



Universal Equity Zero Emission Vehicle Charging Card

Project Demonstration Report
30th September 2023



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Executive Summary

As mobility benefits and financial inclusion gain more attention at the state-level, Cal-ITP aimed to demonstrate the importance and demand for a convenient payment option for low-income ZEV owners, and to identify and quantify social and technical barriers related to their use.

In early 2022 Valley CAN partnered with the California Integrated Travel Project (Cal-ITP) on a demonstration project centered around the design and development of a Universal Zero-Emission Vehicle (ZEV) Equity Charging Card. The Universal ZEV Equity Charging Card is a preloaded and reloadable contactless debit card designed to make it easier for priority communities to access and use mobility subsidies. These subsidies were available to be spent specifically on sustainable transportation, including ZEV charging, transit, and bike/scooter sharing, among others. Participants were largely low-income ZEV drivers from income-qualified ZEV incentive programs and low-income candidates identified through community partnerships in San Joaquin Valley, Pacoima/San Fernando Valley, Los Angeles, Pomona, and Inland Empire.

The project was deployed in two phases:

- **Phase 1** – launched at the end of July 2022 (11 months) with a cohort of 98 Clean Cars 4 All (CC4A) customers who qualify for the \$1,000 EV (Electric Vehicle) public charging credit.
- **Phase 2** – launched in February 2023 (4 months) with a cohort of 150 customers, of which 55 were recruited from the CC4A program, and 95 recruited via partner Community Based Organizations (CBO). This phase included a wider range of mobility options that could be paid for with the card, such as transit, bike and car share, scooters, and public electric vehicle charging. The second phase was also used to implement program changes that address challenges discovered in Phase 1.

We leveraged participant surveys, issue logs, transaction reports, and partner interviews to gain insights and evaluate the success of the demonstration.

Summary of demonstration insights

The project demonstration generated many insights, some of which are summarized below. Each section in the report provides a more detailed overview of the lessons learned for each theme.

Gaining experience with bank cards

- The project demonstration validated that prepaid cards worked as a tool for recipients to receive funds, and in some cases, helped build familiarity with bank cards.
- 74% of participant exit survey respondents agreed that the ZEV Charging Card helped them get familiar with contactless payments.
- Relying on Community Based Organizations and Valley CAN for recruitment and participant support was key for the success of the demonstration, especially for older adults, unbanked and monolingual non-English speakers.

Improving affordable access to clean mobility

- 87% of exit survey respondents with access to an EV reported that the ZEV Charging Card allowed them to drive the same or more as prior to the program.
- Battery electric vehicle participants relied more on their cards, compared to plug-in hybrid drivers, by spending 10% more funds on both phases.



Charging at EV public stations

Payment experience

- Around 16 participants who logged an issue perceived that their bank cards were not accepted at charging stations. The interface made participants believe that they needed to become members and/or download the company app, leading to confusion and frustration.

Using funds for other modes of travel

- 30% of Phase 2 participants tried more than one mode of travel. On average this group used 2.5 different modes during the project demonstration.
- Non-vehicle owners relied on ride hailing services the most (60% of transactions), followed by micromobility and carsharing (31% of transactions).

Creating effective prepaid card programs

Recruiting and engaging with participants

- Recruiting vehicle owner participants at the vehicle trade-in stage increased participation substantially.
- Community engagement was crucial for recruitment and engaging with participants.

Enabling Open Loop expansion

Open loop ecosystem

- Participants used more than 20 brands of charging stations during the project demonstration, confirming the need of an open loop solution to address EV charging needs in lower income communities.

Merchant Category Codes (MCC)

- Around 70% of transactions by amount were matched to their correct MCCs.
- EV charging transactions were linked to 10 different MCCs, creating the need for more harmonization.

Understanding the use of contactless

- Around 80% of transactions by amount were done through electronic commerce or credential on file, showcasing the high use of cards in the digital through mobile or web applications.
- Contactless had a 17% share by number of transactions, becoming the largest physical use of the card. This share is reduced to 7% if we compare by share of total amount.



General Recommendations

Our findings from the Universal ZEV Equity Charging Card program have implications for market players across the ecosystem. Here is a summary of the most relevant recommendations. A more detailed set can be found in the Recommendations section.

- Continue supporting prepaid cards as part of the mediums to distribute benefits related to mobility and EV charging, as it allows the use of multiple platforms and brands across the ecosystems.
- Pursue further prepaid card demonstrations to test new functionalities, such as:
 - Multiple funding sources in one card
 - Validating Merchant Category Codes (MCC) restriction and comparing this to other ways of limiting spend
 - Multiple wallets for multiple purposes
- Supporting scale by creating a state-level procurement bench, ideally with products that have a path to traditional bank accounts and rewards programs.
- Cal-ITP and other government organizations should continue working with the EV charging ecosystem to improve the user and payment experience of their users, potentially through carrying out an electric vehicle charging user experience and pricing survey to understand the user perspective on operating chargers.
- Continue working with the payments ecosystem on aligning the use of Merchant Category Codes (MCC) for EV charging.

1. Introduction

In early 2022 Valley CAN partnered with the California Integrated Travel Project (Cal-ITP) on a demonstration project centered around the design and development of a Universal Zero-Emission Vehicle (ZEV) Equity Charging Card.

This project was funded by the Governor’s Office of Business and Economic Development (GO-Biz) with in-kind contributions by Cal-ITP and Dash Solutions (previously Prepaid Technologies), and support from Mastercard, Pacoima Beautiful, Redeemer Community Partnership, and Latino/Latina Roundtable. The ZEV Charging Card was intended to demonstrate the importance and demand for a convenient payment option for low-income ZEV owners, and to identify and quantify social and technical barriers related to their use.

For Cal-ITP, which has focused on expanding the use of contactless bank cards in public transit, programs like this serve to unlock new markets by encouraging bank card issuers to provide and/or expand financial services and accounts to the unbanked and underbanked.

For Valley CAN, the ZEV Charging Card provides an additional method of serving its client base, expanding the benefits it provides to low income and disadvantaged communities. For GO-Biz, projects like this further its goals of accelerating the adoption of ZEVs across California, in ways that ensure industry is at the center of furthering the State’s social and economic objectives.

This report provides insights on the following:

- An overview of the project, how it was designed, and who participated.
- How participants gained experience with bank cards.
- How the program helped improve access to clean mobility.
- Understanding the experience at EV public charging stations.
- How funds were used for other travel modes.
- Lessons learned on creating effective prepaid card programs.
- What are the next steps on enabling the expansion of open loop solutions in the EV charging ecosystem.
- Conclusions and recommendations.



Figure 1 - The ZEV Charging Card in use at a public station.



Figure 2. Universal ZEV Equity Charging Card demonstration partners

Program administrator



Funding partners



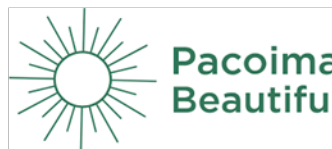
Support



Issuer



Community support





2. The Project Demonstration

2.1. Overview

The Universal ZEV Equity Charging Card is a preloaded and reloadable contactless debit card designed to make it easier for priority communities to access and use mobility subsidies. These subsidies were available to be spent specifically on sustainable transportation, including ZEV charging, transit, and bike/scooter sharing, among others.

The broader goals and objectives of the demonstration project are shown in Table 1, along with a reference to the report chapter that details the relevant outcomes.

Table 1: Project Goals, Objectives, and Outcomes.

Goal	Objectives of the ZEV Equity Charging Card	Report Chapter with Outcomes
More affordable access to clean mobility	Provide a customer-friendly solution for low-income and previously underbanked and unbanked customers to access sustainable mobility	Chapter 3: Gaining Experience with Bank Cards Chapter 4: Improving access to clean mobility
A single way to pay for any mode of sustainable mobility	Provide a solution that can work across providers and modes (starting with EV charging and transit)	Chapter 5: Charging ZEVs at Public Stations Chapter 6: Using funds for other modes of travel
A publicly funded mobility program that aligns with customers' needs	Provide an effective solution for government and non-profit entities administering and funding public benefit programs for EV charging	Chapter 7: Creating Effective Prepaid Card Programs

In addition, the project demonstration was used to test the following key value propositions:

- **Customer proposition**
 - Customers can use their Charging Card at *any* public EV charging station (Phase 1).
 - Customers can use their Charging Card for *any* applicable mobility mode (Phase 2).
 - No effort is required to access available subsidies (funds are loaded and reloaded onto card automatically).
- **Infrastructure proposition**
 - All electric vehicle supply equipment (EVSE, or charging station) are equipped with contactless card readers to accept payment.
- **Operational proposition**
 - Valley CAN has the ability to easily reload funds.
 - Valley CAN has the ability to see transaction data in (near) real-time.

The project was deployed in two Phases, which are summarized in Table 2.

- **Phase 1** – launched at the end of July 2022 (11 months) with a cohort of 98 Clean Cars 4 All (CC4A) customers who qualify for the \$1,000 EV (Electric Vehicle) public charging credit.
- **Phase 2** – launched in February 2023 (4 months) with a cohort of 150 customers, of which 55 were recruited from the CC4A program, and 95 recruited via partner Community Based Organizations



(CBO). This phase included a wider range of mobility options that could be paid for with the card, such as transit, bike and car share, scooters, and public EV charging. The second phase was also used to implement program changes that address challenges discovered in Phase 1.

Key project tasks included:

- Design, development, and issuance of the prepaid reloadable card.
- Establishment of the accounting infrastructure, processes, and procedures to distribute funds and gather project insights while protecting the user's privacy.
- Participant recruitment and associated customer support.
- Ongoing customer outreach via phone, in-person and through surveys to understand a range of customer experiences - from card usage to paying for EV charging and other modes.
- Monitoring the use of funds and analysis of this data.

Table 2. Number of participants by Phase and vehicle type owned.

Participant Cohort	Plug-in Hybrid Electric	Battery Electric	Other / No vehicle	Total
Phase 1	61	37	0 (N/A)	98
Phase 2	43	12	95	150
Total	104	49	95	248

2.2. Card Recipients

The participant recruitment process focused on low-income ZEV drivers from income-qualified ZEV incentive programs and low-income candidates identified through community partnerships in San Joaquin Valley, Pacoima/San Fernando Valley, Los Angeles, Pomona, and Inland Empire.

As part of the onboarding process, the program collected information related to the demographics of participants, which are shown in Figure 3 and Figure 4. Some highlights of the statistics presented below are:

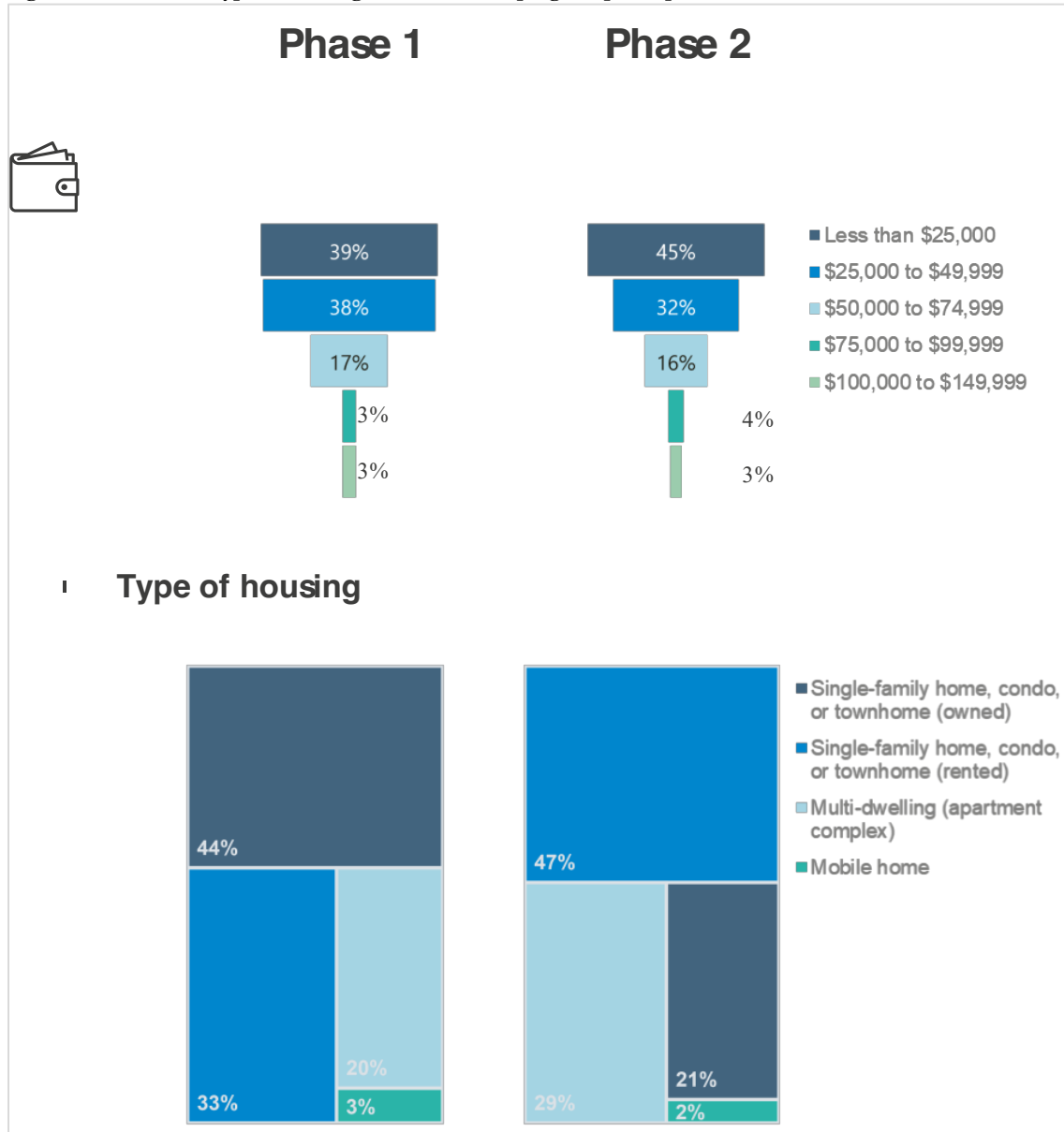
- There were more female participants (57%) on Phase 2, compared to Phase 1 (31%).
 - This can be explained as Community Based Organizations (CBOs) were involved in Phase 2 and their programs usually focus on women from priority communities.
- More than 70% of participants identified as Hispanic/Latino in both Phases.
- For both Phases, around 77% of participants reported an income below the \$50,000 mark and 43% had an income below \$25,000. Both cohorts saw about 60% of participants held a conventional full-time job.
- 45% of participants in Phase 1 live in an owned single-family home, condo, or townhome. On the other hand, 47% of participants in Phase 2 live in a rented single-family home, condo, or townhome.
- 42% of participants owned a plug-in hybrid electric vehicle, compared to 20% who owned a battery electric vehicle. 38% of participants did not own a ZEV; all of those participants were part of Phase 2.
- Over 70% of participants with access to an EV had access to charging at their home.

We further explore vehicle use habits of EV drivers in Appendix D.

Figure 3. Gender and race/ethnicity statistics of the program participants.



Figure 4. Income and type of housing statistics of the program participants.



3. Gaining Experience with Bank Cards

One of the goals of the ZEV Charging Card demonstration project was discovering whether distributing funds using prepaid cards led to an increase in familiarity and comfort in using bank cards among recipients who lack experience with traditional banking. About 1 in 5 households in California are unbanked (5% of households) or underbanked (13.9%)¹. These numbers are known to be disproportionately high for Native American, Black, and Hispanic households. Underbanked households are unique in that they may have access to a bank account, but largely rely on alternative services like cash-checking, peer-to-peer payments, and more to pay for goods and services given the high fees charged to use their accounts. Such households may not feel comfortable using their bank cards to pay for public charging sessions, especially when pricing may not be transparent up front.

At the end of the project, the team carried out exit surveys, which compiled data from a sample of participants. These surveys showed that 94% and 82% of Phase 1 and 2 ZEV Charge Card recipients had bank accounts, respectively. Of those with bank accounts, most had access to at least once contactless enabled card (59% in Phase 1 and 72% in Phase 2). In total, about 76% of participants used any bank card they had available more than once a week or day. Of the total 33 participants who did not have a bank account, 82% self-identified as Hispanic/Latino or Black/African American, consistent with unbanked/underbanked statistics.

Overall, the project achieved its goal of increasing familiarity with bank cards: 74% of respondents agreed that the ZEV Charging Card helped them get familiar with contactless payments. At the start of the program, 61% of participants used contactless bank cards for payments at least sometimes, upon exit from the program, 63% of surveyed participants reported using their contactless bank cards sometimes or all the time.

74% of survey respondents agreed that the ZEV Charging Card helped them get familiar with contactless payments.

During the demonstration participants were able to report issues through support via the Valley CAN management team and through phone surveys. The reports gathered from participant reports showcased the following insights:

- **Card activation issues:** 12 activation-related issues were logged in Phase 1, meaning that recipients needed help activating the cards from the Valley CAN staff. One activation issue was logged in Phase 2. Some reasons include the had input an incorrect email or had not entered the proper identification information.
- **Using the cards to pay:** In general, participants knew how to use the cards once activated, including tapping the contactless card on the point-of-sale device. There was only one recorded customer who requested Valley CAN support at the time of payment. (Note that the ZEV charger experience is discussed in the next section.) Partner community organizations reported that a few customers needed extra training to navigate disparate payment options across mobility platforms. One organization leader said that “A lot of people didn't know how to use the card... so we appreciate the extra time [referring to the 2-year card expiration].” Partner organizations reported that

¹ [2021 FDIC National Survey of Underbanked and Unbanked Households](#)



participants who required more assistance were older adults, unbanked and monolingual non-English speakers.

- **Good communications increase success:** One community partner found that by communicating what the user process is like and especially what messaging to expect upon sign-up helped prevent participants from ignoring program communications or thinking those are scams.

The project validated that the prepaid cards worked as a tool for the recipients and, in some cases, proved beneficial in building familiarity with bank cards. Comprehensive resources and communications describing the onboarding process and how to use cards is key to creating a seamless user experience, especially when presented in simple terms and in multiple languages. Note that the prepaid cards used in the project are not designed to enable customers to transition to broader banking services, e.g., convert to using a checking account. Some participants surveyed at the start of each phase reported being interested in opening a bank account but cited barriers such as high fees, having access to a relative's banking products, or a lack of time. Interestingly, only three participants remained uninterested in opening a bank account at the end of the program, each citing that the lack of trust in banks.

What did we learn?

4. More Affordable Access to Clean Mobility

One of the most relevant objectives of the demonstration project was to understand how the use of prepaid card funds can contribute to making travel more affordable. From the exit survey, 87% of respondents with access to an EV reported that the ZEV Charging Card allowed them to drive the same or more as prior to the program.

Expenditure data also showed that participants spent funds at different rhythms, depending on the type of Phase and type of ZEV they had access to. The following sections summarizes findings related to how the prepaid cards were used.

4.1. Prepaid card use

Between the end of July 2022 start date and the May 2023 end date, participants spent a total of \$56,100. Table 3 shows how the spend was distributed between Phase 1 and Phase 2 participants, as well as the type of vehicle they owned (if applicable). This analysis shows that battery electric vehicle owners used the card funds more rapidly compared to plug-in hybrid vehicle owners. Anecdotal evidence from Valley CAN and community organizations confirmed that battery electric vehicle owners relied more on the public charging stations to make sure they have enough power to reach their destinations, compared to plug-in hybrid vehicle owners who could also rely on gas as an alternative.

These findings are also consistent with Table 4, which shows the share of spent funds related to the budget per Phase and vehicle type. In this case, battery electric vehicle owners in Phase 1 spent around 34% of the funds in 11 months, the duration of Phase 1, far more than the plug-in hybrid electric vehicle owners, who spent 5% of the funds. Phase 2 saw a higher rate of spend across their four-month tracking period, in which battery electric vehicle owners spent 18% of the funds, and plug-in hybrid electric participants spent 5%. Transit users, who did not own a car spent 38% of the funds in four months. The highest expenditure rate for Phase 2 is expected to be related to the availability of other modes of mobility, including EV charging.

Table 3. Total spent by Phase and vehicle type (rounded USD).

Participant Cohort	Plug-in Hybrid Electric	Battery Electric	Other / No vehicle	Total
Phase 1	\$ 3,300	\$ 12,400	N/A	\$ 15,700
Phase 2	\$ 2,700	\$ 2,100	\$ 35,600	\$ 40,400
Total	\$ 6,000	\$ 14,500	\$ 35,600	\$ 56,100

Source: Cal-ITP analysis with information from Dash Solutions and Valley CAN

Table 4. Share of spent funds by Phase and vehicle type.

Participant Cohort	Phase timeline	Plug-in Hybrid Electric	Battery Electric	Other / No vehicle	Total of funds spent by Phase
Phase 1	11 months	5%	34%		16%
Phase 2	4 months	6%	18%	38%	27%
Total		6%	30%	38%	23%

Source: Cal-ITP analysis with information from Dash Solutions and Valley CAN

The difference of average weekly spent between plug-in hybrid and battery electric drivers can also be seen in Table 5, where battery electric vehicle drivers spent between \$26 and \$41 dollars, compared to plug-in hybrid vehicle owners, who spent between \$19 and \$24 dollars. Also, participants with no vehicle access (and that relied on other mobility modes) reported a higher weekly average spent of \$67; the split of this spend is detailed in sections below.



Table 5. Average weekly expenditure (rounded USD) by Phase and vehicle type.

Participant Cohort	Plug-in Hybrid Electric	Battery Electric	Other / No vehicle
Phase 1	\$ 19	\$ 26	N/A
Phase 2	\$ 24	\$ 41	\$ 67

Source: Cal-ITP analysis with information from Dash Solutions and Valley CAN

What did we learn?

5. Charging ZEVs at Public Stations

With California’s focus on accelerating the transition from fossil fuel to electric vehicles has come the need to address widely perceived issues with public charging equipment. The ZEV Charging Card project presented an opportunity to collect real world experiences of using ZEV charging infrastructure, especially from the perspective of low income, underbanked and unbanked drivers.

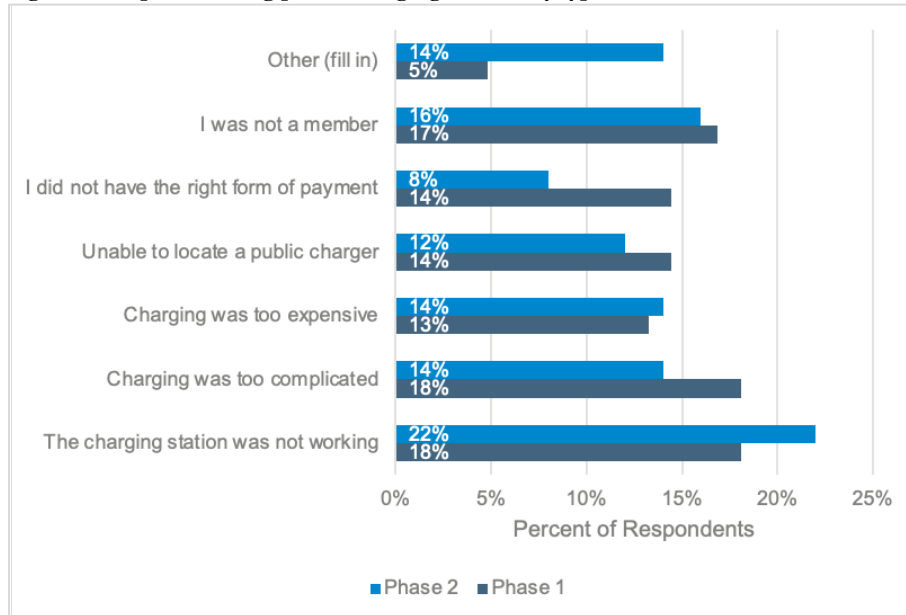
Figure 5. A ZEV Charge Card participant’s vehicle being charged at a public station.



To identify EV charging experience issues, the project demonstration implemented an issues log to track individual experiences paying for charging throughout the course of the project, while user surveys probed participants to provide feedback on the aspects summarized below.

At onboarding, participants with EVs were asked to note any barriers to using public charging as summarized below in Figure 6. The figure describes the percentage of respondents from each phase reporting a particular issue while charging at public stations. Across both cohorts, the top three issues experienced using public chargers were that the station was not working properly, the participant was not a member of the charging provider, and that charging was too complicated. On average, each issue category we included in our survey was reported by about 15% of respondents per cohort.

Figure 6. Responses citing public charging barriers by type of issue.



Source: Cal-ITP analysis with information from Valley CAN surveys

It is important to note that this is not an exhaustive list of issues and only represents reported situations from participants through contacting the Valley CAN team or summarizing in the offboarding surveys.

- **Charging payment experience**

- Phase 1 had 14 payment issues logged. Most participants encountered that their card was not accepted, or they were required to download an app. One customer contacted Valley CAN three times as their card continued to be declined. The issues were only resolved after the participant loaded the funds into a Chargehub account. Another participant showed no card usage, Valley CAN reached out and found this was due to the customer not knowing how to use the card to pay at the chargers.
- Phase 2 had 12 payment issues – only two were regarding public chargers the rest described issues loading ZEV funds to other transportation accounts (TAP, Uber, etc.) or with using the tap feature.
- More participants chose to pay for charging sessions through mobile phone applications over using the card at all by the end of the program, as compared in Figure X. Contactless taps only increased by 1%. Given that 17% of Phase 1 participants and 16% percent of those in Phase 2 experienced challenges paying for public charging since they were not a member of the provider’s network, the current state of public charging payment infrastructure may have inadvertently encouraged participants to switch from using their physical card to loading their credentials into mobile apps.

- **Charging infrastructure experience**

- Phase 1 only four charging issues were logged. Three issues described faulty equipment or unavailable charger. One participant wasn’t shown how to use the charger when they purchased the vehicle and needed support to use public chargers.
- Phase 2 – no charging issues



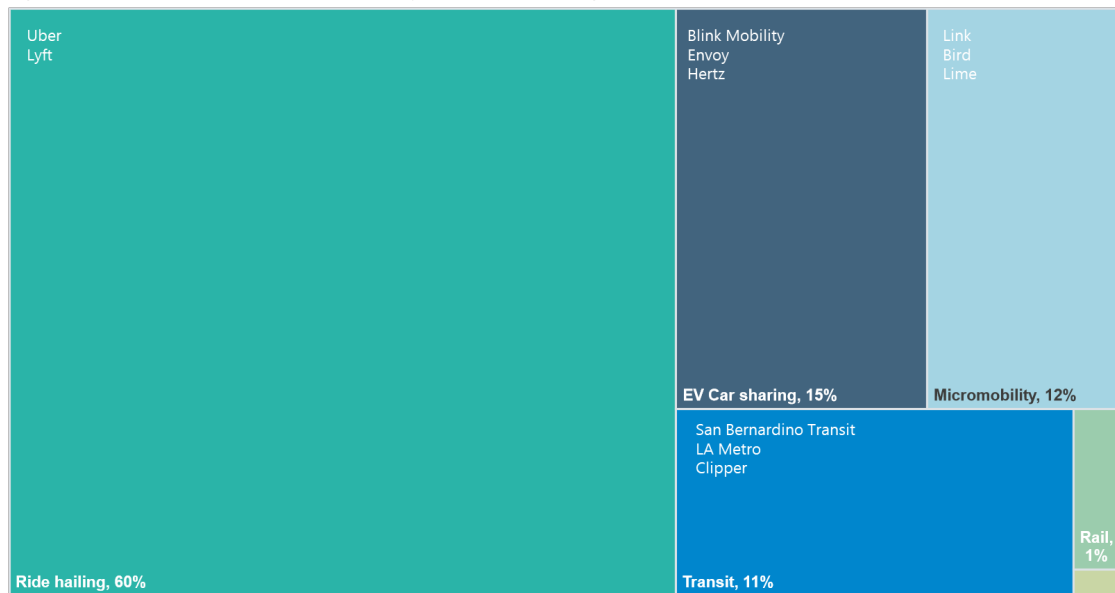
- **Other (e.g., geographic location of infrastructure, etc.)**
 - Significantly, 17 issues were logged describing difficulties in finding chargers nearby.
 - 28 issues described miscellaneous card issues including activation difficulty, card replacement, password support, and more.
 - Across the program, five participants reported that the ZEV card was not useful as they had plug-in hybrid electric vehicles and were struggling to find chargers at a distance that was worth driving to as the plug-in hybrid electric vehicles had low battery miles.
 - During the pilot, two people reported that their card information had been compromised – both cases were resolved, and participants retained access to funds.

What did we learn?

6. Using Funds for Other Modes of Travel

In Phase 2, 150 participants received ZEV Equity Charge Cards with expanded access allowing payments for other transportation modes in addition to public charging. While service varied depending on the participant’s location, these modes largely included public transit (rail, bus), rideshare, carshare, bike share, e-scooters, and more (please see Figure 7).

Figure 7. Share of Phase 2 expenditure by mode (Percentage share)



Source: Cal-ITP analysis with information from Dash Solutions

When comparing how participants used their funds across different modes of mobility, ride hailing had the largest proportion of spend (following EV-related purchases) with a total spend of around \$11,342, comprising around 60% of all dollars spent. In addition, EV car sharing made up 15% of all total transactions with a total spent of \$2,900. The higher share of these modes relates to the higher rates per trip required, compared to others.

However, in terms of transactions, micromobility had 328 transacted operations, the second highest number of the observed modes, same as carsharing, which reached 96 transactions (7% of total shares). This means that although participants relied more on carsharing, they also tried other modes related to micromobility and EV carsharing.

In terms of multimodality, 30% of Phase 2 participants used more than one mode during the project demonstration. On average, multimodal participants used around 2.5 modes with their ZEV Charging card.

30% of Phase 2 participants relied on more than one mode.
On average they tried 2.5 modes.



The use of carsharing as a mobility mode was higher by in participants who did not have access to a vehicle. This is expected, as carsharing provide an opportunity for participants and users to use sustainable modes at the time they needed.

Through an issues log and survey, Cal-ITP collected insights supporting the following insights:

- **Cards fostered familiarity with other modes of travel.** Eleven participants reported trying a new mode of transportation since receiving their card. All except for 2 participants reported trying more than one mode. Rideshare and bike share options proved to be most tried. At least two customers expressed interest in using card funds to purchase an electric bike and scooter, respectively, after trying shared modes.
- **Service and support were most often reported as barriers to trying new modes.** Six participants reported that they'd try other modes if services were closer or available at more convenient hours. Another four participants cited greater need for support through training on how to find, use, and pay for other modes. One participant also reported that accessibility was a barrier to try new modes as they had limited mobility for more active transportation options. Only two participants cited high cost as a barrier to trying new modes.
- **Paying for other modes was a challenge.** In total, nine participants found it difficult to pay for other modes. Payment acceptance varied per mode and ranged from apps and virtual cards to point-of-sale devices at kiosks and on-board vehicles. Participants relied on step-by-step support from Valley CAN and CBO partners to resolve these issues when possible. CBOs also reported that some monolingual participants struggled to receive adequate support at transit stops due to the language barrier and/or there were no available ambassadors to help. Ultimately, more work is needed to understand why the charge cards were not accepted in some instances by some vendors.
- **CBO feedback was paramount in deepening our understanding of our survey data.** Interviews with CBO partners reflected that while most participants had no problems using their cards for other modes, customer support was important for those who did. Further, one partner noted that sometimes transit was a participant's only transportation option. In fact, one participant is relying on the card to pay for transit to and from a new job.

What did we learn?



Recommendations:

7. Creating Effective Prepaid Card Programs

At the close of the program, Cal-ITP conducted post-project interviews internally with Valley CAN, and with the three CBOs to gather learnings on program design and administration as described below:

- **Card design and issuer selection:** While Valley CAN found that the market was an adequate size, with many players and products available, additional guidance was needed. The market, although robust, was difficult to navigate as “every stakeholder has a piece of information but not the whole picture.” Given this, a subject matter expert would have been helpful during stakeholder discussions.

Particularly, Valley CAN identified that a better defined and comprehensive list of product requirements ahead of formal stakeholder engagement would have been beneficial. Even after issuer selection, Valley CAN encountered an unexpected interruption when the selected issuer was acquired midway through the program which altered expectations on data collection, delivery, and customer experience.

- **Participant recruitment and customer support:** To summarize the recruitment experience, Valley CAN remarked that they “thought it would be much easier to give people \$1000.” All partners experienced challenges in recruitment. Cal-ITP found that challenges largely arose for two reasons – trust and economic tradeoffs.

Regarding trust, all partners expressed that participants were especially wary of scams. Participants were unsure of which communications channels and apps were trustworthy, and were reluctant to provide personal information (i.e., address). As a result, Valley CAN made two changes to recruitment during the course of the program. For EV-payments only recipients (Phase 1 and Phase 2), recruiting participants at the time they were purchasing an Electric Vehicle helped improve enrollment. For Phase 2, engagement with CBOs helped to identify and enroll more participants and spark interest in the target communities. The CBOs reported that in-person recruitment was especially effective in building trust and knowledge about the program when recruiting outside of EV purchasing.

Uptake was also slower than expected largely due to the economic trade-off of choosing a public charging incentive which is \$1,000 less than the Clean Cars 4 All home charging incentive. As a result, we recommend the following program changes:

- Rather than ask people to choose, offer everyone both the home charger benefit and the public charging benefit.
- Look to increase the public charging benefit from \$1,000 to \$2,000.
- Offer the benefit alongside vehicle trade-in incentives, not separately.

Customer service was repeatedly mentioned as being vital to troubleshooting. Valley CAN and CBOs have had to intensively engage with users to help them navigate the activation processes and issues when using the card. Programs should consider a mix of in-person and self-serve options for recipients and ensure that in-person support is sufficient across the communities being served. Pacoima Beautiful found that they had “to let [participants] know what [program communication] was to complete it and not dismiss it.” Card activation was also confusing and difficult for some new users because of language barriers and/or lack of familiarity with card activation processes. A total of 87 issues were officially logged. Of these, 22 were technical issues related to activation, password help, and card replacement. Data collected for these purposes should always be anonymous/aggregated to comply with privacy principles and policies, and where possible findings



shared across the public/non-profit sectors to support ongoing program improvements across California.

- **Administrative processes:** Valley CAN had access to a portal from the issuer to monitor and manage program tasks. Tasks like loading and reloading funds were completed manually, which works for a demo but is not easily scalable. Further, portal design and functionality changed several times, making an account manager from the issuer helpful for future programs.
- **Partnering with CBOs:** When considering the program at scale and in the future, CBOs felt they had an important role fostering trust to increase recruitment and in educating participants on the program. All three CBO partners expressed a need for a designated, paid personnel to manage outreach and education. Both Pacoima Beautiful and Redeemer noted that access to mobility options is highly variable by community, so the personal program impact varies. More mobility options are needed. Regardless of hurdles left to address and how administrators choose to measure program success, Latina Round Table remarked that “on the ground these programs work.”

We can conclude that programs like these are valuable and require in-depth scoping at the earliest stages of program development to create a seamless experience for administrators and program partners. Having clear program needs defined at the outset may facilitate adequate administrative processes for each program. Importantly, customer support required significant time investment but was key in recruitment and participant satisfaction. CBOs were vital to building trust in the program within the community and acted as resources for troubleshooting. Due to the positive impact of partnering with CBOs, program administrators must consider the support needs of partner organizations to create effect programs.

What did we learn?

- Presenting the demonstration as a separate program from the home charging benefit, where people would have to choose only one of them, deterred user participation.

8. Enabling Open Loop Expansion

The use of bank cards to distribute benefits proved to be an extremely useful tool for the ZEV charging project demonstration. Bank cards have the potential of supporting sustainable mobility programs through the use of Merchant Category Code (MCC) restricted products. These products unlock the possibility of a participant to use multiple brands of charging stations, compared to a card from a single company that restricts user's options. For example, participants in the ZEV Charging Card demonstration used more than 20 different brands of charging stations, confirming the need of an open loop solution.

More than 20 brands of charging stations were utilized by participants during the project demonstration, confirming the need of an open loop solution to address EV charging needs in lower income communities.

However, an analysis of transactions using customized expenditure reports from Dash Solutions, showed that not all merchants had properly registered Points of Sale (POS) terminals, showing a misalignment between the actual merchant and the type of business registered in the MCC network system. This could cause declined transactions from lower income participants, limiting the benefits reach, creating frustration, and limiting the program success.

The MCC analysis presented below was possible as the project relied on the use of unrestricted bank cards, which meant that the cards themselves could technically accept transactions for payments across all types of merchants. However, participants were told to only use the funds for EV charging or sustainable mobility. During the monitoring of the demonstration, card misuse was flagged to the participant. This flagging and notification process included a reminder of the purpose of the ZEV Charging Card as well as an explanation of a three-strike policy. Only one user was suspended for continuous card misuse.

The use of this data created an understanding across a variety of topics:

- How MCCs matched with each business name(s)
- If there was misuse of funds by participants during the demonstration.

8.1. Overall transactions

Table 6 presents a summary of transactions by type of transaction (if the MCC matches the use of the merchant), transaction number and amount. In this case, around 70% of transactions (by amount) were done through a POS that has the correct MCC. POS that had an inconsistent MCC were between 24% by amount.

The analysis also identified that around 6% of transactions by amount were done at a merchant that was not related to EV charging or mobility.



Table 6 - Transaction Analysis Total (both phases)

No.	Description	Transactions	Amount	Transaction (% share)	Amount (% share)
1	MCC match and correct use	441	\$ 26,733	65%	70%
2	MCC mismatch and correct use	181	\$ 9,212	27%	24%
3	Incorrect use	52	\$ 2,192	8%	6%
4	Unidentified MCC/transactions	6	\$ 138	1%	0%
	Total	680	\$ 38,275	100%	100%

Source: Cal-ITP analysis with information from Dash Solutions.

Note: The transaction analysis report uses a sample of the transactions carried out during the project demonstration. Total transaction figures might not match the total expenditures presented in Section 4.

8.2.EV transaction analysis

Moreover, the analysis linked the EV charging transactions to the MCCs below. Table 7 shows that, by amount, around 72% of transactions were registered with the MCC 5552, “Electric Vehicle Charging”. The next most used MCC is 7523 “Automobile Parking Lots and Garages”, as many charging stations are located in parking lots. The remaining 16% is distributed among different MCC that range from utilities to services not classified.

Table 7 - MCCs used for EV-Charging and share of total transactions and spent.

MC Code	MCC Description	Transactions (% share)	Amount (% share)
5552	Electric Vehicle Charging	62.1%	71.5%
7523	Automobile Parking Lots and Garages	26.0%	12.2%
6540	Non-Financial Institutions Stored value Card Purchase/load	1.4%	4.2%
7399	Business Services not elsewhere classified	1.4%	3.6%
4900	Utilities: Electric, Gas, Water, Sanitary	2.2%	3.8%
5542	Automated Fuel Dispenser	2.2%	2.2%
5045	Computers, Computer Peripheral Equipment, Software	1.9%	1.8%
5734	Computer Software Stores Record Shops (Debit only)	0.7%	0.4%
5541	Service Stations (with or without Ancillary Services)	1.4%	0.2%
7299	Other Services not elsewhere classified	0.7%	0.1%

Source: Cal-ITP analysis with information from Dash Solutions

8.3. Understanding the use of contactless

Table 8 highlights the total number of transactions and sum of settle amount for the different POS Entry types. Entry types are the different ways a card can be used to pay for a service, these options are:

- Electronic commerce – Used to buy services through internet.
- Credential on file – Card saved in an app or profile.
- Contact chip – Card chip physically used.
- Contactless – Card contactless physically used.
- Magnetic stripe – Card magnetic stripe physically used.
- Manual entry – Card number entered manually in a physical transaction.

The largest sum of transactions by settle amount comes from electronic commerce purchases, which accounts for 40% of the total sum of settle amounts. However, credential on file has an around 50% share of total transactions. This is explained by smaller trips done by either mobile or web micromobility applications. Moreover, contactless was used in around 16% of all transactions.

Table 8 - Transaction Analysis for POS Entry Types

POS Entry Type	# of Transactions	Total Settle Amount	Transaction (% share)	Amount (% share)
Electronic Commerce	571	\$ 12,804	26%	40%
Credential on File	1078	\$ 12,371	49%	38%
Contact Chip	147	\$ 3,298	7%	10%
Contactless	351	\$ 2,353	16%	7%
Magnetic Stripe	43	\$ 1,217	2%	4%
Manual Entry	3	\$ 106	0%	0%

Source: Cal-ITP analysis with information from Dash Solutions

What did we learn?

Open loop ecosystem

- Participants used more than 20 brands of charging stations during the project demonstration, confirming the need of an open loop solution to address EV charging needs in lower income communities.

Merchant Category Codes (MCC)

- Around 70% of transactions by amount were matched to their correct MCCs.
- EV charging transactions were lined to 10 different MCCs, creating the need for more harmonization.

Understanding the use of contactless

- Around 80% of transactions by amount were done through electronic commerce or credential on file, showcasing the high use of cards in the digital through mobile or web applications.
- Contactless had a 17% share by number of transactions, becoming the largest physical use of the card. This share is reduced to 7% if we compare by share of total amount.



9. Conclusions and Recommendations

9.1. Conclusions

As a project demonstration, the Universal ZEV Equity Charging Card made it possible to understand the impact of mobility subsidies for priority communities using bank cards. The demonstration provided numerous insights across many themes, which are summarized here:

Gaining experience with bank cards

- The project demonstration validated that prepaid cards worked as a tool for recipients to receive funds, and in some cases, helped build familiarity with bank cards.
- 74% of participant exit survey respondents agreed that the ZEV Charging Card helped them get familiar with contactless payments.
- Relying on Community Based Organizations and Valley CAN for recruitment and participant support was key for the success of the demonstration, especially for older adults, unbanked and monolingual non-English speakers.

Improving affordable access to clean mobility

- 87% of exit survey respondents with access to an EV reported that the ZEV Charging Card allowed them to drive the same or more as prior to the program.
- Battery electric vehicle participants relied more on their cards, compared to plug-in hybrid drivers, by spending 10% more funds on both phases.
- Non-ZEV owner participants in Phase 2 relied on the card to explore more mobility options. They spent on average \$67 a week, the highest rate of all participant groups.

Charging at EV public stations

User experience

- Stations not working was the biggest frustration to charging for participants.
- In general, participants viewed the process of charging at a public station as complicated.

Payment experience

- Around 14 participants who logged an issue perceived that their bank cards were not accepted at charging stations. The interface made participants believe that they needed to become members and/or download the company app, leading to confusion and frustration.

Using funds for other modes of travel

- 30% of Phase 2 participants tried more than one mode of travel. On average this group used 2.5 different modes during the project demonstration.
- Non-vehicle owners relied on ride hailing services the most (60% of transactions), followed by micromobility and carsharing (31% of transactions).
- Frequency and quality service was mentioned as a barrier to use more modes for participants.
- CBO support was crucial to help participants navigate their local mobility ecosystem.

Creating effective prepaid card programs

Issuer selection

- When selecting a card issuer, it was important to align the program requirements to the issuer's technical capabilities, including setting expectations across 1) customer experience/support, 2) data availability and operations (funds loading, and accounts management), and 3) card restrictions.



Recruiting and engaging with participants

- Recruiting vehicle owner participants at the vehicle trade-in stage increased participation substantially.
- Community engagement was crucial for recruitment and engaging with participants.

Program design around Zero Emission Vehicles

- Requiring recipients to choose between the public charging benefit and the home charging benefit deterred user participation.

Enabling Open Loop expansion

Open loop ecosystem

- Participants used more than 20 brands of charging stations during the project demonstration, confirming the need of an open loop solution to address EV charging needs in lower income communities.

Merchant Category Codes (MCC)

- Around 70% of transactions by amount were matched to their correct MCCs.
- EV charging transactions were linked to 10 different MCCs, creating the need for more harmonization.

Understanding the use of contactless

- Around 80% of transactions by amount were done through electronic commerce or credential on file, showcasing the high use of cards in the digital through mobile or web applications.
- Contactless had a 17% share by number of transactions, becoming the largest physical use of the card. This share is reduced to 7% if we compare by share of total amount.

9.2. Recommendations

Our findings from the Universal ZEV Equity Charging Card program have implications for market players across the ecosystem. We summarize our recommendations below:

General recommendations

Prepaid cards as tools to support benefit distribution.

- Continue supporting prepaid cards as part of the mediums to distribute benefits related to mobility and EV charging.
- Pursue further prepaid card demonstrations to test new functionalities, such as:
 - Multiple funding sources in one card
 - Validating Merchant Category Codes (MCC) restriction and comparing this to other ways of limiting spend
 - Multiple wallets for multiple purposes
- Supporting scale by creating a state-level procurement bench, ideally with products that have a path to real bank accounts and rewards programs.

Electric Vehicle Supply Equipment (EVSE) interventions

- CARB and Cal-ITP will continue work with the industry to understand multi-mobility Merchant Category Codes (MCC) for electric vehicle charging and guide with proper categorization. This is particularly important to ensure that future restricted programs don't preclude participants from using mobility options that may be mislabeled.



- Share user feedback on customer experience and pricing transparency concerns with EVSE from future pilots and programs.

Carry out an electric vehicle charging user experience and pricing survey with different companies to understand the user perspective on operating chargers.

Gaining experience with bank cards

- Continue supporting demonstrations that use bank cards as a medium to provide benefits.
- Explore the possibility of using financial products that can help participants become banked.
- Continue the engagement with Community Based Organizations (CBOs) when implementing these programs to reach vulnerable populations.
- Pursue further prepaid card demonstrations to test new functionalities, such as:
 - Multiple funding sources in one card
 - Validating Merchant Category Codes (MCC) restriction and comparing this to other ways of limiting spend
 - Multiple wallets for multiple purposes

Improving affordable access to clean mobility

- Continue the development of larger scale programs that provide benefits for lower income Zero Emission Vehicle drivers. Focus on battery electric vehicle owners.
- Work with partners like Uber/Lyft to create incentives for future program participants to choose EV/sustainable mobility options through their apps.
- Work with other government organizations to identify the efforts related to transitioning ride sharing services to EVs and link to the program.

Charging at EV public stations

- Cal-ITP and other government organizations should continue working with the EV charging ecosystem to improve the user and payment experience of their users. Potentially, through carrying out an electric vehicle charging user experience and pricing survey to understand the user perspective on operating chargers.

Using funds for other modes of travel

- Allow for the use of other mobility modes, additional to EV charging, through Merchant Category Code-restricted bank cards.

Creating effective prepaid card programs

Issuer selection

- Create a state-level card issuer bench that allows for government organizations to choose vetted suppliers for their programs.
- Have at state level an issuer expert that supports and guides government organizations on designing the card-related components of the program.
- Promote the Cal-ITP Prepaid Card Requirements guidance for program funders and administrators.

Recruiting and engaging with participants

- Design the recruitment process to be inserted into already existing processes (for example, during vehicle trade-in, or when paying an electricity bill, among others), to incentivize enrollment.
- Work with CBOs to continue engaging with communities they serve.

Program design around Zero Emission Vehicles



- Design programs to be complementary and not substitutes between each other. This will retain participants.
 - One example is to offer a Multimobility Charge Card together with the home charging program. Both incentives serve different purposes for the user, promoting sustainable mobility options.

Enabling Open Loop expansion

- Continue using bank cards as the underpinning tool to distribute EV charging and multimobility benefits, as it allows the use of multiple platforms and brands across the ecosystems.
- Continue working with the payments ecosystem on aligning the use of Merchant Category Codes (MCC) for EV charging.



10. Acknowledgement

The success of this project was made possible by cross-agency collaboration between many partners:

- We thank Valley CAN for their leadership in this space, and for inviting Cal-ITP to collaborate in bringing this demonstration to life. Particularly, Valley CAN's customer service team, who gathered lots of important data and maintained a personal touch with participants, made a positive impact on the participant experience.
- We thank Go-Biz, CARB and the San Joaquin Valley Air District for their funding and their engagement throughout the project. We also thank Dash Solutions for working together to launch and support the card throughout the project, and Mastercard for their guidance on card issuance.
- Finally, community organizations were key, not just in recruitment, but in participant education and beyond. For their hard work and insights, we thank Pacoima Beautiful, Redeemer Community Partnership, and Latino/Latina Roundtable, as well as emPOWER.

We look forward to continuing this important work, hopefully in partnership with many of you in the years to come.

For organizations interested in working with us or learning more about how Cal-ITP is making travel simpler and more accessible, please visit <https://www.calitp.org/> or reach out to us at hello@calitp.org.



Appendices

A) EV Charging Merchants by MCC code

The transaction data gathered showed the MCC codes used, as follows:

Merchant category code	Merchant name
5552 Electric Vehicle Charging	[Redacted]
7523 Automobile Parking Lots and Garages	[Redacted]
6540 Non-Financial Institutions Stored value Card Purchase/load	[Redacted]
7399 Business Services not elsewhere classified	[Redacted]
4900 Utilities: Electric, Gas, Water, Sanitary	[Redacted]
5542 Automated Fuel Dispenser	[Redacted]
5045 Computers, Computer Peripheral Equipment, Software	[Redacted]
5734 Computer Software Stores Record Shops (Debit only)	[Redacted]
5541 Service Stations (with or without Ancillary Services)	[Redacted]
7299 Other Services not elsewhere classified	[Redacted]

B) ZEV Equity

Through the project, a working definition of ZEV equity has been developed, which looks at access and affordability of zero emission vehicles across a number of parameters, as shown in the figure below. The intent of developing this draft was to give guidance to policymakers on important factors to investigate when evaluating the impact of government interventions. We hope that as a tool it proves valuable.

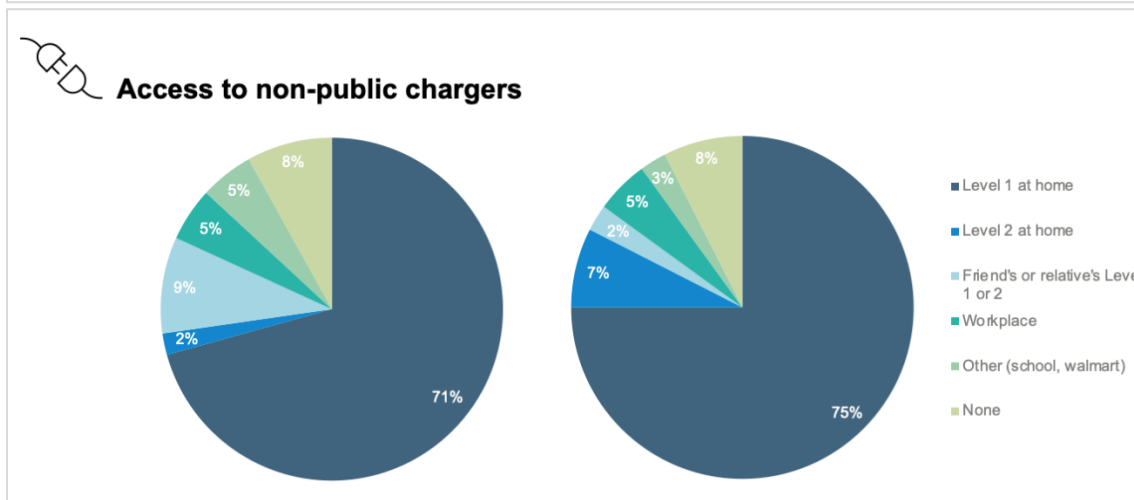
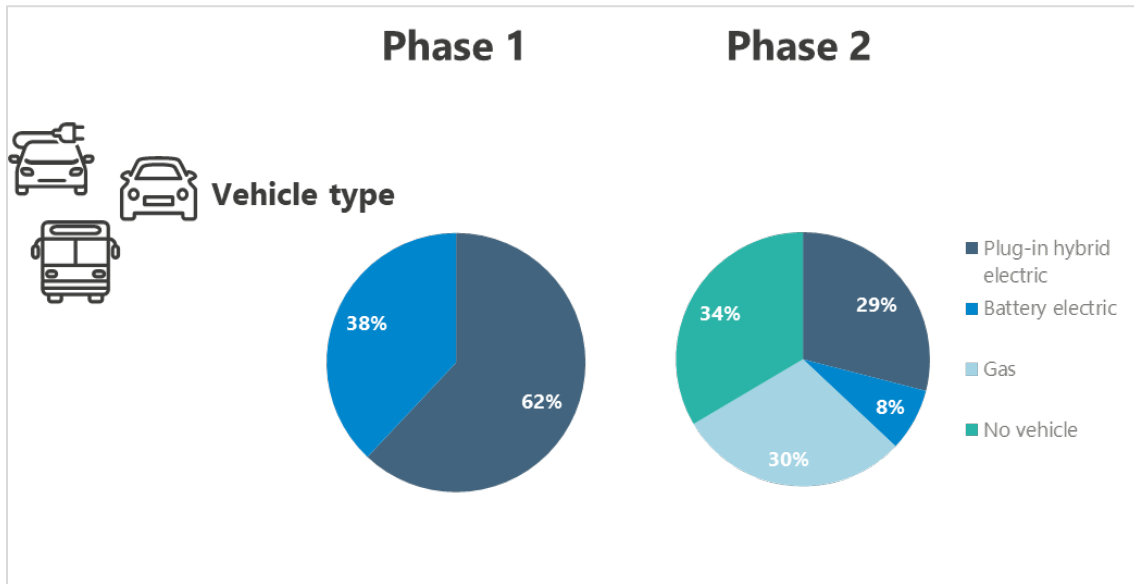
	Access	Affordability
ZEV vehicles	<p>Can I buy, lease, or share a car?</p> <ul style="list-style-type: none"> • Are there enough cars on the market when I'm ready to buy or lease? • Are ZEV car shares in my community? • Are they in locations close to me? 	<p>Can I afford the car?</p> <ul style="list-style-type: none"> • Do I have enough money for an upfront payment? • How about ongoing loan / lease / membership payments? • What about maintenance costs?
ZEV charging / filling infrastructure	<p>Does the charging infrastructure work for me?</p> <ul style="list-style-type: none"> • Is it in locations convenient to my home, work, and other key travel locations? Can I find these easily? • Are there enough chargers? Do I have to wait? • Is the infrastructure working? • Are there safety or other issues I worry about when spending time charging? • Do chargers accept payment methods I can easily use? 	<p>Can I afford to charge it?</p> <ul style="list-style-type: none"> • Do I need to purchase home charging equipment? • How do I pay for home energy costs? • How much does public charging cost? • Can I reliably find and understand pricing information before I go to a charger to budget accordingly? • How do I budget for fluctuating costs? • Is it easy to compare the cost at different chargers to make sure I don't overpay?
Financial inclusion	<p>Does the financial system work for me?</p> <ul style="list-style-type: none"> • Do I have a bank account with a payment card? • Will my lack of (good) credit prevent me from getting a vehicle loan / lease? 	<p>How much do my financial services cost me?</p> <ul style="list-style-type: none"> • Does my bank account charge me fees to withdraw cash, pay rent, go into overdraft, or other penalties? • Do the loans I am offered come with exorbitant interest rates?

I wish I could trade in my gas guzzler for a cheaper, cleaner car

I regularly have to choose between food and transportation

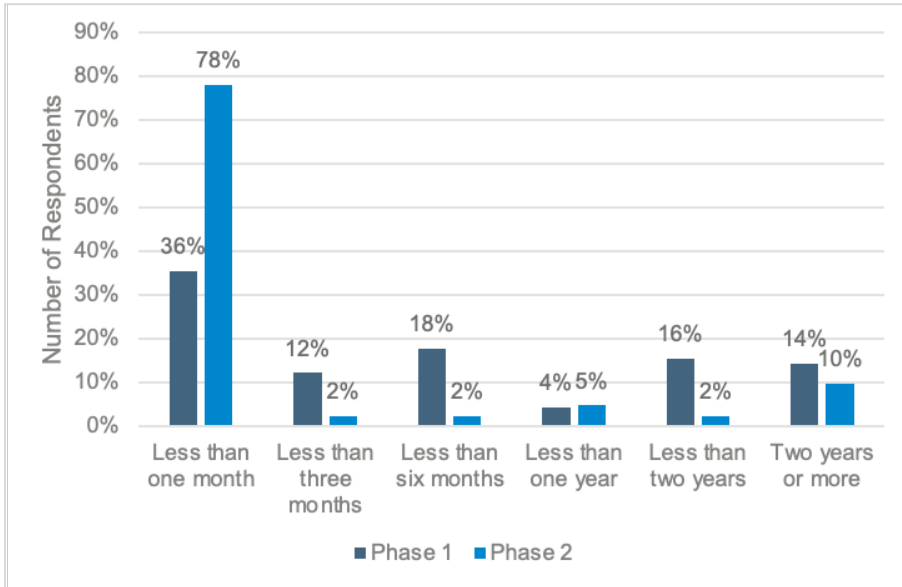
C) EV Driver Habits

We describe key driving, charging, and access trends for all participants below.

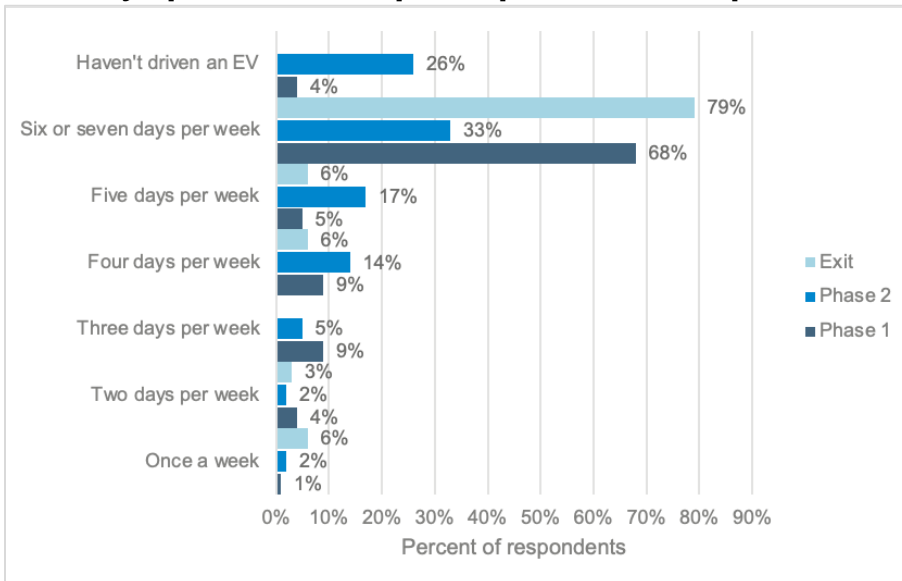




Number of years participant has driven an EV



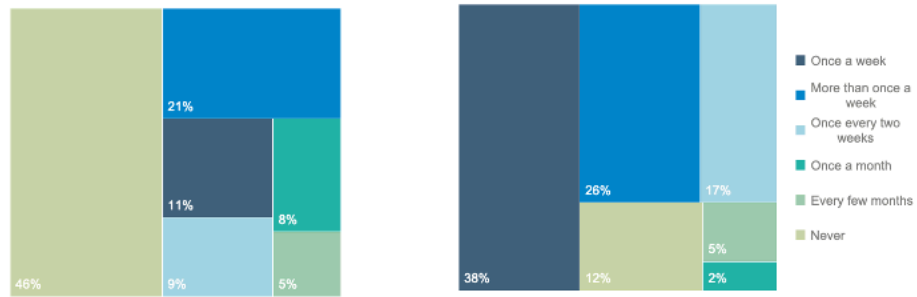
Days per week that participant makes trips with an EV



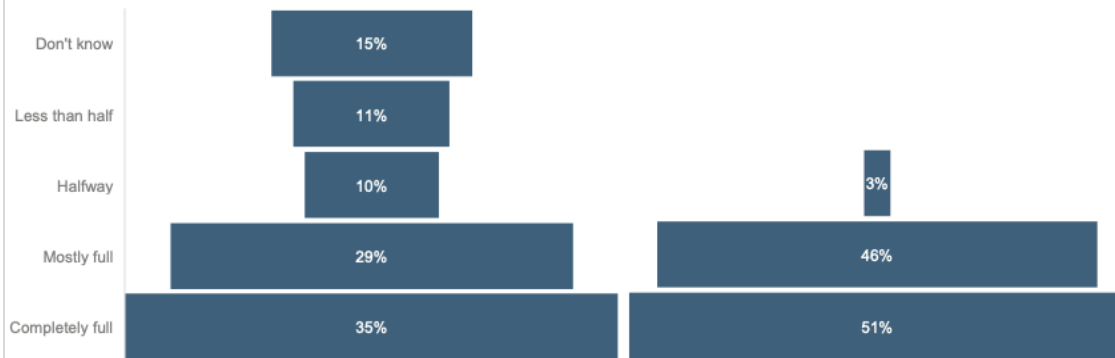
Phase 1

Phase 2

Frequency that participant uses public chargers



Level to which participant charges to at public chargers





D) Mobility transactions by MCC summary

This Appendix presents the different transactions by Merchant Category Code (MCC) and the share by amount and transaction. The analysis also provides examples of merchants used by MCC category.

Table 9 - Carsharing Transactions

MCC	MCC Description	Amount	Amount (% share)	Transactions	Transaction (% share)	Merchant Examples
4121	Taxicabs / Limousines	\$ 12,464	32.6%	228	33.5%	Uber
5817	Digital Goods - Applications (Excluding Games)	\$ 1,977	5.2%	16	2.4%	Envoy Car Share
7512	Car Rental Agencies not elsewhere classified.	\$ 541	1.4%	3	0.4%	Blink Mobility
3357	Hertz Corporation	\$ 398	1.0%	2	0.3%	Hertz Corporation

Source: Cal-ITP analysis with information from Dash Solutions

Table 10 - E-Scooter Transactions

MCC	MCC Description	Amount	Amount (% share)	Transactions	Transaction (% share)	Merchant Examples
7999	Recreation Services not elsewhere classified	\$ 681	1.8%	22	3.2%	Bird
5571	Motorcycle shops and Dealers	\$ 970	2.5%	15	2.2%	Link Scooters

Source: Cal-ITP analysis with information from Dash Solutions

Table 11 - Bike Sharing Transactions

MCC	MCC Description	Amount	Amount (% share)	Transactions	Transaction (% share)	Merchant Examples
7999	Recreation Services not elsewhere classified	\$ 677	1.8%	18	2.7%	Uber Lime
5940	Bicycle Shops: Sales and Service	\$ 10	0.3%	1	0.2%	Vevo Ride

Source: Cal-ITP analysis with information from Dash Solutions