars are not as common, expanding Xcel Energy's program to include used cars and additional vehicle types can help to further reduce costs for new PHEV and EV buyers, particularly lower-income buyers.

20. The Colorado Sun. "As more electric vehicles are on the way, Colorado's tax incentives begin to wind down." March 2020.

Alternative Fuel Vehicle Tax Credit

District of Columbia

Beginning in 2015, the District of Columbia offers an income tax credit of 50 percent—up to $19,000 per vehicle—for the incremental or conversion costs for qualified alternative fuel vehicles. Qualified alternative fuels include ethanol blends of at least 85 percent, natural gas, propane, biodiesel, electricity, and hydrogen. EV purchasers receive the credit at the end of the financial year in which they purchased the car when taxes are filed. The incentive expires December 31, 2026. A tax credit is also available for 50 percent of the equipment costs for the purchase and installation of alternative fuel infrastructure. Several analyses have shown that tax incentives for electric vehicles and infrastructure are the dominant factors in driving alternative fuel vehicle adoption.[21]

Challenges & Lessons Learned

One challenge of the state income tax credit is that not all purchasers will be able to claim the full amount of the tax credit. If a purchaser does not have a tax liability of the full amount of the credit, they can only claim up to the level of their liability. Because higher-income earners generally owe more in taxes, they are more likely to receive the full tax credit amount than low-income earners.

Another downside to alternative fuel vehicle tax credits is that it may take up to a year for purchasers to reap the benefits, which may deter participation from lower-income households. Point of sales incentives such as rebates and grants have shown to be more effective in aiding adoption of electric vehicles, particularly amongst low-income purchasers who view the upfront cost of purchasing an electric vehicle as a key barrier to adoption.

Applicability to Boulder County

The state of Colorado offers a tax credit of $5,000 that is set to expire in 2022. Unlike Washington D.C.'s program, however, it is a more effective equitable model. The credit is refundable, meaning the purchaser will receive the full value even if they have less than $5,000 in tax liability, and assignable, allowing the purchaser to assign the credit to a financing agency and take it as a price reduction at the point of sale.

Data has shown that over time, fewer new EV buyers take advantage of state tax credits. This trend, also reflected in Colorado, is likely due several factors including the growing prevalence of electric vehicles, declining manufacturing and purchasing costs, reductions in the credit amount, and the introduction of more popular incentives like grants and rebates applied at point of sale. As the market moves beyond the early adoption phase and federal incentives end, state tax incentives will still play a role in influencing a buyer's decision to go electric though the need for this incentive will dissipate over time.

21. The Role of Demand-Side Incentives and Charging Infrastructure on Plug-In Electric Vehicle Adoption: Analysis of US States. Easwaran Narassimhan and Caley Johnson. 2018.

Electric Vehicle Registration Fee Reduction

Connecticut

Owners of an electric vehicle are eligible for a reduced biennial vehicle registration fee of $57 instead of $120 for a gasoline vehicle. As of January 2021, there is a total of 13,800 registered electric vehicles, with 4,408 registered in 2020 alone. [22]

Funding Sources

- N/A

Challenges & Lessons Learned

Growing concerns related to declining gas tax revenues have prompted several states to implement registration fees for electric vehicles in addition to regular vehicle registration fees. Studies have shown, however, that increased registration fees, and a reliance on registration fees in general, are not a sustainable mechanism to provide adequate funding as states transition towards zero-emission vehicles. Additionally, an additional fee detracts from the adoption of zero-emission vehicle technologies by as much as a 20 percent decrease in new zero-emissions vehicle sales.

Applicability to Boulder County

The state of Colorado requires PEV owners to pay an annual fee of $50 for a Plug-in Electric and Electric Vehicle Decal. This decal is required for use of public electric vehicle supply equipment in Colorado. Part of the annual fee contributes to the Electric Vehicle Grant Fund, which provides grants to local governments to install charging infrastructure. Given that Colorado's registration fee structure is markedly different to Connecticut's, this case study is not directly applicable to Boulder County. However, state policymakers can consider lowering annual fees for Plug-in Electric and Electric Vehicle Decals for car owners who meet specific income thresholds to further incentivize EV adoption within low-income communities. Such an incentive, which will be perceived as added cost, will need to be paired with a robust educational campaign to highlight the environmental and long-term cost benefits of owning an electric vehicle.

22. State of Connecticut Department of Motor Vehicles. Accessed via: https://portal.ct.gov/DMV/News-and-Publications/News-and-Publications/Electric-vehicle-stats

CONCLUSION

This review of alternative fuel vehicle programs, policies, and incentives provides a basis for understanding the challenges and opportunities in expanding access to low- to medium-income residents.

Key findings include:

The high, upfront cost of purchasing an EV or PHEV is a key barrier to adoption amongst low-income buyers. Grants and rebates applied at or near the point of sale are preferred more than tax credits whose benefits are applied at the end of the tax period. Consider allowing state or locally-issued grants, rebates, and tax credits to be stackable to offer additional benefits to low-income buyers.

Find a local, regional, and state-level official who is willing to be the champion for the program, policy, or initiative. Partnering with public officials who are willing to support the overarching vision and to work with city partners from the outset can help to secure buy-in from the broader public.

Simply offering programs and incentives to low-income recipients is not enough to encourage participation. Targeted education and outreach could enhance their understanding of electric vehicles and potential benefits, however, these efforts require sustained funding and dedicated staff. It is important to earmark funding for outreach and to work in partnership with community-based organizations early in the process to ensure barriers are understood before designing programs and policies. Funding can be used to hire outreach staff, produce marketing materials, or to host educational workshops.

Currently, most large scale carshare programs still heavily rely on state funding and private investments for program start-up and ongoing operations. In addition to exploring long-term funding options, diversifying revenue streams and leveraging existing assets should be considered. This can mean ensuring every dual port charging station remains open to both carshare members and the broader public or allowing ridehail drivers to use carshare vehicles to conduct trips.

Consider integrating electric vehicles with broader multimodal planning efforts. Many cities around the nation are including EV charging infrastructure or EV carshare at mobility hubs anchored by high frequency transit service to provide improved connections to transit. Providing a transit incentive card that would allow residents to try and use other electric-powered, first- and last-mile mobility options can help acclimate residents to the shared mobility model.