# San Diego Regional ZEV Strategy Appendix

September 2023

# Table of Contents

# Tables

# Figures

# A Basics of Transportation Electrification

Understanding zero emission vehicle (ZEV) technology and associated zero emission (ZE) infrastructure is key in aiding in proper technology selection, site planning, and effective policy decisions. A lack of knowledge and understanding of this technology is often cited as a key barrier for many communities in adoption. This section provides a brief overview of different types of ZEV technology, including their varying costs and power levels, to serve as a resource of background information.

## A.1 Vehicle Types

ZEVs are vehicles that run on fuels other than gasoline and include a variety of low- to no-emission technologies including battery electric vehicles (BEVs), plug-in hybrid vehicles (PHEVs), and hydrogen fuel cell electric vehicles (FCEVs).

BEVs are entirely powered by electricity stored in the vehicle's battery; whereas PHEVs are powered primarily by an onboard battery but can utilize a backup internal combustion engine (ICE) fueled by gasoline, if needed. Conventional hybrid cars differ from PHEVs in that the battery only provides sufficient power to drive at slower speeds (residential areas and cities), and mostly makes use of the ICE. Thus, PHEVs have a better range and are widely available, but require gas as well which means they can produce emissions, unlike BEVs.

BEV and PHEV models are typically priced pretty similarly while FCEVs are currently considerably more expensive and less widely available. However, FCEVs are a promising emerging technology that produce zero emissions with a longer range than pure battery options. The long range of FECVs in addition to a quick refueling time make them more suitable for medium-duty and heavy-duty (MDHD) applications. FCEVs run on compressed hydrogen gas; they produce their own electricity through a fuel cell powered by hydrogen and use that electricity combined with battery storage to power the motor. A comparison of each of the aforementioned vehicle types is presented in Table 1 for a comparison of key traits.

*Table 1 ZEV Vehicle Comparison*

| Trait | BEV | PHEV | FCEV[12] |
|---|---|---|---|
| **Vehicle Type** | • Most commonly sedans, but also includes SUVs and buses (more limited model availability for larger vehicle types)<br>• Includes light- and medium-duty vehicles | • Primarily sedans and SUVs. More models available than BEVs<br>• Typically light-duty vehicles | • Sedans, compact SUVs, buses<br>• Includes light-, medium-, and heavy-duty vehicles |
| **Fuel Source** | Battery 42-129 kWh | Gasoline, battery 15-27 kWh | Compressed hydrogen, two batteries typically 70 kWh each |
| **Range** | 100-400 miles[3] | 10-50 miles on electricity, additional 300 miles on gasoline[4] | 300-400 miles |
| **Efficiency** | 67-133 mi/GGE | 45 mi/gal | 60 mi/GGE |

## A.2 ZE Infrastructure

There are many methods to charge and refuel ZEVs that depend on power output, connector type, and car capability. The charger type directly impacts the time it takes to charge, the cost, and grid impact. There are three charger power levels as well as hydrogen fuel for FCEVs.

*Level 1 chargers* have the lowest power output at 120-volts, so they have the longest charging time. These chargers can be plugged into a standard outlet and are common for home charging. Level 1 chargers can get up to five miles of range per hour plugged in, which is expected to be sufficient for the standard San Diego commute of 25 miles from overnight charging.[5] It should be noted that this commute does not account for rural commuters, who often travel much longer distances.

*Level 2 chargers* use 240-volt outlets which reduces the charging time of a Level 1 charger considerably, providing a range of 26 miles per hour plugged in. These chargers can be installed in homes/residential areas as they use the same outlets typically used by refrigerators or air conditioners, but they are typically found in charging stations at public locations such as office buildings.

*Level 3 chargers,* or Direct Current Fast Charging (DCFC), require 480-volt outlets that can supercharge ZEVs. They provide about 50 miles for every 15 minutes of charging. Their increased power requires commercial power levels that can commonly be found in public charging stations at shopping malls or along major travel corridors.[6]

FCEVs can run on hydrogen, a renewable resource with no connection to the grid. Fuel cell vehicles can refuel a tank in under five minutes and run about 300 miles before running out of fuel. As an emerging technology, it is not as prevalent as other forms of refueling. San Diego currently has one hydrogen fuel station, but more are being built in the region.

Table 2 summarizes the recharge time, cost to charge, and impact to grid for each refueling/charger type. The cost to charge can be highly variable and presented information is based on average costs recorded by the California Air Resources Board (CARB) in California in 2022. It should be noted that as these technologies continue to gain traction, recharge times are expected to decrease for a faster refueling experience.

*Table 2 Charger Metrics Summary*

| Charger Type | Recharge Time | Cost to Charge[7] | Impact to Grid[8] |
|---|---|---|---|
| Level 1 | 8 hours | $0.18/kWh | Low- 120 VAC, 12-16 A |
| Level 2 | 0.5-8 hours | $0.30/kWh | Medium- 208/240 VAC, 80 A |
| DCFC | 20 minutes | $0.40/kWh | High- 200-5—VDC, up to 350 A |
| Hydrogen Station | 3-5 minutes | $0.39/kWh[9] | None |

# B Core Principles and Implementation Goals

## B.1 Core Principles

The five Core Principles as listed in the California ZEV Market Development Strategy are:

1. Equity in every decision
2. Embrace all ZEV pathways
3. Collective problem solving
4. Public complements private
5. Design for resilience & adaptation

The aforementioned core principles are used in all ZEV planning projects within California to achieve the goal of large-scale equitable market development (as shown in Figure 1). It was determined that the Accelerate to Zero Emissions (A2Z) effort would use the same core principles to ensure alignment with broader regional initiatives.

*Figure 1 ZEV Market Development Strategy*[10]

## B.2 Implementation Goals

Implementation Goals are the objectives established as part of the Strategy development process to guide decisions and shape future Strategies. The following Goals have been established for the A2Z Collaboration:

1. Reduce vehicle emissions
2. Support education and collaboration
3. Reduce barriers to ZEV Adoption
4. Provide equitable access to ZEV infrastructure
5. Encourage partnerships and attract investments
6. Innovate utility operations and service
7. Enhance grid resiliency
8. Promote workforce development
9. Anticipate future growth and innovation
10. Evaluation Criteria for Initial Strategies

*Table* 3 *shows the eight evaluation criteria used to rank the Initial Strategies, including a description and the qualitative and/or quantitative assessments for each of the score from 0 (negative impact) to 4 (greatest/direct benefit).*

*Table 3 Evaluation Criteria and Scoring Matrix*

| Evaluation Criteria | Description | Qual vs Quant | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|
| **ZEV Adoption** | This criteria is evaluated both qualitatively and quantitatively based on the specific strategy and modeling data available. Modeling outputs from the Uptake Tool include the number of ZEVs adopted per dollar spent, but where a specific strategy was not modeled, a qualitative assessment is utilized. | Quantitative | Provides decrease in vehicle adoption compared to baseline | Provides no increase in vehicle adoption compared to baseline | Provides up to 0.5% increase in vehicle adoption compared to baseline | Provides between 0.5% and 3% increase in vehicle adoption compared to baseline | Provides greater than 3% increase in vehicle adoption compared to baseline |
| | | Qualitative | Negative impact on ZEV adoption | Negligible on ZEV adoption | Minor impact on ZEV adoption | Moderate impact on ZEV adoption | Significant impact on ZEV adoption |
| **Implementation Difficulty** | This criteria includes factors such as the number of stakeholders/orga | Qualitative | Prohibitively difficult to implement due to | Difficult to implement due to coordination | Hard to implement due to coordination | Medium difficulty and some coordina | Easy/Minimal Effort to implement with minimal |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | nizations to coordinate with, if cross-functional cooperation is required, extent of approvals (internal/external) required, political and/or bureaucratic hurdles anticipated, etc. | | coordination with stakeholders | with many stakeholders | with multiple stakeholders | tion required | coordination required |
| **Greenhouse Gas (GHG)/Air Quality (AQ) Benefits** | This criteria is evaluated based on the strategy's ability to provide air quality benefits and/or GHG reductions. There is an inherent link to the ZEV Adoption criteria but this criteria evaluates more direct AQ/GHG benefits or impact. | Qualitative | Negative impact/Increase in emissions | Negligible impact on emissions/AQ | Indirect or minor benefit on emissions/AQ | Direct moderate benefit on emissions/AQ | Direct large benefit (emissions reductions/improved AQ) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Support for and Engagement of CoCs** | This criteria is evaluated based on if the strategy supports, engages with, provides direct benefits to, or otherwise improves Communities of Concern (CoCs) | Qualitative | Negatively impacts CoCs | No support/engagement of CoCs | Some/minor benefits to CoCs | Strong benefits to CoCs | Targeted strong benefits specifically for CoCs |
| **Timeline for Deployment** | This criteria is related to how long it will take to enact the proposed strategy, including any planning, procurement, development, etc. before the public can begin seeing the benefits | Qualitative / Quantitative | Unknown timeline due to unavailable technology in coming future | Long-term planning required (5+ years for deployment) | Mid-term until benefits (2-5 years) | Near-term benefits (6 months to 2 years) | Immediate action/benefit (within 6 months months) |
| **Capital & Operating Costs** | This criteria is evaluated based on the total upfront costs and ongoing costs required to | Qualitative / Quantitative | Prohibitively expensive | Expensive but implementable (estimated $5M+) | Moderate cost to implement (estimated up to $1-5M) | Small cost to implement (estimated under $1M) | Negligible costs to implement |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | implement the strategy. | | | | | | |
| **Availability of Funding** | This criteria is evaluated based on if funding is readily available for implementation of the strategy or if funding needs to be identified through potential grants or other funding sources. | Qualitative | No funding available | Funding available but difficult to obtain | Moderate funding needed but not yet obtained/identified | Some funding required, but already funded or easily identified/ appropriated | No funding required |
| **Economic/Workforce Impact** | This criteria is evaluated based on the strategy's potential to create economic opportunities, such as job creation. It also takes into consideration existing workforce needs to operate and maintain charging | Qualitative | Removes jobs and/or economic opportunities | Does not create or remove any jobs or economic opportunities | Creates minimal to negligible jobs and economic opportunities | Creates moderate number of jobs and economic opportunities | Creates many jobs and economic opportunities |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | infrastructure. Strategies receive a boost if economic/workforce beneficial impact is in CoCs. | | | | | | |

*Note: Air Quality (AQ), Communities of Concern (COCs), Greenhouse Gas (GHG), Zero Emission Vehicle (ZEV)*

Table 4*Table* presents the final weighting of the evaluation criteria as determined through discussions with the Core Team and Steering Committee. Weighting was based on overarching goals of the A2Z collaborative, potential for impact/success within the broader region, and ability to address multiple evaluation criteria within an initiative.

*Table 4 Weighting for Evaluation Criteria*

| Evaluation Criteria | Weighting |
|---|---|
| ZEV Adoption | 18% |
| Implementation Difficulty | 15% |
| GHG/Air Quality Benefits | 14% |
| Support for and Engagement of CoCs | 18% |
| Timeline for Deployment | 12% |
| Capital & Operating Costs | 7% |
| Availability of Funding | 5% |
| Economic/Workforce Impact | 11% |

*Note: Communities of Concern (COCs), Zero Emission Vehicle (ZEV)*

# C Policy, Regulatory, Market, and Industry Environment Review

The initial step of the Existing Conditions Review and Analysis included a review of the current policy and regulatory environment impacting EV's to identify key changes since the publication of the A2Z Gap Analysis in 2021. Changes in policy and regulation were factored into the Strategy development process where they impact on the gap(s) and/or strategies.

## C.1 A2Z Gap Analysis Peer Review

The San Diego Regional Electric Vehicle Gap Analysis (A2Z Gap Analysis), published in July 2021, was peer reviewed as a part of this effort to identify key assumptions and methodology regarding the modeling and/or the gaps and strategies identified in the report to be addressed and/or updated within the ten Strategy.

The key gaps to achieving A2Z's transportation electrification targets identified in the A2Z Gap Analysis were found to be:

- Vehicles
  - High-cost premiums of ZEV ownership,
  - ZE vehicle class unavailability,
  - Insufficient secondary market for ZEVs to mitigate high initial capital costs of purchasing vehicles,
  - Lack of incentives
- Infrastructure
  - Insufficient infrastructure policies to support ZEV transition,
  - Need for greater infrastructure access and availability,
  - Inconsistent permitting processes across jurisdictions,
  - Site constraints for infrastructure implementation,
  - Technology uncertainty with regards to faster charging solutions, wireless charging, or battery capacity
- End-user
  - Overlapping education and outreach campaigns,
  - Absence of regional coordination for ZEV activities,
  - Disaggregated information on vehicle and charger availability, incentives, and other factors for vehicle purchase decisions,
  - Car dealerships and frontline sales individuals' inability to speak to ZEV technology and benefits,
  - Lack of property owner expertise and awareness to plan and install charging infrastructure,
  - Granular vehicle data required for infrastructure planning,
  - Demand for local government pilot programs,
- Workforce
  - Training needed for MDHD truck drivers, and

- Maintenance workers need to know how to fix issues with ZEVs.

Risks and issues identified by the Project Team were classified as either impacting the existing gap, such as a more stringent target or delay in assumed activities in the analysis, or impacting the strategies to address the gaps, including the new findings from the review of best practice regional and national strategies. A summary of the risks and issues and associated potential impacts on the A2Z Gap Analysis and strategy development moving forward is provided in this section.

The San Diego Regional Electric Vehicle Gap Analysis was peer reviewed to identify key differences in assumptions related to the gaps, strategies, and modeling approaches.

A key finding from the analysis was that there may be a higher ZEV public charging infrastructure gap than originally anticipated, due to the initially assumed linear relationship between vehicle uptake and charging needs. Modeling undertaken as part of this effort demonstrated that infrastructure must be distributed across many sites to meet all driver's needs, which can result in needing a higher initial ratio of chargers to drivers, rather than a constant, linear relationship. Over time, the ratio of chargers to drivers may fall once site distribution is achieved, and utilization rates increase. Region-wide distribution is key to achieving equitable and accessible distribution of ZEV charging infrastructure.

The other key finding of the modeling undertaken was that the forecast rate of plug-in electric vehicle (PEV) and FCEV adoption may be too high in the near term and too low in the medium-term, due to the assumed linear uptake rates of PEVs and FCEVs, and the assumed constant percentage of PEVs used to forecast FCEVs. It has been found that an accelerating uptake rate (consistent with an 's-curve' adoption profile) is more likely in the medium term, which slows over time.

The key risks identified during this effort and the potential impacts on the key gaps and Strategies that were addressed are summarized in Table 5. The column on the left shows screen captures and quotes from the original A2Z Gap Analysis with the section headers displayed (e.g., if titled "Appendix", then it was the Appendix in the A2Z Gap Analysis). The right shows results of the A2Z Gap Analysis review.

*Table 5 A2Z Gap Analysis Review*

<table>
<tr><th>Gap Analysis Statement</th><th>Potential Risk or Issue for Strategy</th></tr>
<tr><td colspan="2">Appendix – Methodology</td></tr>
<tr><td>Table 6: Gap Assessment End Use Summary, pg. 36<br>
<table>
<tr><th>Vehicle Adoption Model</th><th>Year</th><th>Vehicle Adoption Model Percentage</th><th>Communities of Concern</th><th>Type</th></tr>
<tr><td rowspan="9">Light-Duty</td><td>2020</td><td>39.07%</td><td rowspan="3">N/A</td><td rowspan="3">Multi-family – Not Including Communities of Concern</td></tr>
<tr><td>2025</td><td>40.82%</td></tr>
<tr><td>2030</td><td>42.43%</td></tr>
<tr><td>2020</td><td>39.07%</td><td rowspan="3">43.30%</td><td rowspan="3">Multi-family – Communities of Concern</td></tr>
<tr><td>2025</td><td>40.82%</td></tr>
<tr><td>2030</td><td>42.43%</td></tr>
<tr><td>N/A</td><td>N/A</td><td>43.30%</td><td>Communities of Concern – Single Family</td></tr>
<tr><td>N/A</td><td>14%</td><td>N/A</td><td>Workplace</td></tr>
<tr><td>N/A</td><td>1.19%</td><td>N/A</td><td>Light-Duty Fleet</td></tr>
</table></td><td>Vehicle Adoption Model Percentage (All): It is unclear whether adoption percentages are sales or rolling stock. The 2020 adoption is likely too high for stock so it would be assumed that the percentage is sales, and therefore expected that sales would trend proportionally to the mandate of 100% ZEVs by 2035.<br><br>Vehicle Adoption Model Percentage (2030): Assuming ZEVs become cheaper than ICEs to buy. This has been observed in Norway, one of the only countries to decrease costs of ZEVs, which subsequently increased ZEV Adoption. In this case, percentages of ZEV adoption could be significantly higher, approaching 70-80%.<br><br>Vehicle Adoption Model Percentage (CoCs): It is expected that much lower uptake relative</td></tr>
</table>

| | |
|---|---|
| | to the rest of the community will be observed due to income effect. [11] |
| | **Vehicle Adoption Model Percentage (Light - Duty Fleet):** Fleets would be expected to convert relatively quickly, once economic, therefore a 1.19% adoption rate is a low estimate in the Project Team's view. It's unclear where the fleet data is sourced from. |

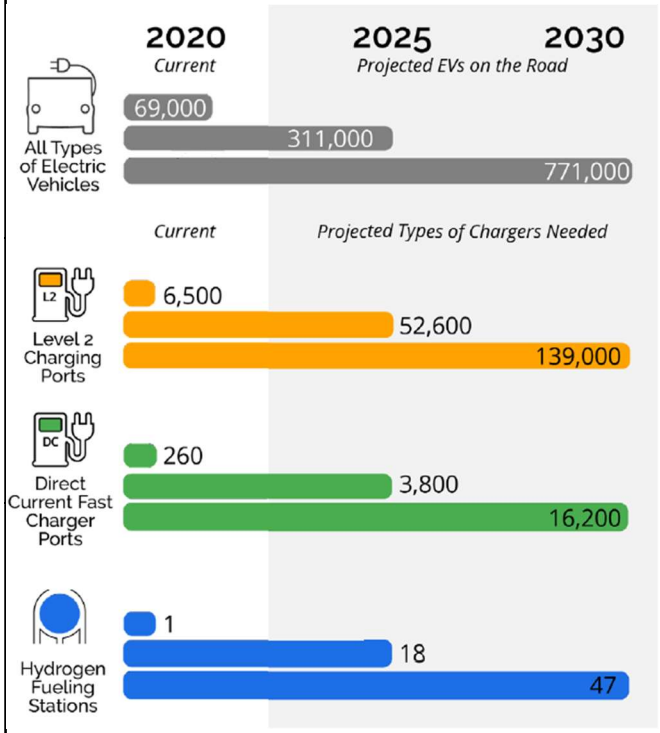
| Gap Analysis Statement | Potential Risk or Issue for Strategy |
|---|---|
| **Appendix - EV Infrastructure Gap Analysis** | |
| Pg. 35<br><br>"The A2Z Collaboration Regional EV Gap Analysis used the electric vehicle infrastructure projection tool (EVI-Pro) and a BV developed end-use charging model to determine needs for charging infrastructure. Assembly Bill (AB) 212719 used an updated version of EVI-Pro and other developed models depending on the vehicle application studied. These models are compared below to illustrate the different applications included in the analyses." | This table is separated by locations for public charging, but not differentiated based on the types of charging needed per driver segment. It will be important to clarify the type of charger needed by each driver segment to address this gap and effectively plan infrastructure installations. |

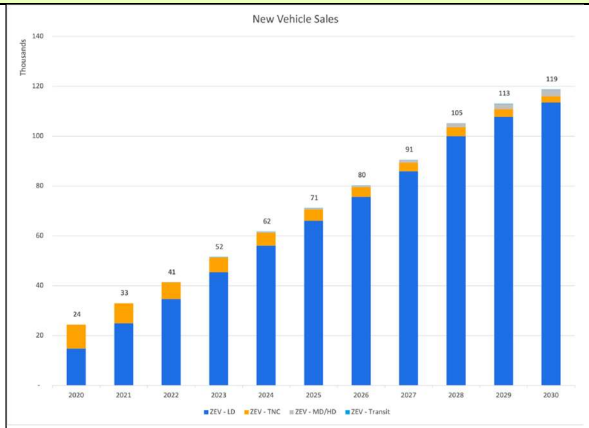
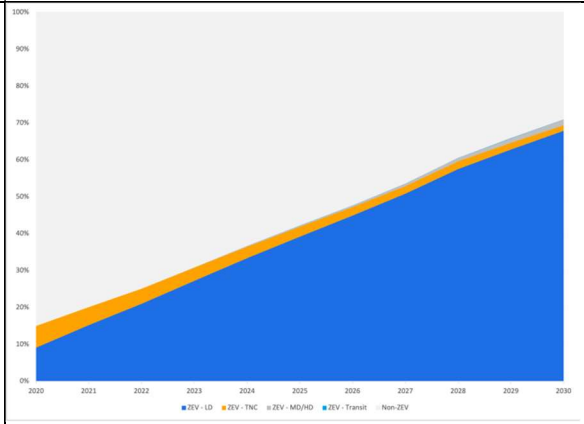
| Application | A2Z Collaboration Regional Gap Analysis | AB 2127 |
|---|---|---|
| **Light-Duty (<100 miles)** | EVI-Pro | EVI-Pro 2 |
| **Light-Duty (>100 miles)** | Not Applicable | EVI-Road Trip |
| **Light-Duty (Multi-family)** | End-use Charging Model | EVI-Pro 2 |
| **Light-Duty (Multi-family CoC)** | End-use Charging Model | Not Available |
| **Workplace** | EVI-Pro | EVI-Pro 2 |
| **Light-Duty Fleet** | End-use Charging Model | Not Available |
| **TNC** | End-use Charging Model | WIRED |
| **Commercial Transit** | End-use Charging Model | Not Available |
| **Good Movement (Freight)** | End-use Charging Model | HEVI-LOAD |
| **School Bus** | End-use Charging Model | Not Available |

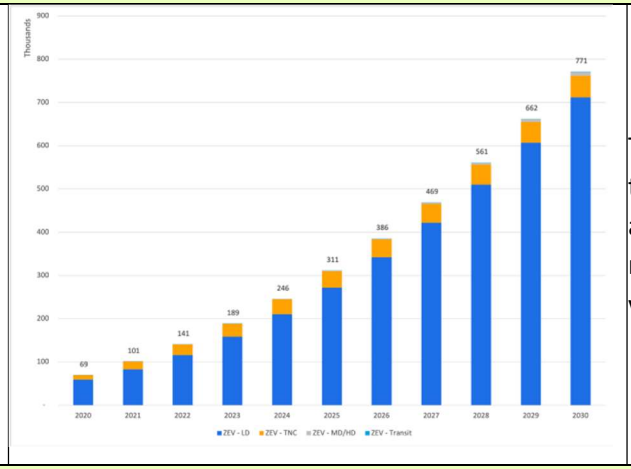
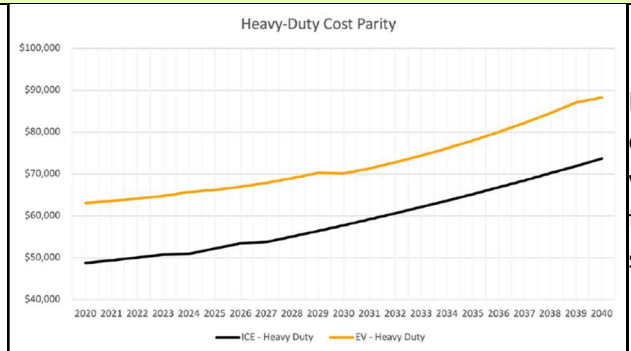
| Gap Analysis Statement | Potential Risk or Issue for Strategy |
|---|---|
| **Appendix - Assumptions** | |
| Pg. 35<br><br>"The assumptions used for light-duty applications in the A2Z Collaboration Regional EV Gap Analysis and AB 2127 assessment are captured below." | **Electric / Hydrogen Fuel Cell Electric Split:**<br><br>The electric/hydrogen fuel cell electric split should be broken out by segment, as FCEVs are more likely in goods transport, etc. to address gap in targeting of PEVs. |
| | **Within Electric, Hybrid / Battery Split:**<br><br>The Project Team's research and modeling experience suggests that hybrids become extinct as range and charging issues are eliminated, the Strategy should test this against the latest data in the public domain to address this gap. Doesn't impact access network but does impact range network, and grid impacts. |
| | **Charging Behavior Objective:**<br><br>It is unclear what the definitive implications of maximizing electric vehicle miles traveled (VMT) are for charging profiles. |
| | **Electric with Home Charging:**<br><br>A 67% level of home charging could be a relatively high assumption given density, ability to charge at home, and the significant benefits from workplace |

| | A2Z Collaboration Gap Analysis (EVI-Pro) | AB 2127 Assessment (EVI-Pro 2 High Scenario) |
|---|---|---|
| **ZEV Population** | 771 thousand by 2030 (SD County) | 7.9 million in 2030 (Statewide) |
| **Electric / Hydrogen Fuel Cell Electric Split** | 95/5% in 2030 | 95/5% in 2030 |
| **Within Electric, Hybrid / Battery Split** | 30/70% in 2030 | 30/70% in 2030 |
| **Charging Behavior Objective** | Maximize electric vehicle miles traveled | Mirror observed behavior |
| **Electric with Home Charging** | 67% | 67% |
| **Time-of-Use Rate Participation** | Not included | 67% in 2030 |
| **Infrastructure Utilization** | Assumed | Observed |

| | |
|---|---|
| | charging. Review of recent research needed to validate assumption. |
| | **Time-of-Use Rate Participation: Not included**<br><br>This is potentially a major issue as unmanaged charging is the primary driver of peak demand at other utilities. TOU/managed charging is a key assumption to test. 80%-90% is more likely and addressing this gap is critical to accelerating ZEV adoption. |
| | **Infrastructure Utilization:**<br><br>This is a key assumption. More information is needed as to what it drives in the modeling. Observed may not be a good assumption to make as current ZEV drivers are a specific niche, e.g., early adopters and those with access to private charging and a second vehicle. They do not represent the overall market in need of public infrastructure. |

| Gap Analysis Statement | Potential Risk or Issue for Strategy |
|---|---|
| **Executive Summary - Vehicle Targets** | |
| Pg. 5<br><br>Figure of San Diego Region ZEV Forecast<br><br>  <br> | Assuming a wide range of locations would need to be covered at low utilization, infrastructure needs will be non-linear, and front-loaded. As more people adopt, utilization goes up, but otherwise, it will significantly delay uptake to only those with nearby electric vehicle supply equipment (EVSE). The estimates in the A2Z Gap Analysis appear to be limited and there may therefore be a large gap in the first 5 years relative to need.<br><br>Hydrogen vehicles are generally coming to market later than BEVs. Therefore, it makes more sense for hydrogen to have a different infrastructure profile than BEVs in terms of proportion installed. There may be an over-estimation of the number of hydrogen stations needed to address the gap.<br><br>FCEV uptake forecast appears to be based on a percentage of PEV adoption, which is based on a linear uptake forecast, and may mean they are also likely to be overstated at least in the near-term. |

| Gap Analysis Statement | | Potential Risk or Issue for Strategy |
|---|---|---|
| **Appendix - Vehicle Adoption Model** | | |
| Pg. 31<br>"By 2030, BV expects to see ZEVs represent 71 percent of new vehicle sales annually which amounts to approximately 119,000 which is illustrated in Figure 14." |  | Previous work suggests that PEV sales are unlikely to grow at a constant rate to the s-curve uptake profile, which could mean there is a gap in the targeted infrastructure, especially in the years post price parity.[12,13] |
| Pg. 32<br>Figure 15: ZEV Share of New Vehicle Sales |  | Total vehicle sales is observed as a linear trend. Prior experience in similar projects show that the sales trend is likely to begin slower, and then accelerate due to the s-curve. Front loading the public charging solution may be needed to account for non-linear uptake and infrastructure sizing needs. |

| Report Statement | | Potential Risk or Issue for Strategy |
|---|---|---|
| **Appendix - Vehicle Adoption Model** | | |
| Pg. 30<br>Figure 13: San Diego Region ZEV 10-yr Growth Forecast, |  | The Project Team expects to see more change in the angle of the adoption curve, indicating a more aggressive adoption of vehicles, as economics make ZEVs lower cost. This could impact on the vehicle and/or charging gap over time. |
| **Appendix - Cost Parity Model** | | |
| Pg. 34<br>Figure 20: Heavy Duty – Annual Cost of Ownership Cost Parity |  | Modeling the Project Team has completed in other projects has found cost parity for this vehicle segment. This could mean there is a gap in the estimated need for charging this vehicle segment. |

*Note: Battery Electric Vehicle (BEV), Communities of Concern (COCs), Electric Vehicle Supply Equipment (EVSE), Fuel Cell Electric Vehicle (FCEV), Plug-In Electric Vehicle (PEV), Time-of-Use (TOU), Zero Emission Vehicle (ZEV)*

## C.2 Regulatory Conditions

The current EV policy and regulatory environment relevant to EVs were reviewed on a federal, state, and local basis. The A2Z Gap Analysis was first reviewed to gather all policy documents mentioned therein, and then comprehensive research was undertaken to discover any reported updates to these policies and regulations, including any reported progress towards their implementation.

### C.2.1 Existing Policies in the A2Z Gap Analysis

The key state-wide developments found since the A2Z Gap Analysis was developed were regarding Executive Order (EO) N-79-20, AB 2127, and AB 8:

**EO N-79-20**, signed in September 2020, includes targets for all new passenger vehicles sold to be ZE by 2035, for drayage and off-road vehicle sales to be ZE by 2035, and MDHD vehicles to be ZE by 2045.[14] Progress towards this target includes:

- CARB's analysis of potential strategies and scenarios to reduce pollution from passenger and heavier duty vehicles as part of their 2020 Mobile Source Strategy (MSS).[15] These include manufacturer requirements promoting clean technology production, incentive programs, outreach and education, and infrastructure planning and development.
- CARB's Advanced Clean Cars II (ACC II) Program with regulations focusing on the economic, environmental, and consumer impacts of post-2025 model year light-duty vehicles.[16]
- The Clean Miles Standard regulation, which provides requirements to transition the ride-hailing fleet to zero emissions through 2030.[17]

In 2018, the **AB 2127** required the California Energy Commission (CEC) and CARB to create integrated energy policy reports on a biennial basis and provide updates on transportation forecasts and infrastructure availability.[18] The 2020 report, updated in 2021, provides an update on current charging infrastructure installations and forecasts to meet EV targets.[19] Progress towards this target includes:

- The integrated policy report, titled Electric Vehicle Charging Infrastructure Assessment, published by the CEC and CARB, indicates that California will need almost 1.2 million public chargers to meet forecasted vehicle demand by 2030.[20] The report states that current number of public charger installations is around 73,000, and an additional 123,000 are planned by 2025. The CEC also expects 157,000 chargers are needed for MDHD vehicles in addition to the 1.2 million chargers for light-duty vehicles. Existing infrastructure availability is not on track to meet California's goal of 250,000 chargers by 2025, but funding will be available through the California Blueprint, as detailed in the "Federal and Statewide Policies and Regulations since 2021" section.

**AB 8**, originally released in 2013, extended the CEC's Clean Transportation Program to develop 100 hydrogen fueling stations to support light-duty FCEVs in California. The CEC and CARB have been publishing annual staff reports to assess capabilities to meet these targets.[21] Progress towards this target includes:

- CARB's release of their Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development that mapped currently open hydrogen fueling stations in California and compared projected station deployments with AB 8's target of 100 stations by 2023. Findings indicate that California is on track to meet the 2023 target, with 52 open stations as of June 2021, and 104 stations in development or funded for future development by 2023.[22]

*Table 2 and 3 in the Report summarizes the key targets and progress towards achieving the goals of the existing policies and regulations reviewed in the A2Z Gap Analysis with considerations for the implications towards the Strategies developed as part of this Report.*

### C.2.2 New Policies and Regulations

After assessing the implications of progress made to policies affecting the A2Z Gap Analysis, the Project Team investigated recently released EV policies and regulations. New federal and statewide policies or programs found include the Infrastructure Investment and Jobs Act (IIJA),[23] EV Charging Action Plan,[24] California Blueprint,[25] and Resolution E-516726. Each is summarized here:

- The US Congress passed the **Bipartisan IIJA** on November 6th, 2021. Also known as the Bipartisan Infrastructure Law, the IIJA targets improvements in public infrastructure, high-speed internet access, clean water systems, public transit investments, upgrades to airports and ports, as well as building a national network of EV chargers among other efforts to combat the climate crisis and achieve ZE goals.
    - The IIJA aims to accelerate ZEV adoption, reduce transport emissions, improve air quality, and create new jobs through a national network of 500,000 chargers.
    - The IIJA provides a total $7.5 billion investment, including $5 billion of funding for states and $2.5 billion for a competitive grant program focused on meeting charger deployment needs in disadvantaged communities.[27]
    - California can expect to receive $384 million over five years as part of the National Electric Vehicle Infrastructure (NEVI) Formula Program established as part of IIJA to fund an ZEV charging network expansion in the state.[28]
- The **EV Charging Action Plan**, announced by the White House in December 2021, aims to build a network of 500,000 EV chargers in hopes of accelerating EV adoption. The Plan includes various funding programs and actions to coordinate the national charging network.
    - As a result of the IIJA, the Department of Energy (DOE) and Department of Transportation established a Joint Office of Energy and Transportation focused on coordinating the deployment of charging infrastructure to build the national network. The joint office will help facilitate the rollout of funded infrastructure as part of the EV Charging Action Plan, which outlines initiatives to implement charging infrastructure programs.
    - The planned coordination will advance public charger deployment and ensure that allocation is equitable and optimized, which will also help decrease infrastructure gaps throughout the country, including the San Diego region.

- Governor Newsom's California state budget for the 2022-2023 fiscal year, dubbed the "**California Blueprint**" involves spending $22.5 billion to address the climate crisis, in which $6.1 billion is allocated to EV related initiatives: $3.9 billion in electrification of ports, heavy-duty trucks, school and public buses, $1.2 billion on 40,000 passenger EVs and 100,000 electric vehicle charging stations (EVCS) by the end of 2023, and $1 billion in ZEV initiatives.[29]
- **California Public Utilities Commission (CPUC) Resolution E-5167**, aimed at establishing new EV infrastructure rules pursuant to AB 841, was unanimously approved by the CPUC on October 7, 2021. The three investor-owned utilities (IOUs,) Pacific Gas and Electric (PG&E,) Southern California Edison (SCE,) and San Diego Gas and Electric (SDG&E) proposed new rules covering the installation of new electrical service and distribution system upgrades for customers installing separately metered EV charging equipment.
    - The resolution directs each IOU to establish new tariffs for customers installing separately metered infrastructure supporting charging stations, so that customers cover the cost of service line extensions and distribution infrastructure while the utility covers costs on the utility-side.[30] The resolution was unanimously approved on October 7, 2021, and all IOUs have proposed the new cost allocation rules that are expected to diminish barriers regarding the customer installation process.
- The Inflation Reduction Act of 2022 (IRA) became law on August 16, 2022 with the goals of reducing inflation, investing in domestic energy generation, expanding the Affordable Care Act and reducing carbon emissions. The IRA proposes $369 billion towards Energy Security and Climate Change programs to reduce energy costs, invest in renewable energy, and lower carbon emissions 40% by 2030.[31]
    - The IRA includes a $7,500 tax credit for EV purchases on vehicles assembled within the U.S.[32] Vehicles that qualify for the tax credit must have a certain percentage of battery components produced or manufactured in North America (exact percentage depends on fiscal year of purchase). Beginning in 2023, the applicable percentage is 40%, but it will grow to 80% by 2027 with a 10% increase each year.[33]

Table *6* in Appendix C.2.3 summarizes the requirements, key targets, and progress towards achieving the goals of the policies and regulations introduced since 2021, with considerations for the implications towards the Strategies developed as part of this Report.

### C.2.3 Regional Plans and Strategies

Developments in local efforts including progress against plans and strategies addressed in the A2Z Gap Analysis were reviewed and evaluated to demonstrate progress to date. Focus was on recent updates within the past two years for each plan to inform how the EV environment has changed with respect to the barriers identified in the A2Z Gap Analysis. Actions were also identified and linked back to respective gaps that they may be addressing, as detailed in Benchmarking Findings of Regional Plans and Strategies.

The documents reviewed included the County EV Roadmap, Regional Decarbonization Framework, SDG&E Sustainability Plan, San Diego Association of Governments (SANDAG) 2021 Regional Plan, San Diego Regional PEV Readiness Plan, Plug-in San Diego, the City of San Diego's Climate Action Plan, and the Port of San Diego's Maritime Clean Air Strategy as summarized here:

- County of San Diego's **EV Roadmap** provides six goals and eleven recommendations that leverage the County's infrastructure permitting process, land use authority, and outreach methods to increase EV adoption and infrastructure installations in the unincorporated area and at County facilities.[34]
- The **Regional Decarbonization Framework**, drafted by the County of San Diego, identifies strategies for decarbonization related to building electrification, energy efficiency, low carbon fuels, alternative fuel vehicles and infrastructure, and carbon removal and stock preservation.[35]SDG&E's **Sustainability Plan** contains six commitments to help meet California's goal of net zero emissions by 2045: pursuing low-cost sustainable, safe and reliable resources, evaluating flexible demand- and supply-side resources, integrating more renewables and low-carbon resources, deploying climate mitigation and adaption solutions, utilizing long-term solutions, and investigating opportunities to reduce the carbon intensity of gas platforms.[36]
- The **2021 Regional Plan** developed by SANDAG operates as a long-term blueprint to meet regulatory requirements, reduce traffic congestion, and create fair access to jobs, education, healthcare, and other resources.[37]
- The **PEV Readiness** Plan, adopted by SANDAG in 2015, identifies barriers related to EVSE installations and provides recommendations to expand on outreach methods, broaden the reach of the EV Expert, provide information and resources for frequently asked questions, and prepare incentive programs to ensure an equitable allocation of charging infrastructure.[38]
- **Plug-in San Diego**, launched by SANDAG, creates actions to address the barriers identified in the PEV Readiness Plan, including improving the permitting and installation process, assisting in station siting, provide technical assistance through the EV Expert, and engage in EV awareness activities for dealerships and workplaces.[39]
- The City of San Diego's draft **Climate Action Plan** is a policy commitment to set specific goals to achieve net zero GHG emissions by 2035, including building decarbonization, transitioning to

clean and renewable energy sources, supporting sustainable mobility options and land use, and increasing waste diversion and landfill gas capture.[40]

- The Port of San Diego's **Maritime Clean Air Strategy** establishes emission reduction goals and identifies potential projects to electrify harbor equipment and fleet vehicles, with the goal of improving general health and air quality, creating jobs, and increasing access to the San Diego Bay.[41]

These plans and strategies are summarized in

Table *6* and identify implications for mitigating gaps and addressing Strategies.

*Table 6 Regional Plans and Strategies informing A2Z Strategies*

| ***Regional Plan/Strategy*** | ***Key Targets*** | ***Relevant Priorities and Actions*** | ***Key Progress and Updates*** | ***Implications for A2Z Strategies*** |
|---|---|---|---|---|
| ***SDG&E Sustainability Strategy, October 2021*** | *ZEV Projections*<br>• *By 2025: 311,000 ZEVs*<br>• *By 2030: 771,000 ZEVs*<br>• *By 2030: Electrify 100% of light-duty fleet*<br>• *By 2030: Transition 30% of overall fleet to ZEV*<br>• *By 2040: Operate a 100% ZEV fleet*<br><br>*ZE Infrastructure Projections*<br>• *By 2025: 52,600 Level 2 chargers*<br>• *By 2030: 139,000 Level 2 chargers* | • *Deliver region-wide clean transportation infrastructure goal*<br>• *Create policies to help ensure adoption*<br>• *Encourage equitable access to ZEVs and charging infrastructure*<br>• *Attract investments to the region and maximize effectiveness of charger deployments* | *Project and Program Deployments*<br>*V2G Pilot Program is part of a 5-year collaboration with the Cajon Valley Union School District (CVUSD), Nuuve, and SDG&E to supply excess energy to the grid via school buses:*<br>• *Eight electric school buses connected to 60 kW bi-direction DCFCs*<br>• *Construction completed June 2021*<br><br>*Power Your Drive provides construction and maintenance incentives to install charging stations. Key metrics include:* | • *Reduces ZE infrastructure gap in this locality*<br>• *Provides equitable and accessible charging opportunities*<br>• *Provides innovative pilots to explore new technologies* |

| *Regional Plan/Strategy* | *Key Targets* | *Relevant Priorities and Actions* | *Key Progress and Updates* | *Implications for A2Z Strategies* |
|---|---|---|---|---|
| | • *By 2025: 3,800 DCFC chargers*<br>• *By 2030: 16,200 DCFC chargers* | | • *4,500 ZEV customers enrolled by end of 2020*<br>• *3,054 charging ports installed at 254 locations through PYD Pilot by 2019*<br>• *336 EVCS being installed across service territory (expected to complete in 2023)*<br><br>*In addition, 3,260 charging ports have been built by SDG&E as of 2021* | |
| ***SANDAG Regional Plan, December 2021*** | *<u>ZEV Goals in San Diego County</u>*<br>• *By 2025: 110,000 ZEVs* | *<u>Big 5 Moves</u>*<br>1. *Flexible fleets*<br>2. *Transit leap*<br>3. *Mobility hubs* | • *Road mileage tax of $0.04/mile driven removed from the plan*<br>• *Method of funding from the regional* | • *Funding programs expected to be more accessible, providing support for growth of the public ZE infrastructure* |

| Regional Plan/Strategy | Key Targets | Relevant Priorities and Actions | Key Progress and Updates | Implications for A2Z Strategies |
|---|---|---|---|---|
| | • *By 2030: 450,000 ZEVs*<br><br>*<u>Public ZE Infrastructure Goals in San Diego County</u>*<br>• *By 2025: 13,000 public chargers*<br>*By 2030: 41,000 public chargers* | 4. *Complete Corridors*<br>5. *Next Operating System*<br><br>• *Support funding programs that increase EVCS*<br>• *SANDAG Regional Electric Vehicle Charger Program: First-come, first-serve rebate program to lower EVCS installation and purchasing costs*<br>• *Supports regional ZEV incentive programs, including SDG&E programs and others within the region* | *transportation agency to be determined* | *network as well as equity initiatives* |
| ***SANDAG Regional PEV Readiness Plan, Jan. 2014 & Plug-In San Diego, 2019*** | *<u>ZEV Goals</u>*<br>• *2025: Forecast of 100,000-150,000* | • *Increase outreach and engagement*<br>• *ZEV Expert Service to provide technical* | • *All 19 jurisdictions in the region have received training on Plug-In San Diego resources to better* | • *Customer and supply chain education and outreach can reduce EVCS costs* |

| Regional Plan/Strategy | Key Targets | Relevant Priorities and Actions | Key Progress and Updates | Implications for A2Z Strategies |
|---|---|---|---|---|
| | *PEVs in the San Diego region*<br><br>*ZE Infrastructure Goals*<br>• *2020: Need for 9,000-15,000 workplace chargers and 1,800-4,200 public chargers needed* | *assistance for EVSE deployment* | *learn what is available to them*<br>• *Installation best practices report and checklist developed*<br>• *ZEV expert established*<br>*58 dealerships selling PEVs in the region reached by Plug-In San Diego staff* | *and increase uptake rates by removing key barriers, such as lack of awareness and educational resources* |
| ***County of San Diego – EV Roadmap, October 2019*** | *ZEV Goals*<br>• *Increase number of EVs in County's fleet to 501 vehicles by 2027*<br>• *Reduce County commuting emissions by increasing County employee EV ownership* | • *Reduce fleet of gas-powered vehicles*<br>• *Accelerate installation of public EVCS in county facilities and unincorporated county*<br>• *Promote and incentivize employee ZEV ownership*<br>• *Incentivize and/or require ZEV charging* | • *Development of Electric Vehicle Consumer Guide*<br>*Provides interactive tools to compare ZEVs, tax breaks, incentives, and a map of charging stations and guidance for home charger installation* | • *Customer education on track to increase uptake rates by removing key knowledge barriers* |

| *Regional Plan/Strategy* | *Key Targets* | *Relevant Priorities and Actions* | *Key Progress and Updates* | *Implications for A2Z Strategies* |
|---|---|---|---|---|
| | • *Increase EV use in light, medium, and heavy-duty regional fleets*<br><br><u>*ZE Infrastructure Goals*</u><br><br>• *Install 2,040 Level 2 charging stations at County facilities and throughout the unincorporated area by 2028*<br><br>• *Increase charging station installations in new and existing private development*<br><br>• *Increase EV ownership and charging station installations through education, outreach, regional* | *infrastructure in new and existing private multi-family development*<br><br>• *Fund ZEV expert/consumer advocate as a regional resource*<br><br>• *Collaborate with regional partners to support public and private fleet electrification* | | |

| *Regional Plan/Strategy* | *Key Targets* | *Relevant Priorities and Actions* | *Key Progress and Updates* | *Implications for A2Z Strategies* |
|---|---|---|---|---|
| | *collaboration, and incentives* | | | |
| ***County of San Diego, Regional Decarbonization Framework, March 2022*** | • *GHG emissions reduced 40% below 1990 levels by 2030*<br><br>*Fully decarbonized by 2050* | • *Require EVITP-certified electricians*<br><br>• *Utilize US Employment Plan to target hire in bus and train car manufacturing for fleet adoption*<br><br>• *Incentivize cleaner vehicles for Transportation Network Companies (TNCs)*<br><br>• *Support ZEV charging for freight at distribution centers* | *Seeking comments on draft Framework* | • *May reduce charging infrastructure gap and accelerate fleet transition* |
| *The City of San Diego's Climate Action Plan,* | • *By 2030: 75% of municipal fleet cars, 50% of light, medium, and heavy* | • *Develop City Fleet Vehicle Replacement and Electrification strategy* | • *City's first Mobility Master Plan in progress* | • *Encourages innovative pilot projects* |

| Regional Plan/Strategy | Key Targets | Relevant Priorities and Actions | Key Progress and Updates | Implications for A2Z Strategies |
|---|---|---|---|---|
| *released in July 2022* | *duty vehicles to be ZEVs*<br><br>*By 2035: 100% municipal fleet cars and light duty vehicles to be ZEVs and 75% of MDHD vehicles to be ZEVs* | • *Explore pilot projects for grid resilience services through ZEV integration*<br><br>• *Develop city-wide ZEV strategy focusing on barriers to ownership for communities of concern* | *Blueprint SD in development to provide a framework for strategic land use planning* | • *Supports fleet transition to zero emissions* |
| *The Port of San Diego's Maritime Clean Air Strategy, approved in October 2021* | • *By 2030: Transition 100% of diesel cargo handling equipment to ZE*<br><br>*By 2030: 100% of truck trips through the marine cargo terminals to be ZE* | • *Collaborate with Port tenants, shippers, truckers, freight movers, utilities, and government agencies*<br><br>• *Pursue funding for ZE trucks and cargo handling equipment from CARB* | *The Port applied to SDG&E's "Power Your Drive" program to transition general services vehicles* | • *May reduce gap for heavier duty electric vehicle adoption* |

## C.3 ZEV Literature Review

Examples of regional ZEV plans outside of San Diego County to inform the EV Strategy development process were evaluated as part of this task. A framework was developed to create a ranking of potential strategies based on their expected value to the A2Z EV Strategy development process. The key criteria agreed upon within the A2Z Collaboration is summarized in Table 7.

*Table 7 Strategy Selection Criteria*

| Criteria | | Definition |
|---|---|---|
| Recent | | Report was published in the last 2-3 years, as more recent studies more likely to reflect latest best practices |
| Contains Target Information[42] | Budget | Includes a budget that can be used to inform the A2Z Strategy |
| | Timeline | Timeline of strategy is similar to the County EV Roadmap[43], which has goals set to 2030 |
| | Strategies | Includes strategies for addressing gaps, e.g., encouraging County employee EV use, increasing stations in public locations, and reducing gas-powered vehicle fleet |
| Region | | Regions are comparable but outside of San Diego, with at least 2 out of state |
| Effectiveness | | Appears on track to meet EV targets |

Ten regional strategies were identified via desktop research and compared against the specified criteria to create a list of the top seven recommended best practice plans. The seven plans include:

- Electric Vehicle Readiness Plan for Ventura, Santa Barbara, and San Luis Obispo Counties
- Fresno County's Electric Vehicle Readiness Plan
- Los Angeles County's Zero Emissions 2028 Roadmap
- San Bernardino County's Zero-Emission Vehicle Readiness and Implementation Plan
- SCE's Clean Power and Electrification Pathway
- Denver's Electric Vehicle Action Plan
- Seattle's Clean Transportation Electrification Blueprint

Other plans were reviewed but were not recommended if they were from incomparable regions, were outdated or had strategies that did not align with the County EV Roadmap.

The strategies of each plan were then assessed to identify potential new strategies to overcome barriers identified in the A2Z Gap Analysis and be included within the Report.

The seven plans with the highest scores in terms of meeting the designated criteria are presented in Table 8.

*Table 8 Regional Strategy Benchmarking*

| Region | Plan Title | Date | Criteria | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Recent | Budget | Timeline | Strategies | Region | Effective |
| Central Coast (Ventura County, Santa Barbara County, San Luis Obispo County) | Electric Vehicle Readiness Plan for Ventura, Santa Barbara, and San Luis Obispo Counties | Revised in 2021 | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ |
| Fresno County | Electric Vehicle Readiness Plan (EVRP) | January 2021 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Los Angeles County | Zero Emissions 2028 Roadmap | November 2019 | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ |
| San Bernardino County | Zero-Emission Vehicle Readiness and Implementation Plan | August 2019 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| SCE Territory | Clean Power and Electrification Pathway | November 2017 | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ |
| Denver, CO | Electric Vehicle Action Plan | April 2020 | ✓ | ✗ | ✓ | ✓ | ✓ | ✗ |
| Seattle, WA | Clean Transportation Electrification Blueprint | March 2021 | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ |

| Legend | |
|---|---|
| ✓ | Meets criteria |
| ✓ | Partially meets criteria |
| ✗ | Not included or does not meet criteria |

A summary of each of the seven best practice ZEV plans is in Table 9.

*Table 9 ZEV Plan Best Practices*

| ***ZEV Plan Best Practice*** | ***Definition*** | ***Strategies to Meet this Goal*** | ***Plan Development to Date*** |
|---|---|---|---|
| *Central Coast EV Readiness Plan (EV Communities Alliance, 2014)* | The Central Coast EV Readiness Plan, originally published in July 2014, is intended to encourage and facilitate the mass adoption of PEVs in the tri-county Central Coast region. One of the plan's key goals is to develop a public charging network and streamline charging station installation to enable rapid deployment. | • Developing a charger permit form<br>• Providing guidance and checklists for the charger installation process<br>• Advancing online permitting,<br>• Establishing reasonable charger permit fees<br>• Waiving requirements for simple installations | To date, the development of the plan has coincided with the construction of nearly 200 level 2 charging stations. Other key goals of the EV Readiness Plan are integrating vehicles and the electric grid via Vehicle-to-Grid (V2G) technology to minimize peak energy usage, providing education and outreach on the benefits of PEVs, and reducing GHG emissions and pollutants from the transport sector. |
| *Clean Power and Electrification Pathway (SCE, 2017)* | SCE's Clean Power and Electrification Pathway is an integrated framework of approaches, built upon existing state policies, to combat climate change and improve air quality. Transportation is amongst the three sectors within the scope of the framework, which | • Incentives for ZEV purchases funded by cap-and-trade<br>• Funding to rapidly deploy adequate charging infrastructure<br>• Expanded customer education | Since the release of the electrification pathway, SCE has been approved for investments supporting transportation electrification pilots and programs, including an Electric Transit Bus-Make Ready Program, Urban DCFC Clusters Pilot, and Residential Make-Ready Rebate Pilot.[44] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | includes goals to electrify 24% of light-duty, 15% of medium-duty, and 6% of heavy-duty vehicles by 2030. | • Competitive fuel cost pricing | |
| *Electric Vehicle Readiness Plan (Fresno Council of Governments, 2021)* | The Fresno Council of Governments' Electric Vehicle Readiness Plan's (EVRP) was funded primarily by Caltrans. The main objective of the Plan was to determine how much public charging is needed and to identify locations for ZEV charging infrastructure to increase local ZEV adoption. The Plan also accounted for unique equity considerations within Fresno County and its unincorporated areas. A number of local entities were engaged as part of a Steering Committee. | • Adopt policies that prioritize transport electrification<br>• Enhance monitoring and reporting of progress on emissions reductions and transportation electrification<br>• Update building codes to expedite charging infrastructure<br>• Reduce future improvement costs<br>• Enhance collaboration between stakeholders<br>• Expand community outreach to disadvantaged communities<br>• Improve education of | Fresno Area Express has since released a Zero Emissions Bus Rollout Plan to enable the full transition to a ZEV bus fleet by 2040,[45] and Fresno County Rural Transit Agency released an Electrical Grid Analysis Study to assess impacts of transportation electrification on the grid.[46] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | | PEV technologies and available funding mechanisms | |
| *Zero-Emission 2028 Roadmap (Transportation Electrification Partnership, 2019)* | The Los Angeles County Zero-Emission 2028 Roadmap was developed by the Transportation Electrification Partnership to accomplish a 25% reduction in GHG emissions and air pollution by 2028, in time for the LA Olympics and Paralympics. Additionally, the Roadmap is guided by a three-pronged call to action and established goals, including 30% of all vehicles on the road to be light-duty electric passenger vehicles and at least 80% of all new vehicles in 2028, shifting at least 20% of all trips in single occupancy vehicles to zero emissions by 2028, and for all public investments into goods movement, freight vehicles, and related infrastructure to | • Creating incentives to support ZEV and public transit access for vulnerable communities<br>• Offering feebate programs to incentivize the removal of ICE vehicles and rebates for ZEVs<br>• Supporting policies for electric fleet transitions<br>• Providing up-front incentives for charging infrastructure<br>• Supporting a public transit system with 100% electric buses<br>• Investing in ZE zones and safer streets for walking, biking, etc. | As of January 2021, Los Angeles has installed over 11,000 commercial charging stations and purchased 155 electric buses for the city's bus fleet.[47] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | advance ZE solutions by 2028. | • Supporting electric ride share options<br>• Creating a last-mile ZE zone pilot project for goods delivery | |
| *Zero-Emission Readiness and Implementation Plan (San Bernardino Council of Governments, 2019)* | The Zero-Emission Readiness and Implementation Plan created by the San Bernardino Council of Governments sets out initiatives to help meet state and regional targets for ZEV charging infrastructure by 2020 and 2025. The plan sets a 100% ZE bus fleet target for 2040 and expects over 44,000 ZEVs by 2025. | • Offering incentives for projects pairing on-site renewables with ZE Infrastructure<br>• Creating a rollout plan for the zero-emission bus fleet<br>• Developing a regional ZE Infrastructure task force<br>• Installing public DCFC at 50-mile intervals<br>• Providing regional ZEV workforce development training<br>• Scheduling charging station installations with site hosts<br>• Pursuing funding for a regional ZEV expert, | In 2020, San Bernardino County residents registered over 3,700 electric, hybrid, or hydrogen fuel cell vehicles, counting towards a cumulative stock of 15,377 ZEVs.[48] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | | outreach campaign and grant funding opportunities | |
| *Clean Transportation Electrification Blueprint (Seattle City Light, 2021)* | Seattle City Light was the first electric utility in the United States to achieve net zero emissions in 2005 and has maintained carbon neutrality every year since. It released a Clean Transportation Electrification Blueprint in 2021 to reduce emissions and pollution, increase electric mobility options, achieve a more reliable grid, create green jobs, and diversify its workforce.<br><br>The six goals targeted for 2030 are:<br>1. 100% of shared mobility (bikes, taxis, carshare services, etc.) to be electric<br>2. 90% of all personal trips to be emission free, meaning walking, biking, via electric transit or ZEV | • Advocating for policies that create ZEV revenue streams for more efficient modes of transportation<br>• Proposing tax incentives benefiting small and minority-owned businesses to transition to ZEV fleets<br>• Developing new utility programs and rate structures for electrification<br>• Addressing grid modernization through a new infrastructure plan<br>• Building charging infrastructure for electrified commercial mobility | The City of Seattle has directed SDOT to implement all actions in the Transportation Electrification Blueprint, in addition to increasing the availability of free transit, creating vehicle free areas and designating a Green and Healthy Street, a specified ZE zone.[49] Seattle's Office of Sustainability & Environment and Department of Transportation (SDOT) are currently exploring road-pricing policies such as meter parking innovations, fleet pricing, urban delivery fees and tolling roads and bridges to invest in projects and programs that will help reduce emissions and improve mobility.[50] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | 3. 30% of goods delivery to be emission free<br>4. 100% of the city fleet to be free of fossil-fuels<br>5. Development of at least one "Green & Healthy Street" in Seattle, meaning streets that promote walking, biking, electrified transit, and goods delivery services<br>6. Increasing installed and operational electrical infrastructure. | • Advocating for state and federal policies to promote electric transport, rebates, and less fossil fuels<br>• Developing a road map for shared mobility to be fully electric by 2030<br>• Creating accessible charging options in residential and community locations | |
| *Climate Action Plan (City and County of Denver, Colorado, 2020)* | The City and County of Denver, Colorado released its EV Action Plan[51] in 2020, building on the *80 x 50 Climate Action Plan* that calls for an 80% reduction in GHG emissions.[52] | • Building ZEV partnerships with businesses, regional organizations, and surrounding communities to deploy infrastructure at retail centers, | Denver has since deployed 6 DCFC stations for ride sharing companies, 7 electric car share vehicles, and 43 e-bike libraries.[53] |

| ZEV Plan Best Practice | Definition | Strategies to Meet this Goal | Plan Development to Date |
|---|---|---|---|
| | The plan has three defined ZEV goals:<br>1. 15% of vehicle registrations to be electric by 2025<br>2. 30% of vehicle registrations to be electric by 2030<br>3. 100% of light-duty vehicles to be electric by 2050 | mobility hubs, high-traffic destinations, and homes<br>• Providing charging station installation incentives<br>• Driving community awareness through targeted campaigns<br>• Facilitating ZEV adopting through installation and permitting guides<br>• Tiered incentives<br>• Offering ZEV mobility hubs | |

# D Engagement Materials

## D.1 Communication Plan Goals and Roles

### D.1.1 Engagement Goals

The following stakeholder engagement goals were developed to guide all engagement activities for the A2Z Strategy:

- Amplify Community Voices Affected by Structural Inequities: Promote intentional procedural and distributional equity by amplifying communities' ability to self-identify structural inequities and needs. Recognize and incorporate regional, state, and federal definitions of "underserved and historically unrepresented", and "disadvantaged" communities to better position communities for potential funding sources

- Reduce Barriers to Participation in Engagement Activities: Engage a broad pool of perspectives and reduce barriers to participation through the provision of location access, language accommodations, varied workshop timings, partnerships with trusted community leaders, in-person and virtual event options, and additional strategies identified throughout the outreach process
- Educate and Inform the Community: Educate the community on strategies of ZEV adoption and maximize participation through existing opportunities, networks, and events
- Identify Jurisdictional Issues and Challenges to ZE Infrastructure and Policy Adoption: Identify jurisdictional issues and challenges in ZE Infrastructure and policy adoption, through Steering Committee and Advisory Committee dialogues and targeted outreach to cities

### D.1.2 Engagement Roles

An overview of the community engagement roles is provided in Table 10 *Engagement Roles.*

*Table 10 Engagement Roles*

| Entity | Engagement Role |
|---|---|
| Project Team | Lead and execute engagement strategy and activities |
| SDG&E Community-Based Organization Coordinator | Work with Community-Based Organizations, AECOM, and Core Project Team to identify potential Community-Based Organization partners and events for each phase of engagement |
| Core Team | Provide direction and oversight to AECOM regarding stakeholder engagement activities; support supplemental events where possible |
| Steering Committee | Provide input on engagement and support supplemental events where possible |
| Advisory Committee | Participate in questionnaires, workshops, and interviews<br>Attend quarterly meetings with the A2Z Core Team and Steering Committee<br>Share information with constituents and network |

## D.2 Phase 1 Engagement Event Boards

*Figure 2 Engagement Event Board*

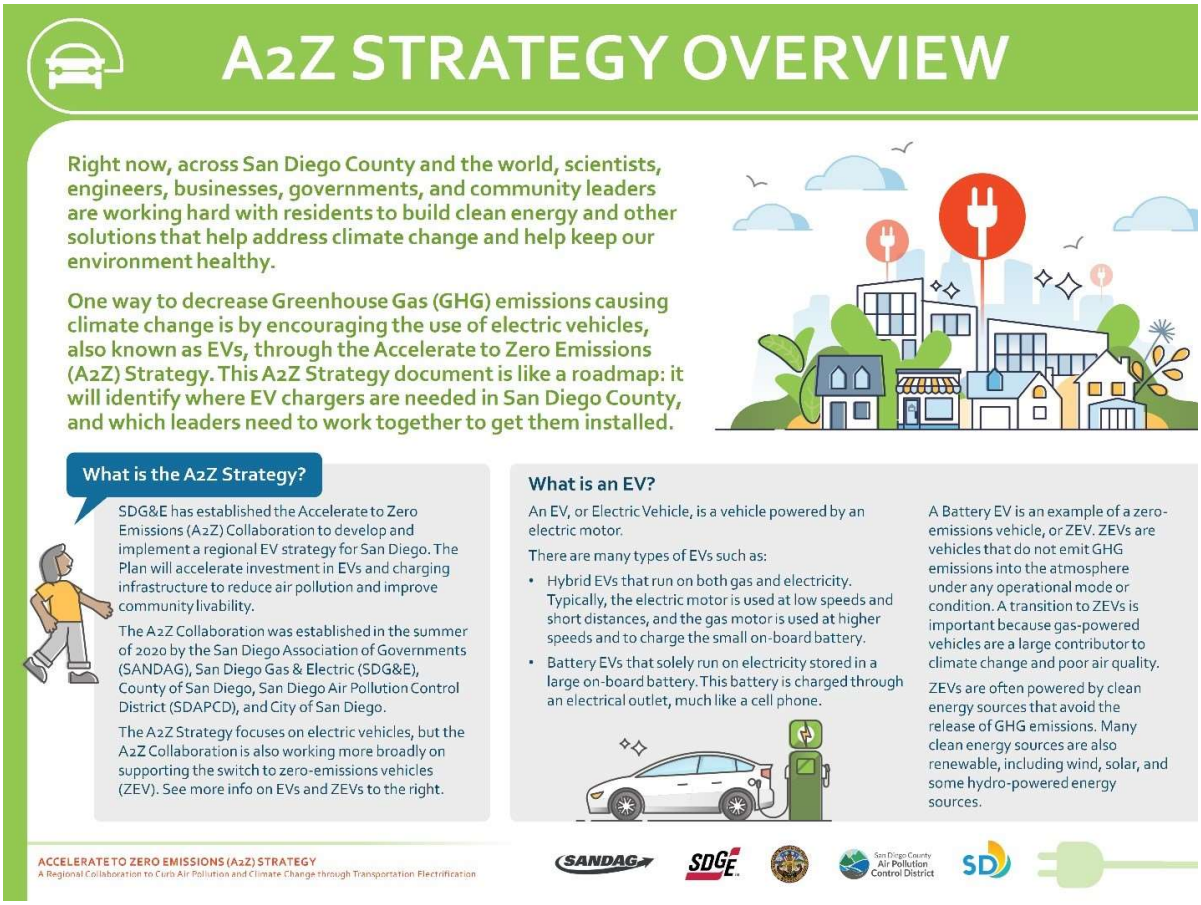


*Figure 3 Engagement Event Board*

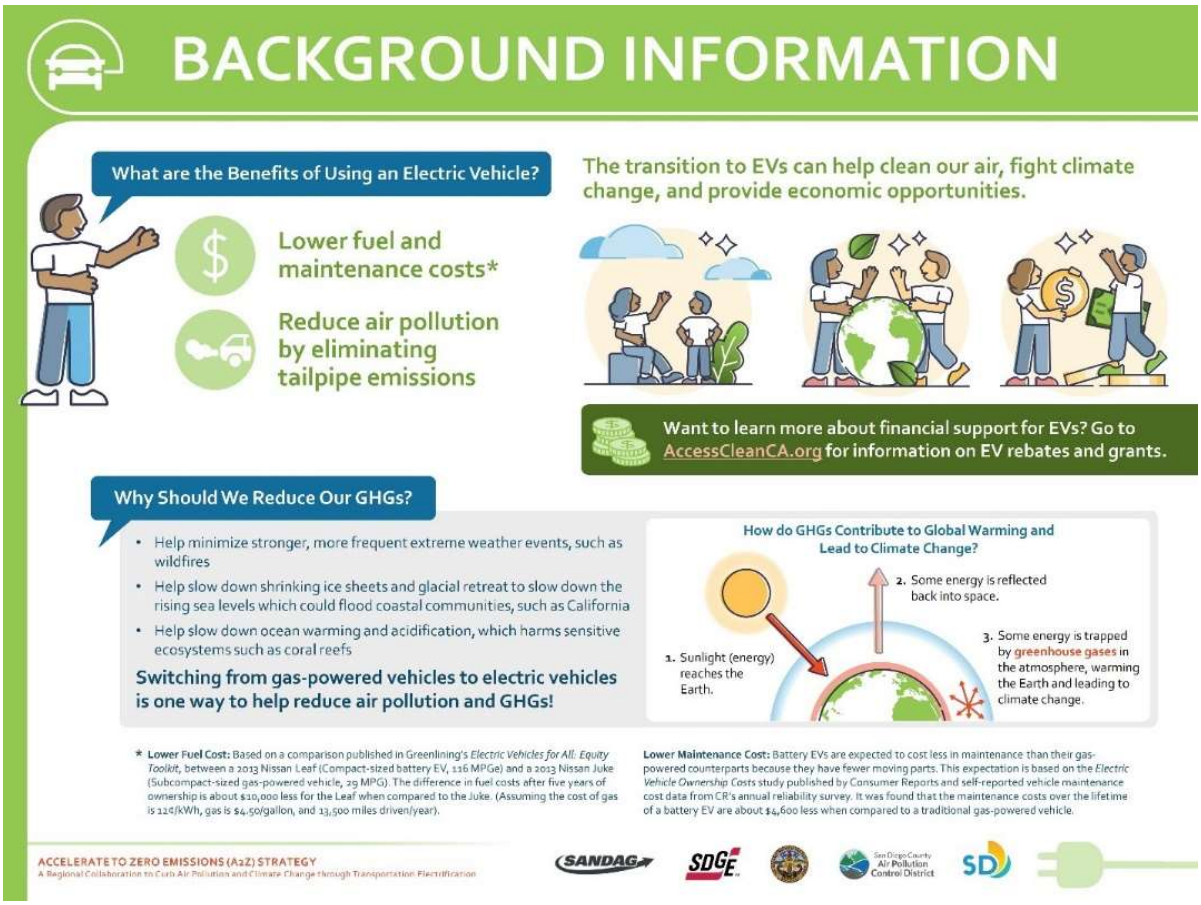


*Figure 4 Engagement Event Board*

*Figure 5 Engagement Event Board*

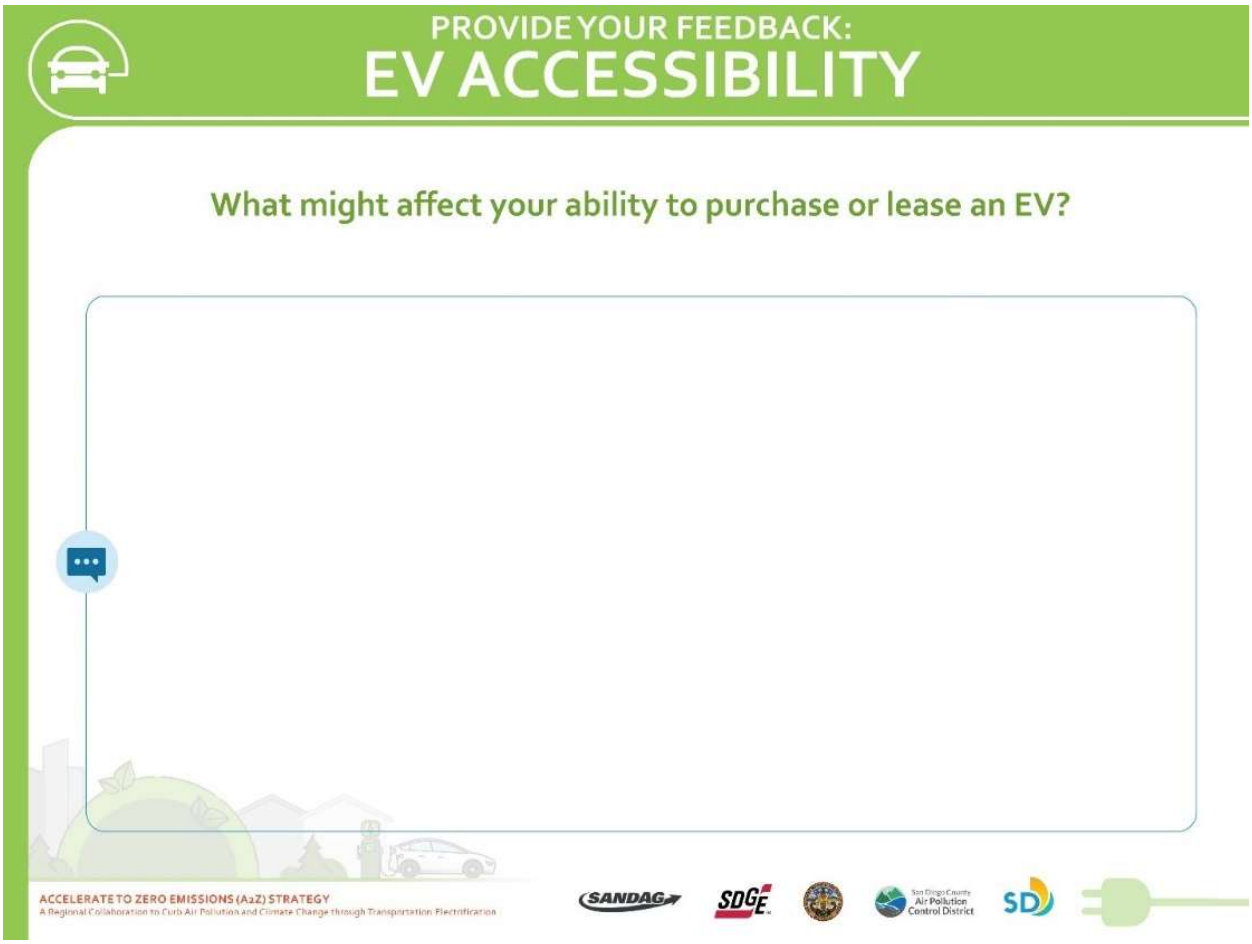


*Figure 6 Engagement Event Board*

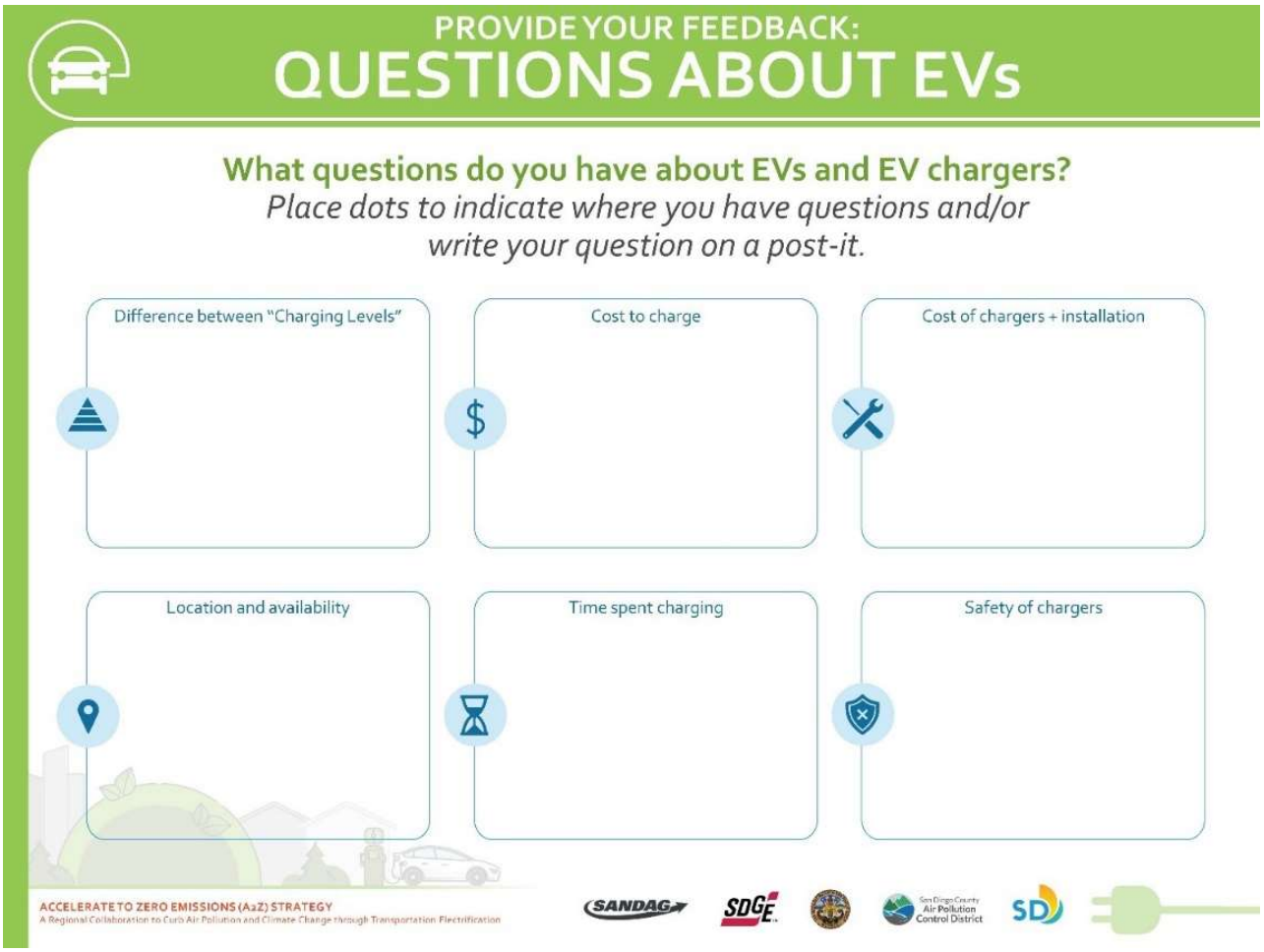


*Figure 7 Engagement Event Board*

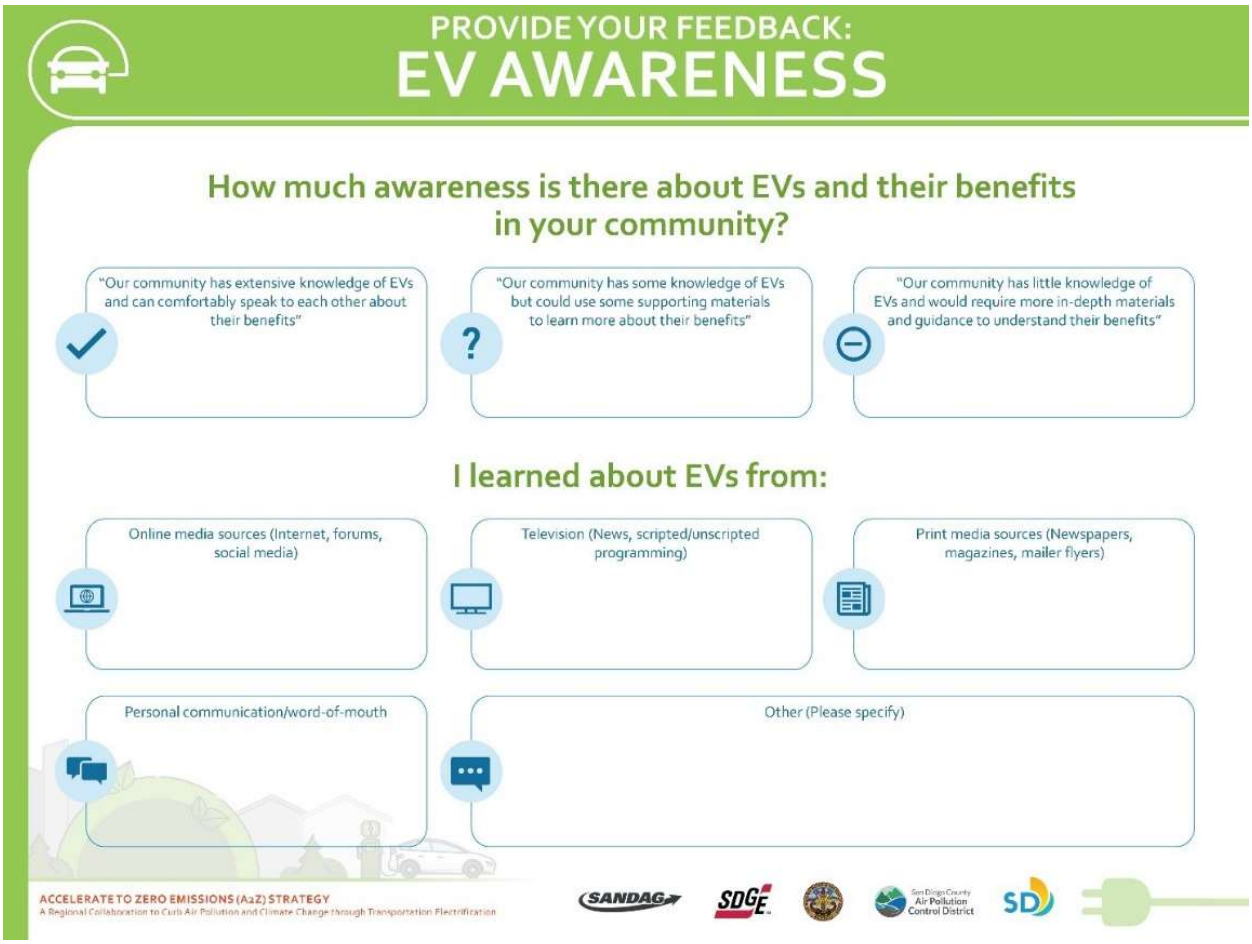


*Figure 8 Engagement Event Board*

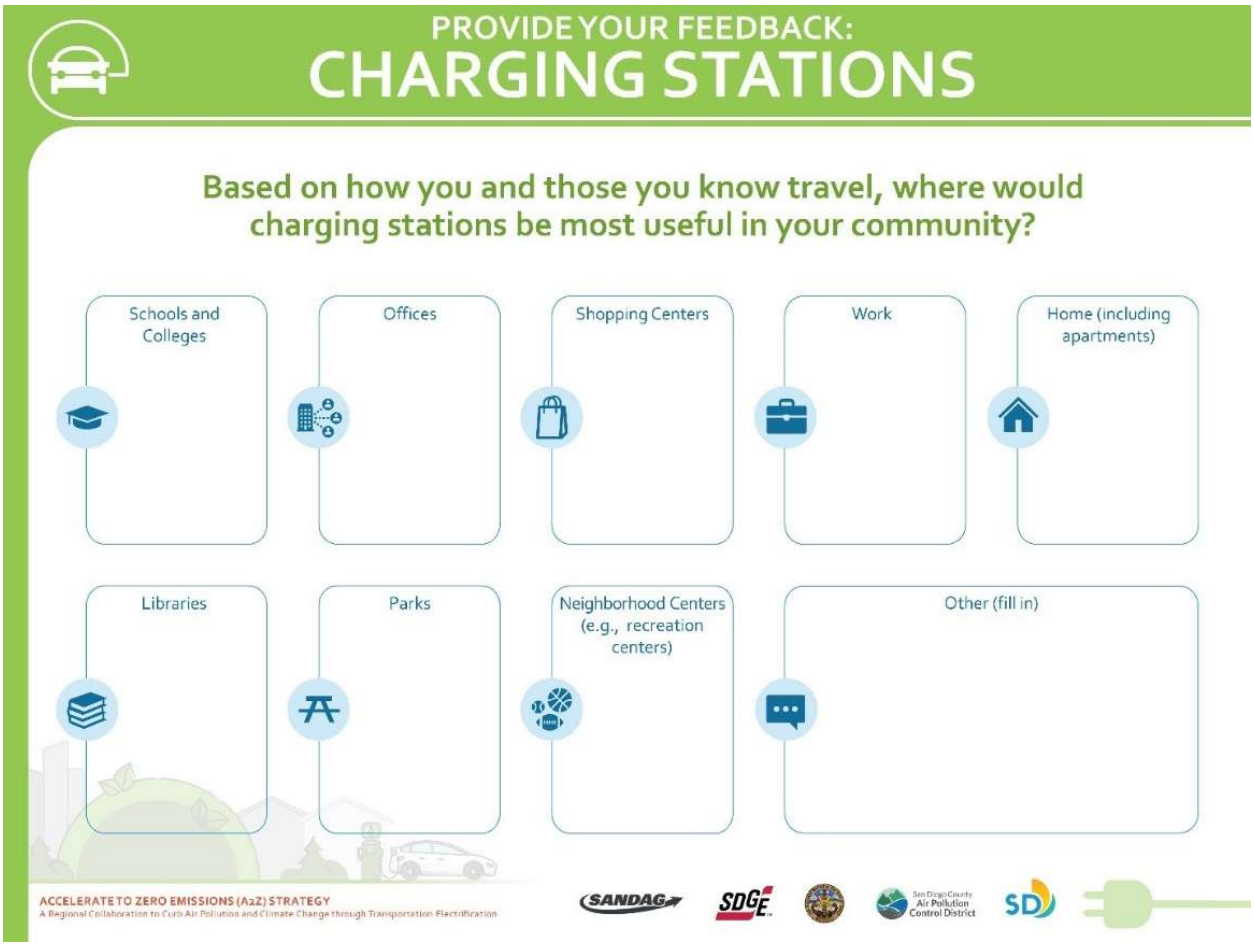


*Figure 9 Engagement Event Board*

*Figure 10 Engagement Event Board*

## D.3 Phase 1 Community Input at Events

### D.3.1 2022 San Diego Earth Fair, Balboa Park

*Figure 11 San Diego Earth Fair, Balboa Park Community Input*

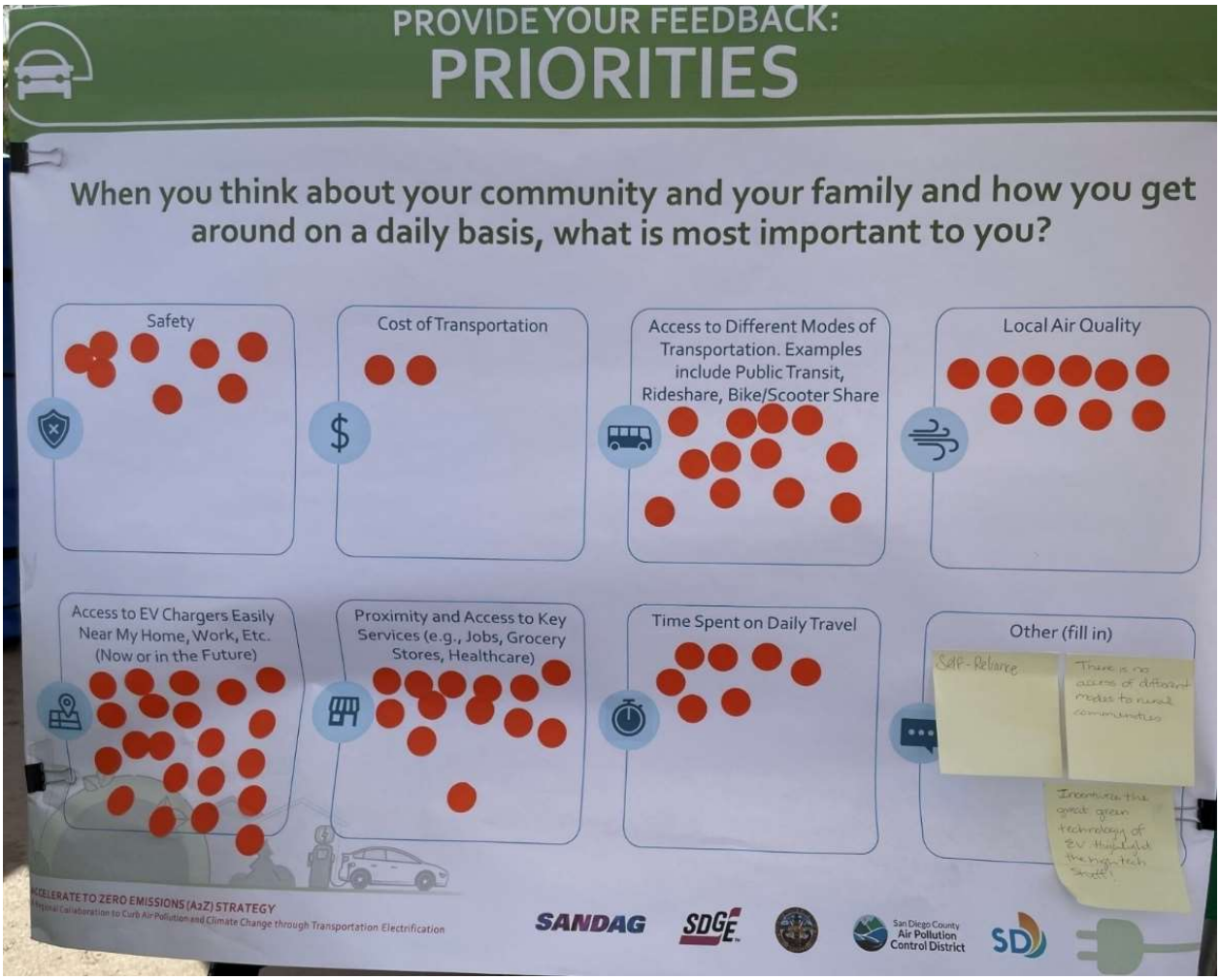


*Figure 12 San Diego Earth Fair, Balboa Park Community Input*

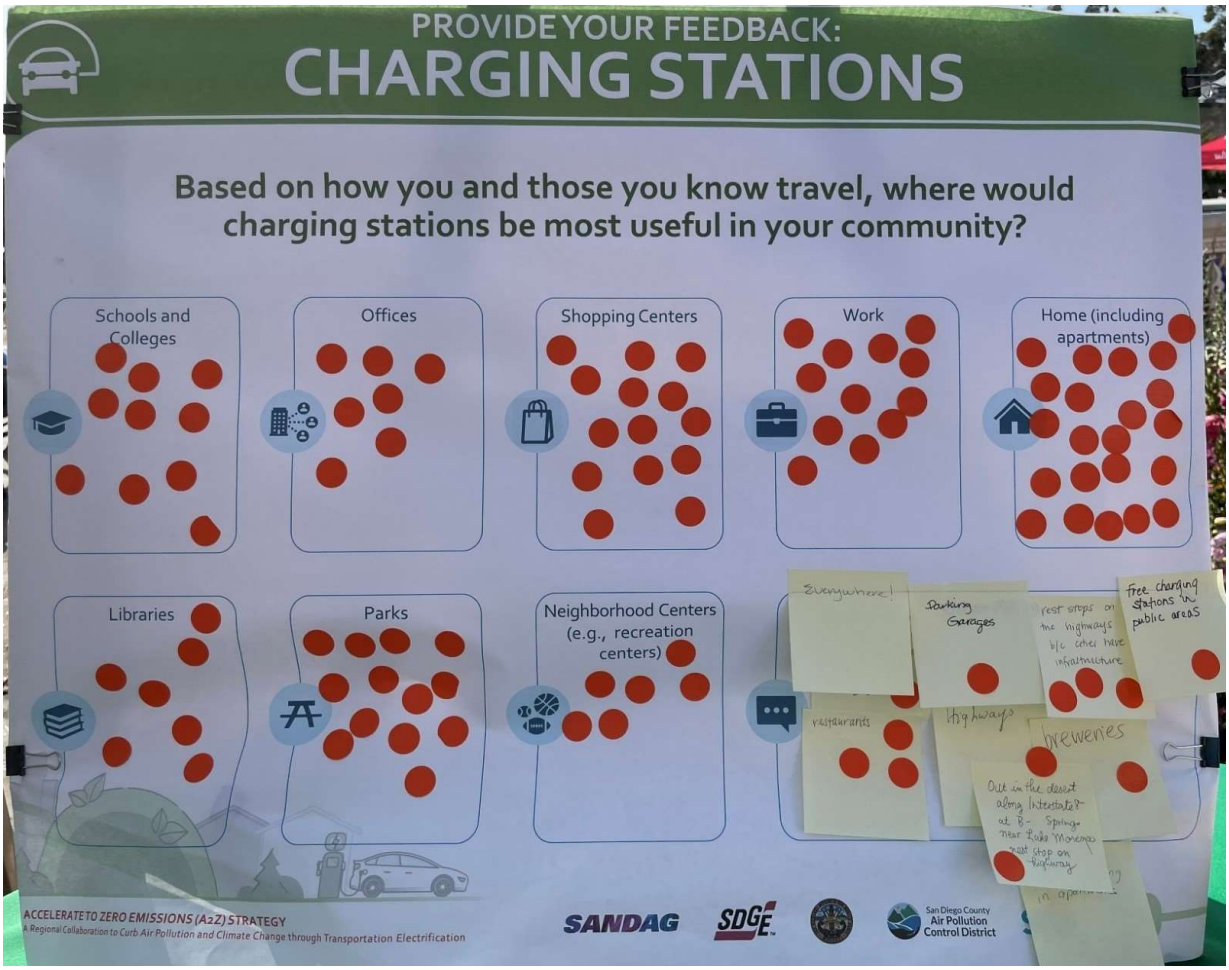


*Figure 13 San Diego Earth Fair, Balboa Park Community Input*

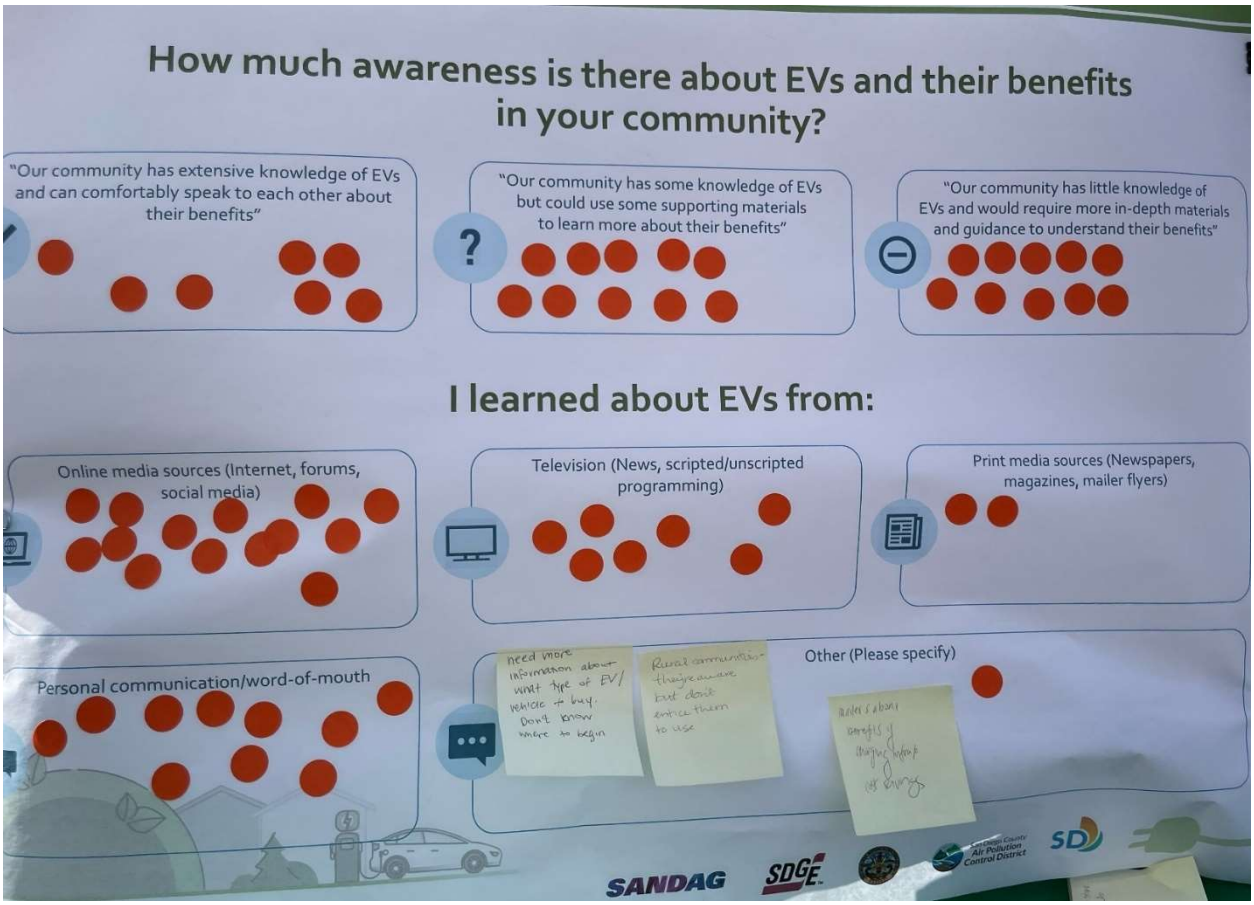


*Figure 14 San Diego Earth Fair, Balboa Park Community Input*

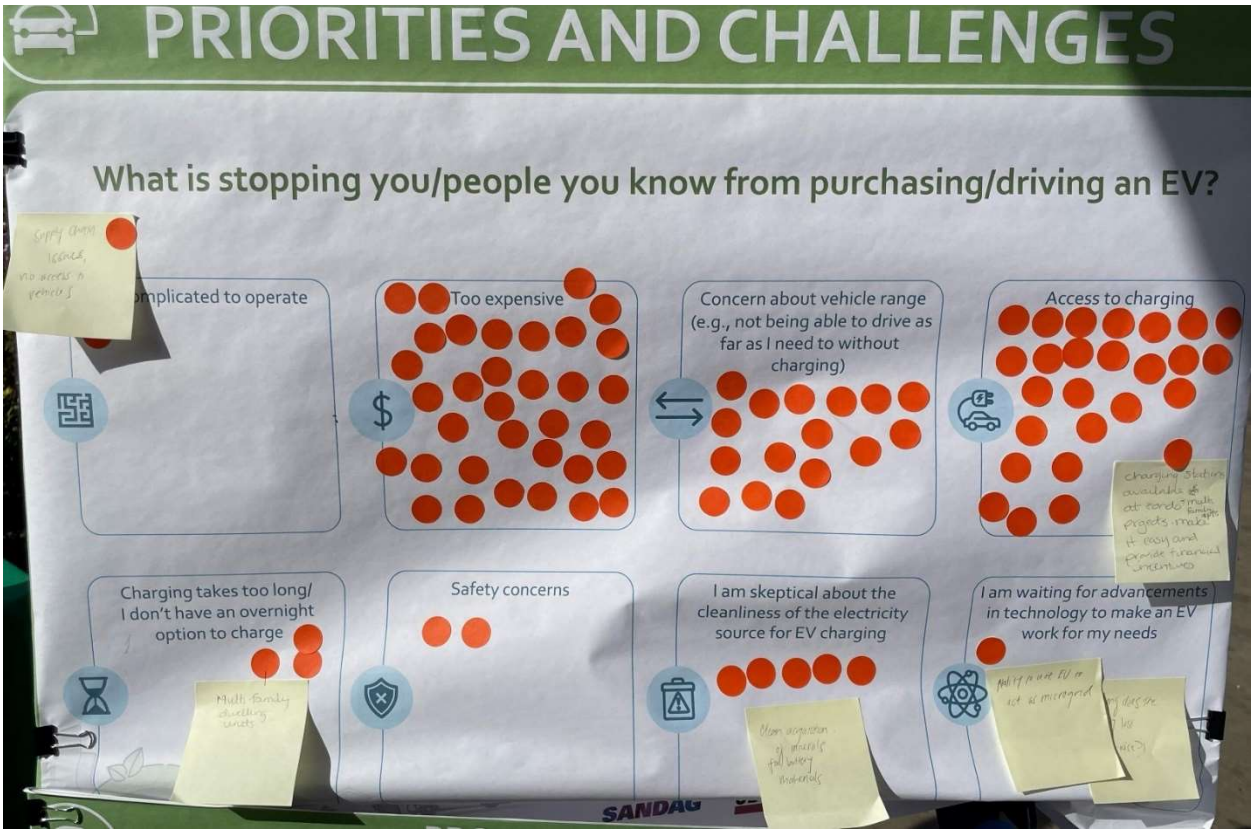


*Figure 15 San Diego Earth Fair, Balboa Park Community Input*

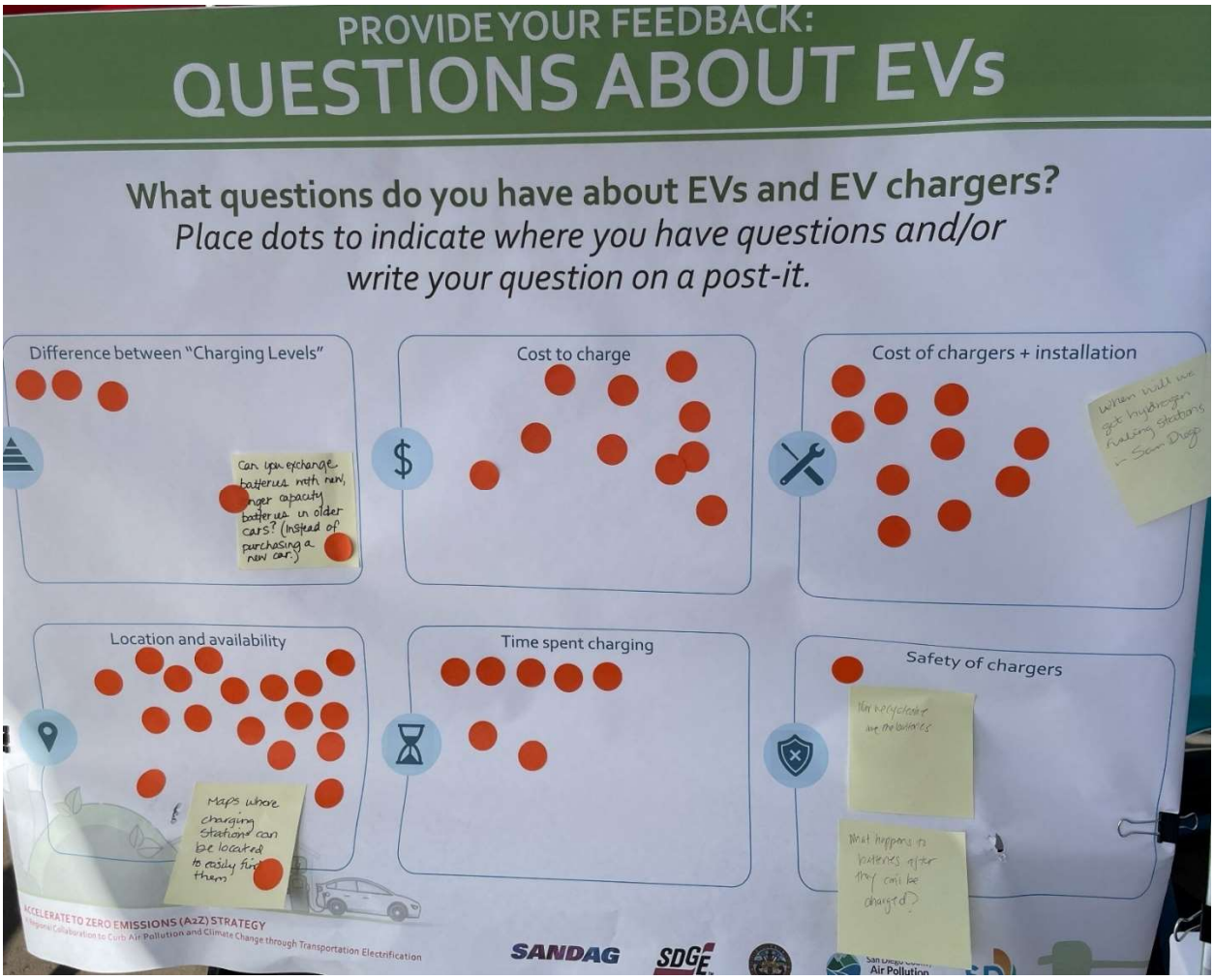
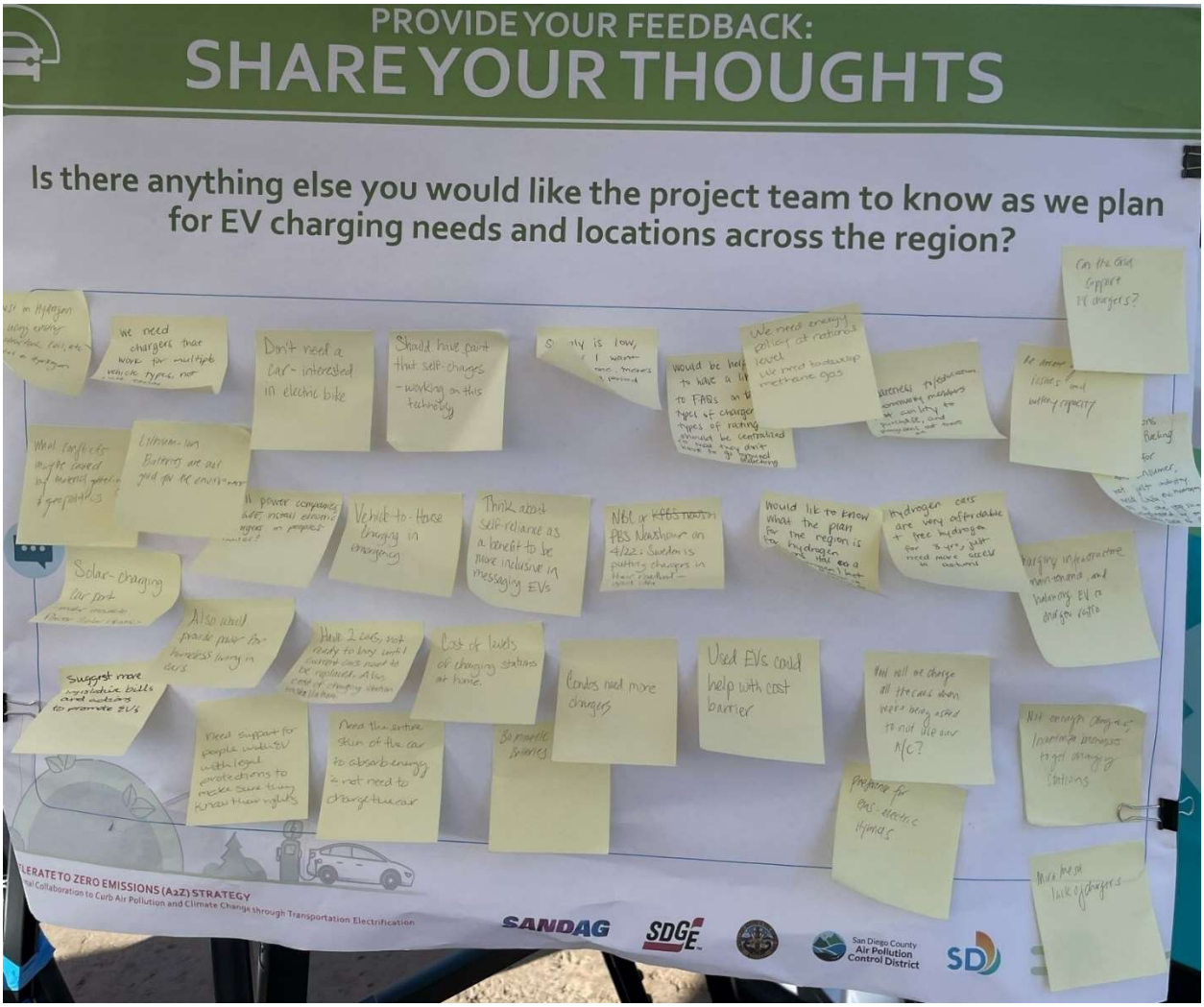


Figure 16 San Diego Earth Fair, Balboa Park Community Input



### D.3.2 Healthy Kids Day, Mottino Family YMCA, Oceanside

*Figure 17 Healthy Kids Day, Mottino Family YMCA, Oceanside Community Input*

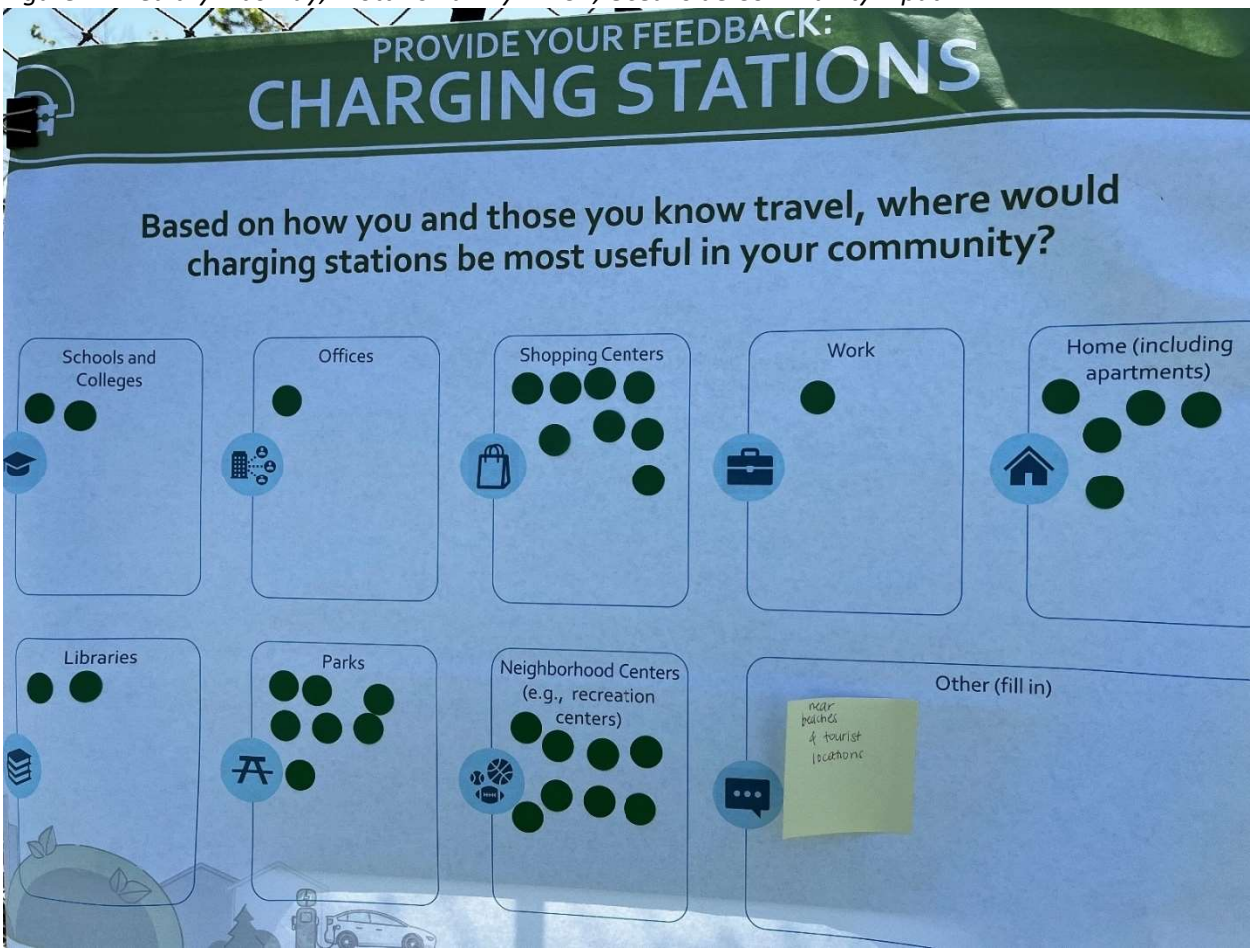


*Figure 18 Healthy Kids Day, Mottino Family YMCA, Oceanside Community Input*

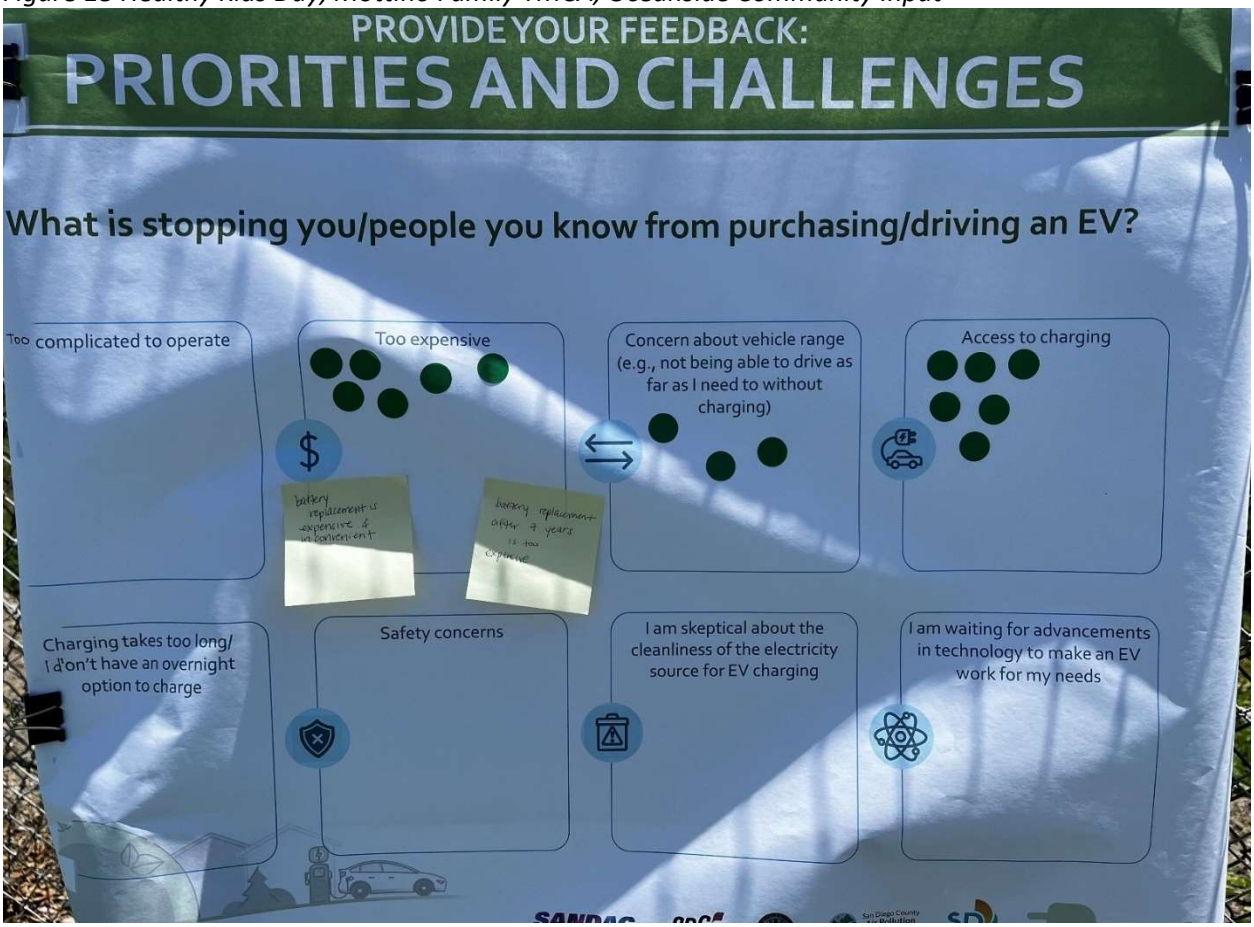
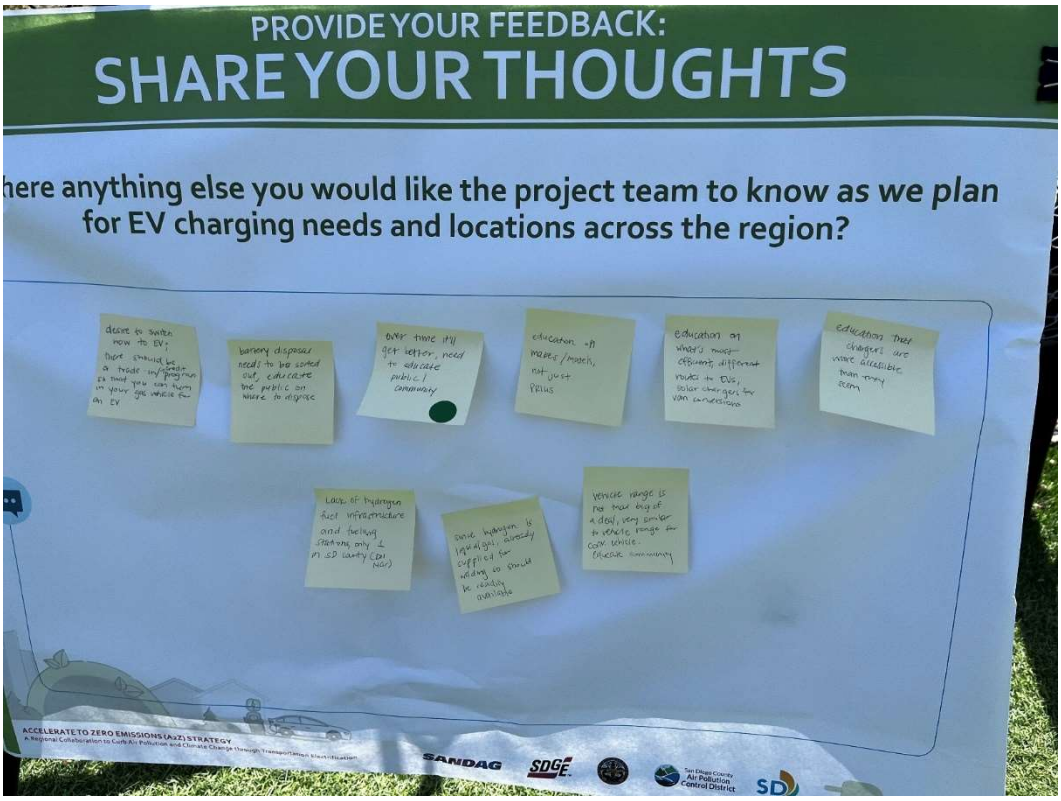


*Figure 19 Healthy Kids Day, Mottino Family YMCA, Oceanside Community Input*



### D.3.3 Healthy Kids Day, Cameron Family YMCA, Santee

*Figure 20 Healthy Kids Day, Cameron Family YMCA, Santee Community Input*

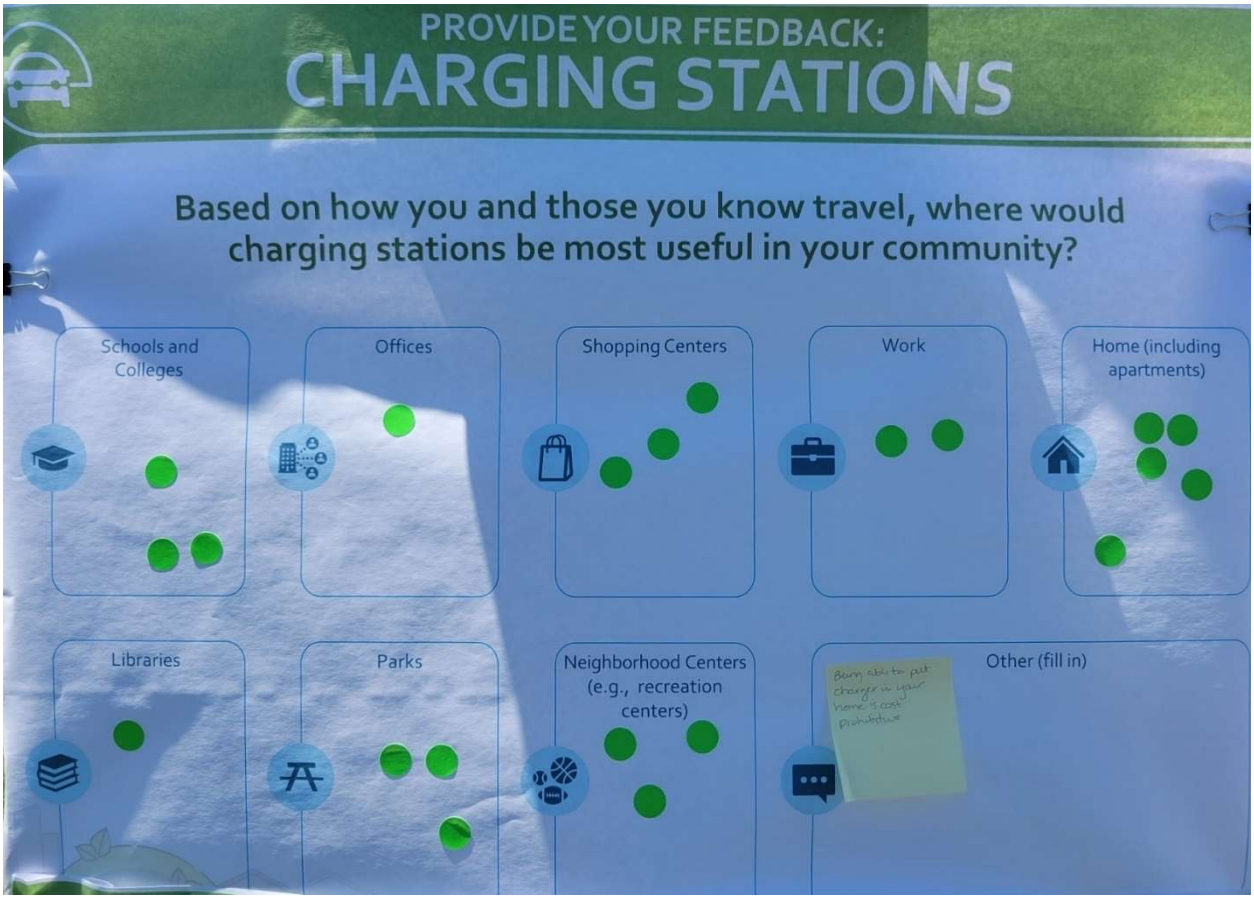


*Figure 21 Healthy Kids Day, Cameron Family YMCA, Santee Community Input*

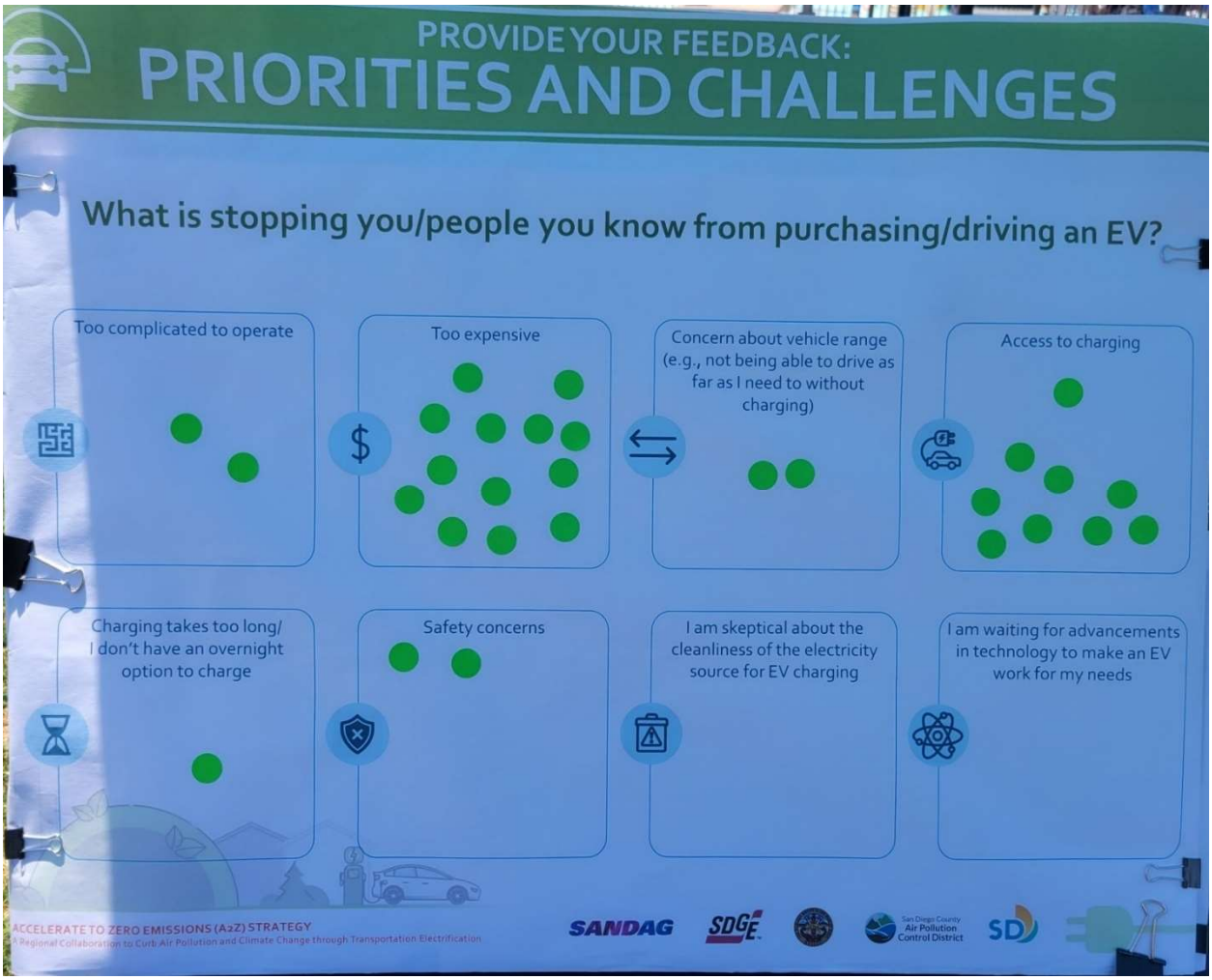
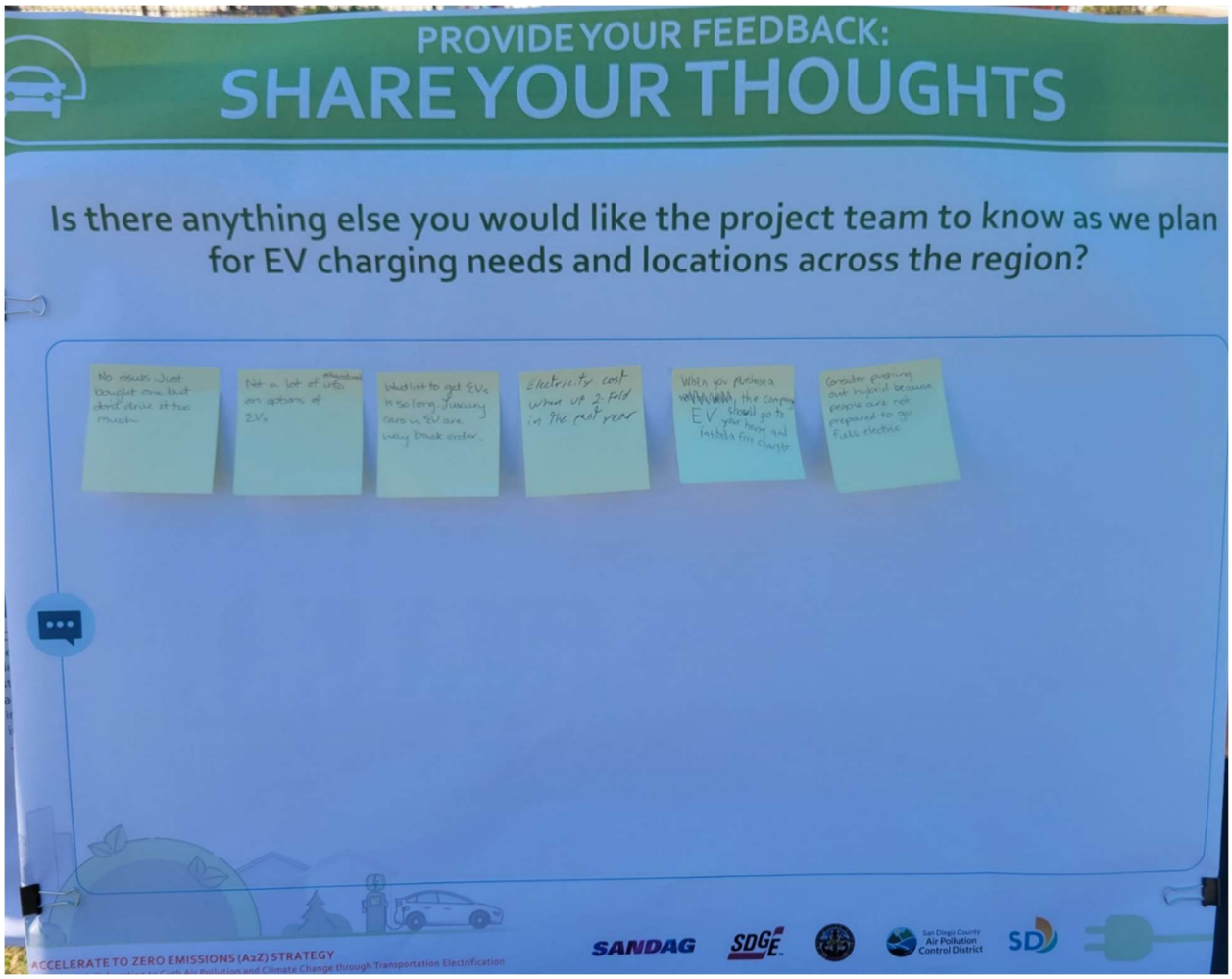


*Figure 22 Healthy Kids Day, Cameron Family YMCA, Santee Community Input*



## D.3.4 Healthy Kids Day, Jackie Robinson Family YMCA, National City

*Figure 23 Healthy Kids Day, Jackie Robinson Family YMCA, National City Community Input*

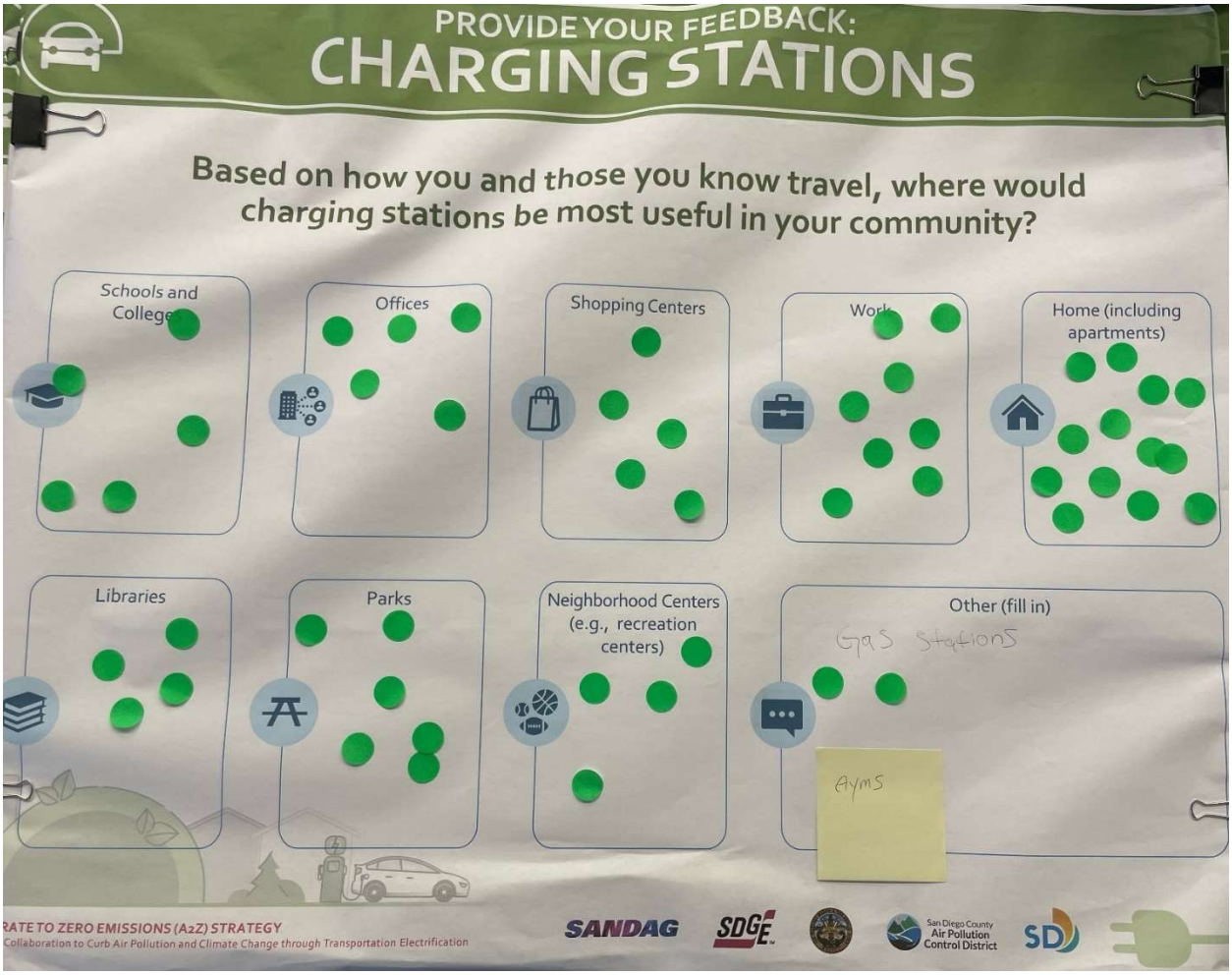


*Figure 24 Healthy Kids Day, Jackie Robinson Family YMCA, National City Community Input*

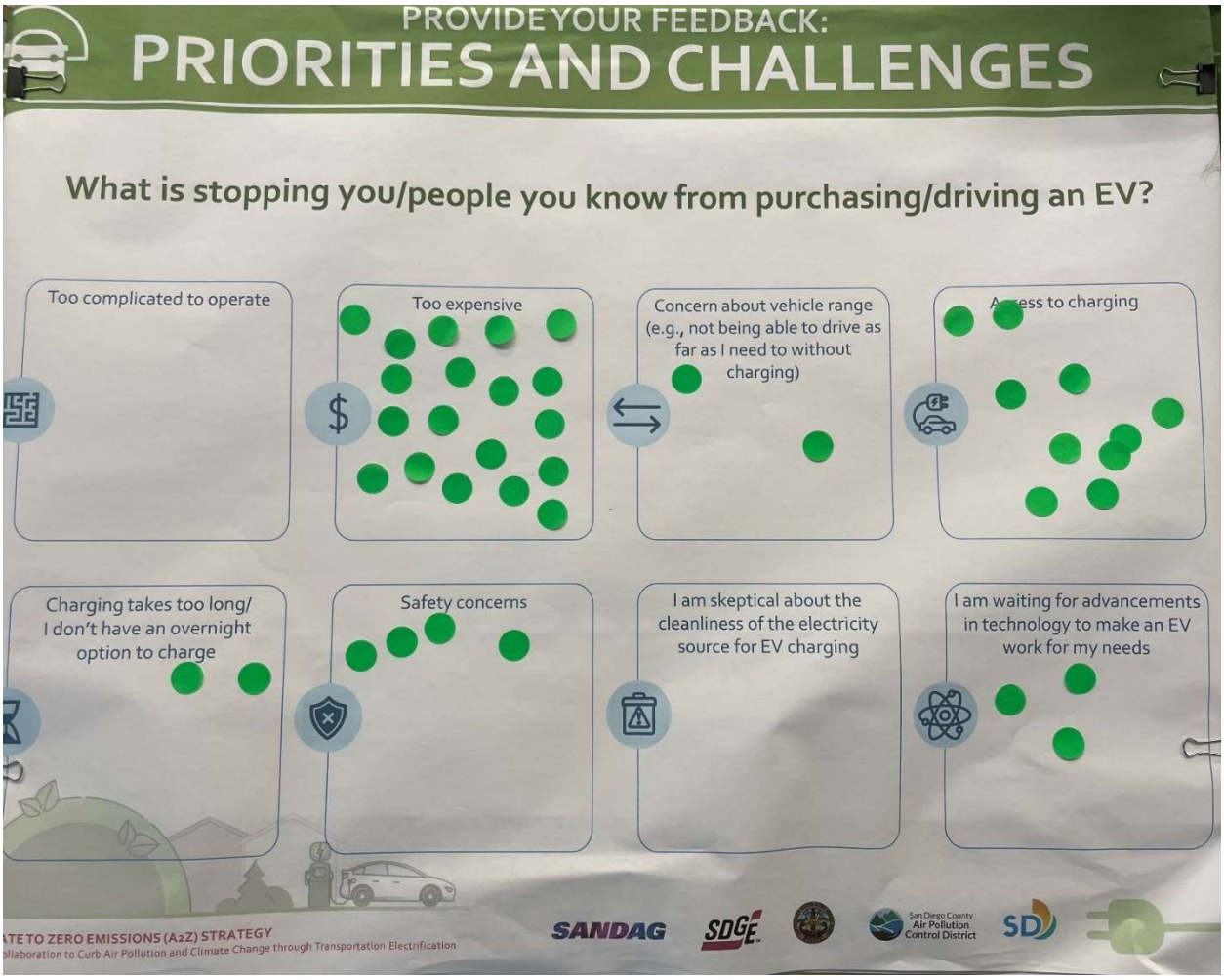
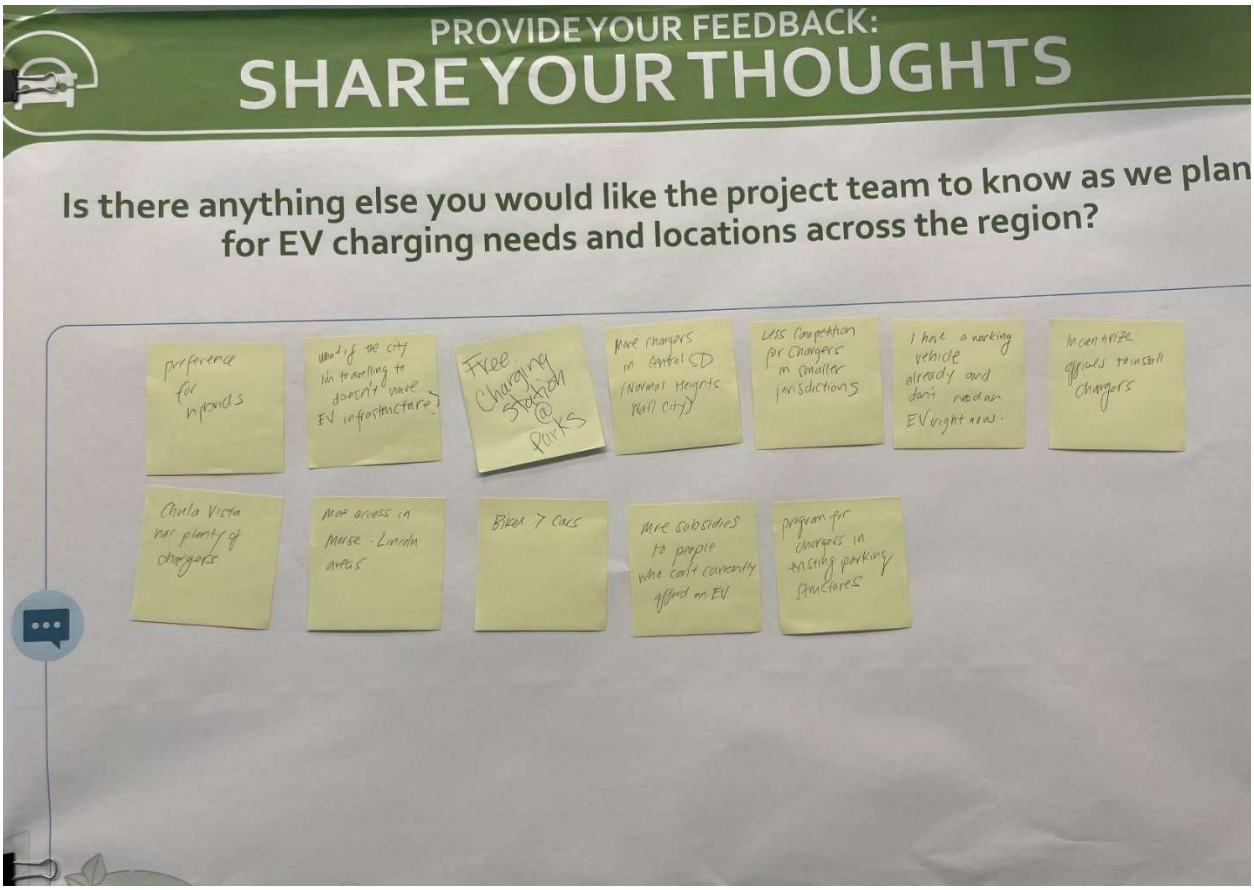


*Figure 25 Healthy Kids Day, Jackie Robinson Family YMCA, National City Community Input*



## D.3.5 Healthy Kids Day, Border View YMCA, Otay Mesa

*Figure 26 Healthy Kids Day, Border View YMCA, Otay Mesa Community Input*

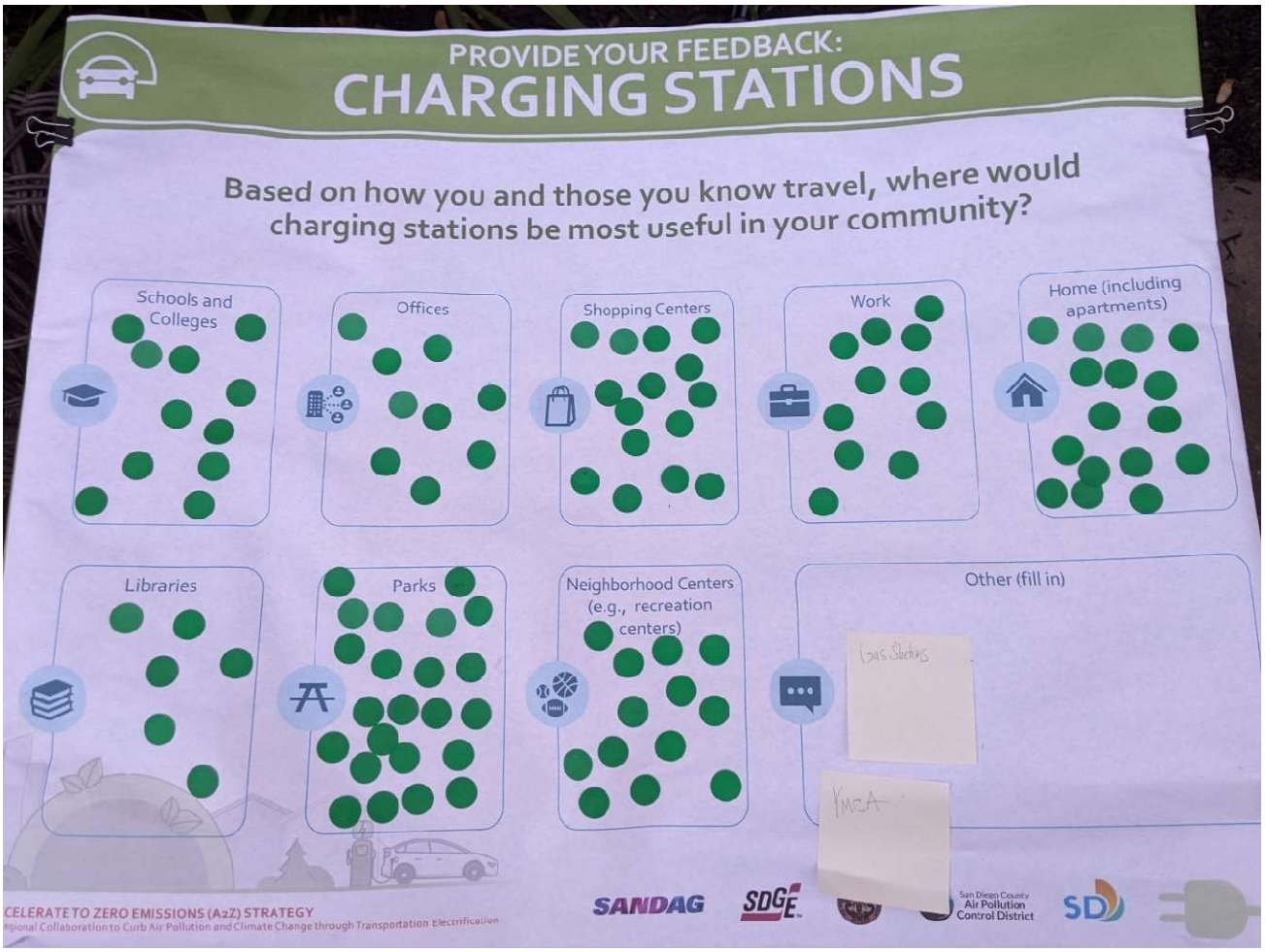
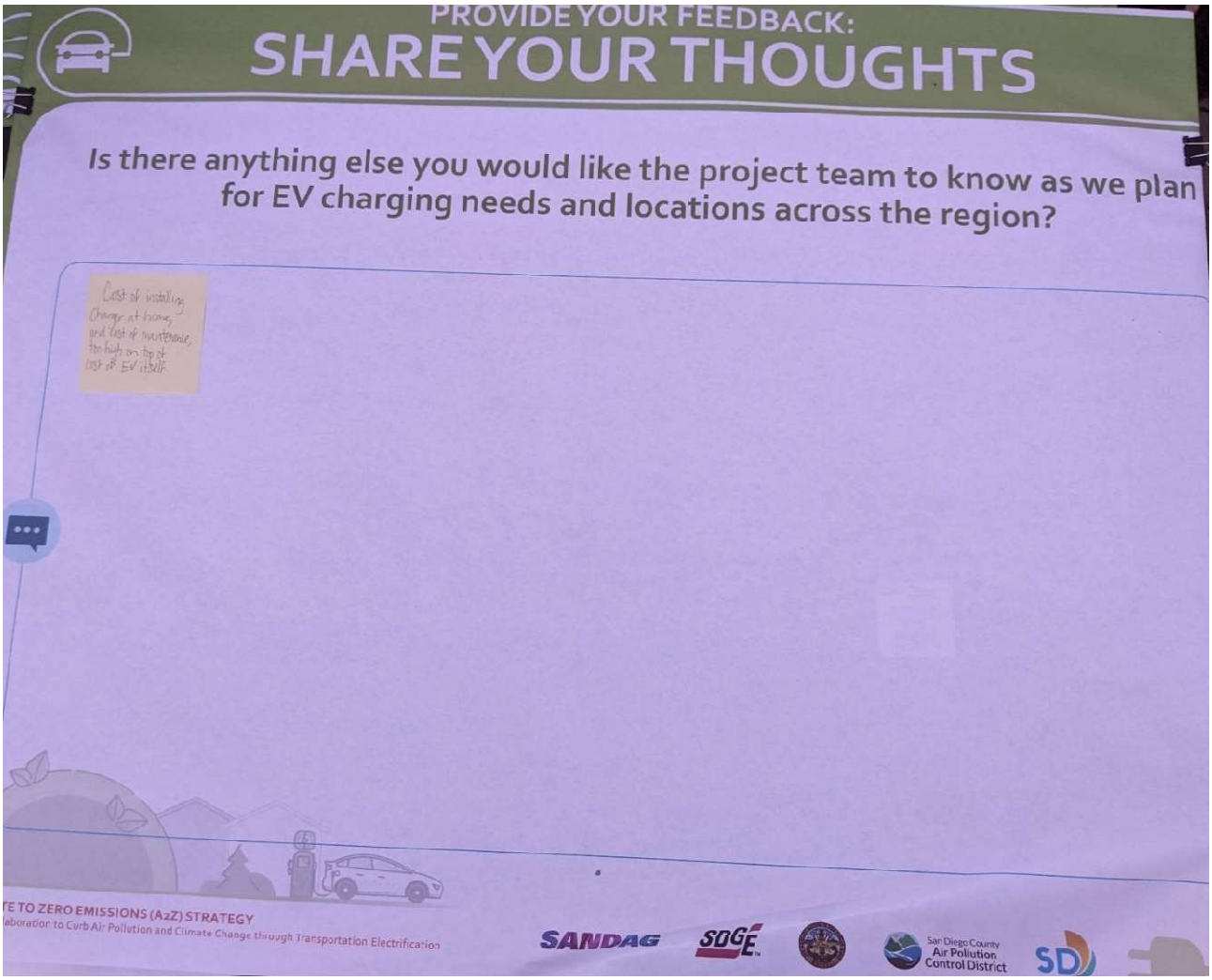


*Figure 27 Healthy Kids Day, Border View YMCA, Otay Mesa Community Input*

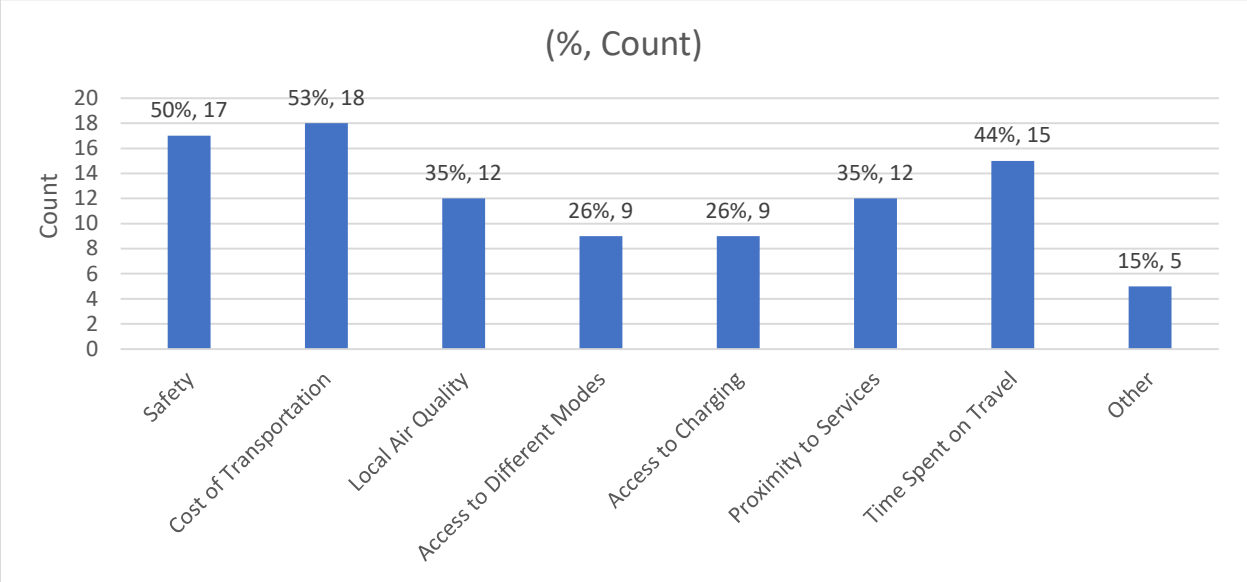
*Figure 28 Healthy Kids Day, Border View YMCA, Otay Mesa Community Input*



## D.4 Phase 1 Questionnaire Responses (April 22 – June 20, 2022)

**Question 1:** When you think about your community, your family, and how you get around on a daily basis, what is most important to you? Please select all that apply. If 'Other', please specify. [1]

*Figure 29 Results of Questionnaire Question 1*



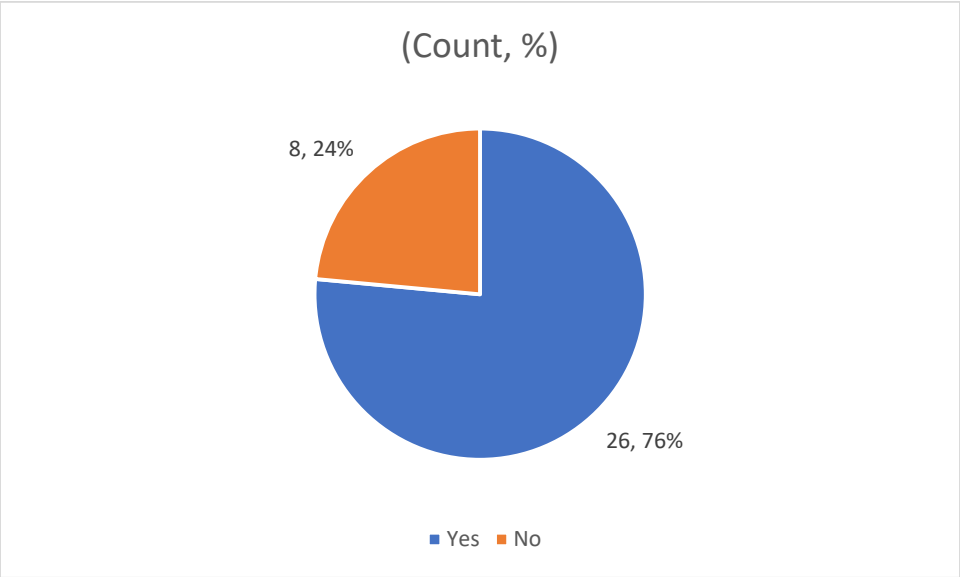

Other:

*Table 11 Results of Questionnaire 1 Question 1*

| |
|---|
| Accessibility, able to go directly to where I need to go, when I need to go there. |
| Enjoyable driving experience |
| The ability to go where I want, without waiting for public transportation |
| Using the excess 3 megawatts/year that I give the crooks SDGE from my solar panels |
| Improved and safe bike lanes – biking is a great option for transportation |

**Question 2a:** Have you considered purchasing an Electric Vehicle?[2]

*Figure 30 Results of Questionnaire 1 Question 2a*



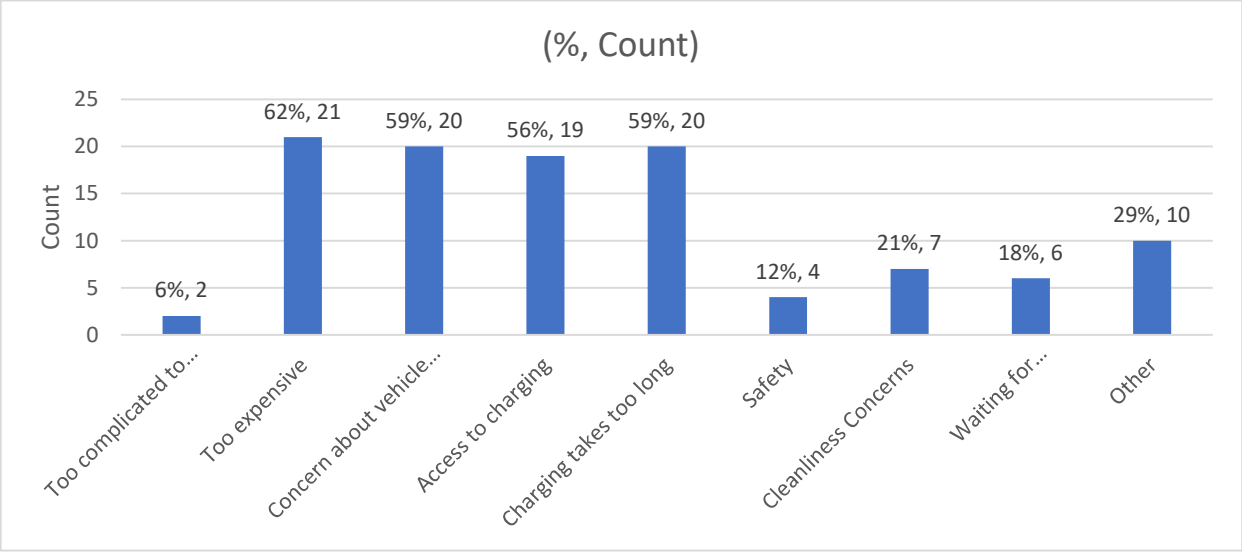

**Question 2b:** What might affect your ability to purchase or lease an Electric Vehicle?[3]

*Table 12 Results of Questionnaire 1 Question 2b*

| |
|---|
| Cost of vehicles, cost of electricity |
| 1) Range of use, and 2) Safety concerns if unable to charge vehicle during power outages (e.g., wildfire prevention outages, but then unable to evacuate if vehicle is not charged) |
| Too expensive and not enough range. |
| Since my car (gas) is fairly new, cost would be a big deal. I don't drive enough to make much difference in the air quality |
| I own an EV now |
| I plan to purchase in the next two years.... but will probably keep one gas vehicle until more charging stations available for long distances. Once that happens no need for gas vehicle. |
| I purchased an EV in 2018 |
| Price |
| High cost |
| Cost |
| Practicality of charging outside of home |
| they don't have a station wagon and I don't want to drive SUV |
| Cost, availability of models |
| Price of EV |
| Cost; however, I already own an EV (Model 3) |
| Nothing, I own a hybrid vehicle, I will never own an electric vehicle |
| The cost |

| |
|---|
| I cannot put a solar panel on my roof because I live in a condo. Therefore, I would be at the mercy of whatever SDG&E wanted to charge me. fix that if you want me to give up my Prius. |
| Cost, finances |
| Availability of the cars |
| Cost of vehicles,<br>Replacement batteries and electricity would need to be considerably lower. |
| Price |
| Ability to drive more than 400 miles. Safety of vehicle (i.e., fires) cost of electricity to charge. Ability to charge. Cost of vehicle. Cost of battery after 10 years. Recyclable ability of battery after it is dead. We can't keep the lights on now, am I going to be able to charge a car? Don't believe most of the BS about global warming in the first place!!!!! |
| Clear plan for safety of the lithium batteries disposal and fear of them exploding |
| Reliability, cost of vehicle & electricity, range. |
| cost + trade-in |
| Have you seen how expensive they are? $800+ payment a month is twice what I pay for a new vehicle. |
| Price. |
| cost |
| Location and availability of DC Fast Chargers for out-of-town trips |
| Cost |

*Figure 31 Results of Questionnaire 1 Question 2b*



Other:

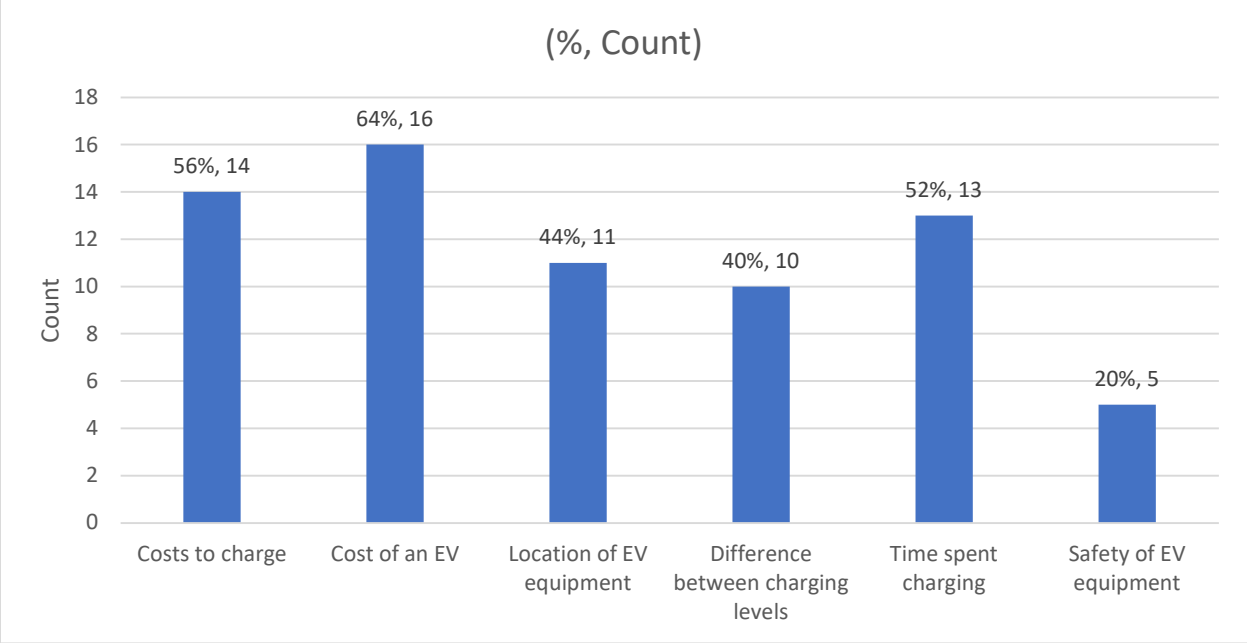
*Table 13 Results of Questionnaire 1 Question 3*

**Question 3:** What may be stopping you or people you know from purchasing/driving an Electric Vehicle? Please select all that apply. If 'Other', please specify.[4]

| |
|---|
| Our Priuses still work. Also, is hydrogen going to be adopted in San Diego? |
| I cannot put a solar panel on my roof because I live in a condo. |
| SDGE pricing plans not conducive to solar and EV ownership. |
| Waiting for an EV model that fits my needs (i.e., more SUVs) |
| Lack of support for converting existing vehicles to hybrid/electric |
| I want a station wagon EV. SUV is too tall/big. |
| Availability |
| I still have concerns with not enough fast charging stations in Chula Vista; specifically on the west side. There are zero charging stations by my work - 5 fwy/E st |
| Battery technology |
| Lithium battery - concerns for environment for procurement of Lithium |

**Question 4a:** What question(s) do you have about Electric Vehicles and Electric Vehicle equipment, such as chargers and hydrogen fueling?[5]

*Figure 32 Results of Questionnaire 1 Question 4a*




**Question 4b:** Do you have additional questions about Electric Vehicles and Electric Vehicle equipment that were not captured in the question above?[6]

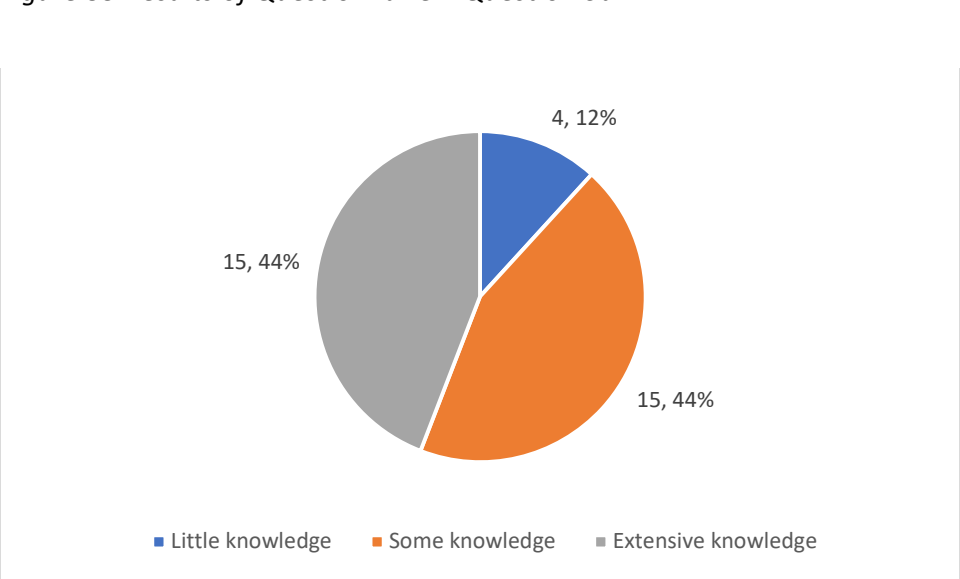
*Table 14 Results of Questionnaire 1 Question 4b*

| |
|---|
| I live in a multi-family building with no chargers. How do I get charging installed? |
| What is the lifespan of a vehicle battery, and if it needs replacing, can I just replace the battery? |
| No |

| |
|---|
| How will there be enough for everyone to quickly charge their vehicles and continue on their journeys - especially during busy travel times? |
| What about the mining of the metals for the batteries as well as disposal at the end of life |
| Even for people like me that have an EV, it is a struggle to have the convenience of a gas powered vehicle given the lack of charging stations in the county, especially the west side of Chula Vista |
| What additional, cheaper SUV or Minivan EVs will be coming out soon? Are there federal or state rebates that could be provided to those buying EVs? |
| Are there rebates for purchasing an EV? If so, could the county educate the public about any rebates that are available. |
| Why would I subject any new car to poor San Diego roads? Also, is there a Rebate info clearinghouse? |
| No |

**Question 5a:** How much awareness do you have about Electric Vehicles?[7]

*Figure 33 Results of Questionnaire 1 Question 5a*




**Question 5b:** What are key benefits of Electric Vehicles, from your perspective?[8]

*Table 15 Results of Questionnaire 1 Question 5b*

| |
|---|
| Clean air, lower cost of operations |
| Reduction in gas/oil usage, quieter operation means less noise pollution on the streets |
| Clean air |
| GHG emissions reductions |
| Saving gas, cleaner air |
| Reduced GHG and they are quiet; which is also a problem in parking lots as people do not hear the cars and step out in front of them. |
| I don't have to purchase gas |
| Quiet, clean, economical |

| |
|---|
| Environmentally much better |
| Less exhaust in the atmosphere; sense of enhancing our community's environment |
| No CO2 emissions as long as you charge the EV with 100% renewable electricity sources |
| Lower energy cost & better for environment |
| Reduced emissions |
| No emissions, can be sustainable if solar power is electrical source |
| zero emissions during driving |
| Air quality benefits |
| Reduced GHG's and improved air quality and more sustainable |
| Reduce GHG and other pollutant production |
| None |
| Saving on gas |
| I'd not be price gouged for gasoline right now because of the liberals and their policies |
| Zero emissions |
| Carbon footprint |
| None |
| At this point NONE! |
| Quiet |
| Clean air, Simplicity, lower maintenance. |
| children's future |
| savings on fuel |
| Cost per mile. |
| sustainable domestic energy |
| Lower carbon emissions and less expensive to operate over time |
| Eliminate combustion engines |

**Question 5c:** What are key drawbacks of Electric Vehicles, from your perspective?[9]

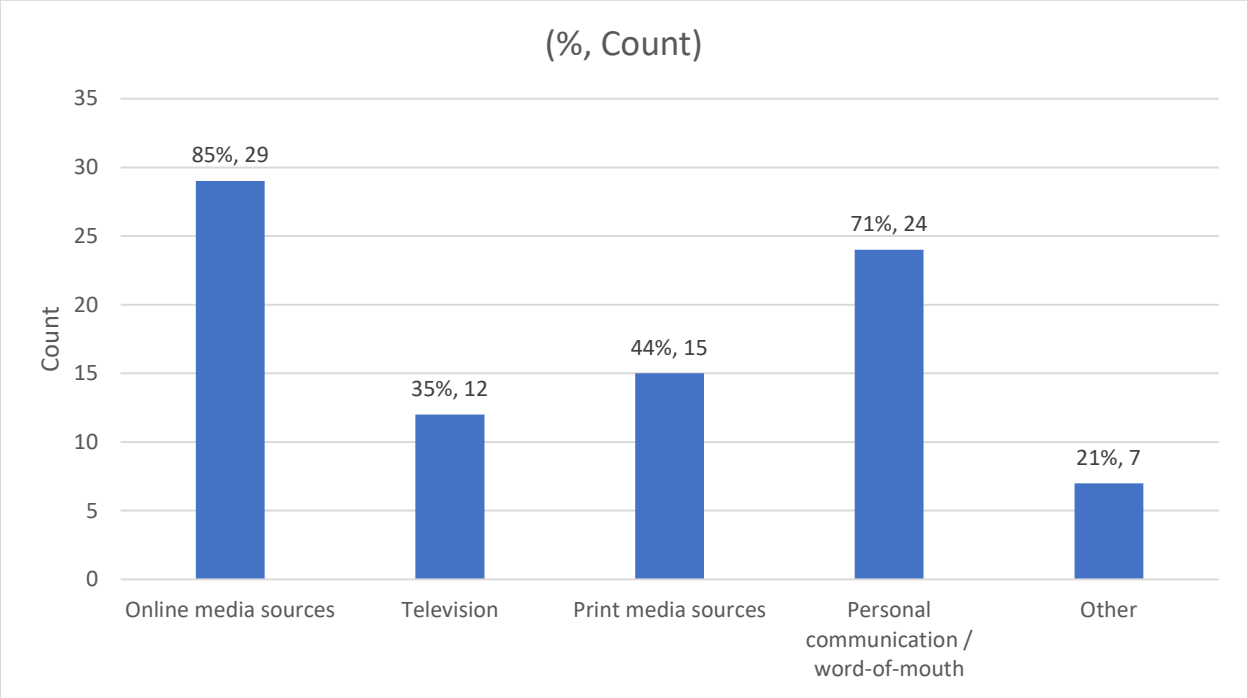
*Table 16 Results of Questionnaire 1 Question 5c*

| |
|---|
| Easy to use chargers |
| Individual, personal electric vehicles won't solve issues of traffic and urban sprawl. Sure, it's nice that cars won't be emitting as much pollution, but at the end of the day, replacing a gas car with an electric car doesn't change much, really. |
| Limited travel |
| Electricity costs, charging times may impact "cleanliness" of electricity provided |
| Range of use and inability to charge during power outages |
| Including the parking lot issue it is really a matter of logistics. If I travel to the National Parks and need to charge my electric vehicle; along with everyone else on the road, there are not enough charging stations to make this trip |

| |
|---|
| reasonable. If I pull into a gasoline station to fill my care - even if there is a line for refueling - I am likely to spend no more than 10 minutes here. If I pull into an electric charging station with a line for recharging - I am likely to spend quite a bit of time. Also, traveling during summer demands air conditioning in the car. If I run out of electricity or low or I am waiting to charge my car - how do I keep my travel companions cool. Think about older travelers, babies, dogs, etc. In 100 plus degree heat this is dangerous. |
| Have to set up the power at my house, i.e. the charging station |
| access to charging in multi-unit apartments |
| Procurement of Lithium and effects on environment |
| The cost of electricity (SDGE) is extremely high for those of us that charge at home; their idea of only charging after 9pm is not realistic when you have a regular charger (not fast charger) which can take more than 12+hours to fully charge; When I had a fast charger at home (level 2), our electric bill increased significantly |
| Need more fast DC chargers along freeways and at shopping malls and big stores |
| High cost to buy, less vehicle options |
| Cost of purchasing and increase of electric costs since I don't have solar at home. |
| Lack of chargers for long range trips. |
| battery components |
| Cost and availability/accessibility |
| Cost, battery degradation and range |
| Range, cost of vehicle |
| Utilizes electric power which is in limited supply. Heavy. Battery fires. Limited range and too long to recharge. High particulate emissions |
| Not knowing how to fix it if something is wrong |
| At the mercy of SDG&E pricing |
| Charging availability |
| Cost |
| See above statements. |
| CA electric grid is inefficient, cost to operate and purchase electric vehicles |
| Cost of battery repairs replacement. Convenient & fast recharge stations |
| no right to repair them. Everything has to be done through the dealership to maintain. |
| Range issues, if the only vehicle owned. |
| focus on consumer emissions rather than larger corporate emitters |
| Lack of non-Tesla DC Fast Chargers I'm community |
| Cost, accessibility to fast chargers |

**Question 6:** Where did you learn about Electric Vehicles? Please select all that apply. If 'Other', please specify.[10]

*Figure 34 Results of Questionnaire 1 Question 6*



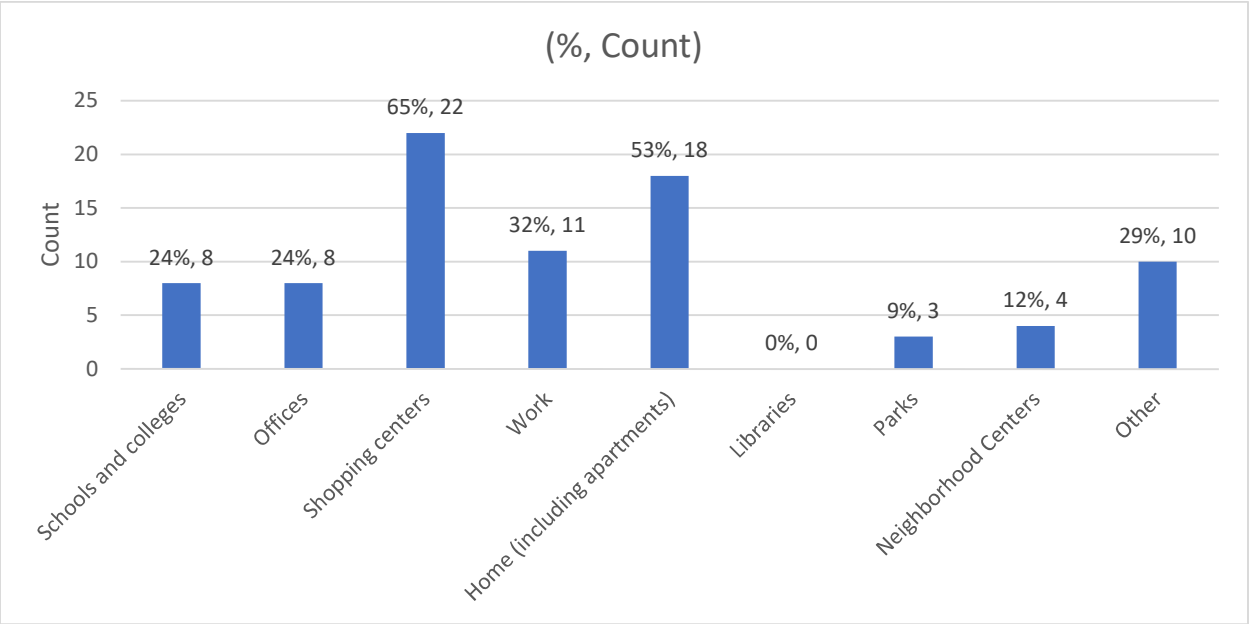

Other:

*Table 17 Results of Questionnaire 1 Question 6*

| |
|---|
| Automotive journals |
| Sports car/Enthusiast performance media |
| In college |
| From users of electric vehicles |
| Research |
| My husband has thoroughly researched |
| I own an EV hybrid |

**Question 7:** Based on how you and those you know travel, where would charging stations and other Electric Vehicle-related infrastructure, including Electric and/or Zero-Emissions Vehicle transit access, be most useful in your community? Please select up to three (3) locations. If 'Other', please specify. [11]

*Figure 35 Results of Questionnaire 1 Question 7*




Other:

*Table 18 Results of Questionnaire 1 Question 7*

| |
|---|
| Currently not feasible anywhere!!! |
| In my condo community. Duh. |
| Off major highways for longer trips |
| Convert gas stations into EV charging stations |
| Apartments |
| Hospitals and Clinics |
| Street parking |
| Rest stops and rural locations |
| Rest stops |
| Apartment complexes in particular, not needed in SF homes |

**Question 8:** Is there anything else you would like the project team to know as we plan for Electric Vehicle charging needs and locations across the region?[12]

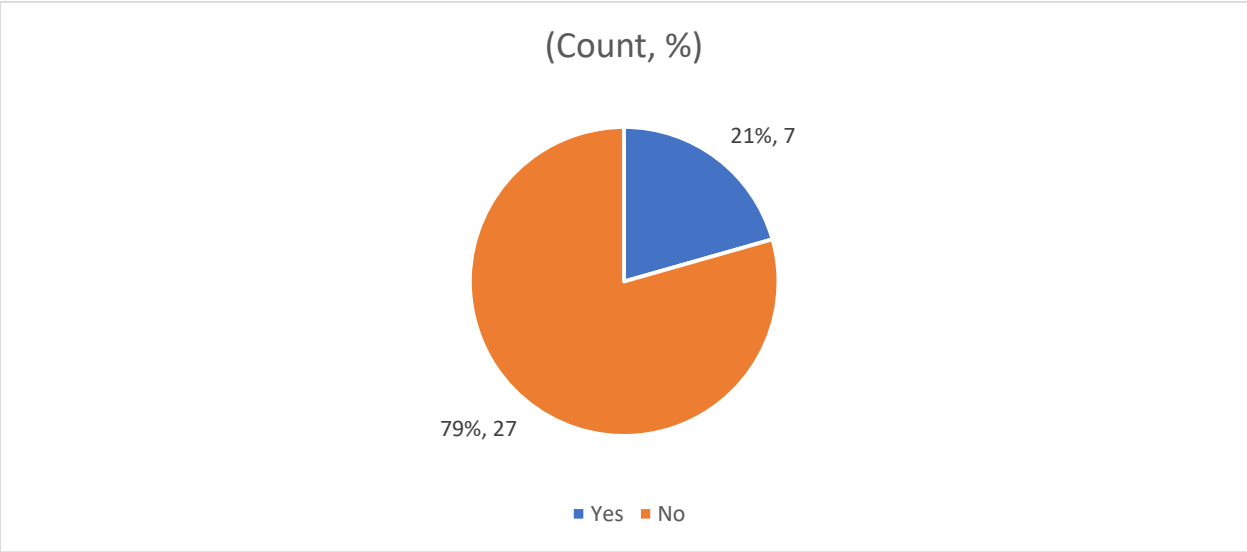
*Table 19 Results of Questionnaire 1 Question 8*

| |
|---|
| The local utility and city planners seem to only want to hinder chargers. How can we get these powerful gatekeepers from stopping electrification? |
| Lower your prices |
| The time and the location need to be logistically reasonable. We can't have charging locations in places that are not highly visible/public. We cannot have people (females) sitting in cars alone and waiting for inordinate amounts of time to charge their vehicle. |
| Talk about the mining of the metals needed for the batteries. |
| Wherever people park, charging should be available |

| |
|---|
| On the west side of Chula Vista, there is very little that encourages a resident to drive an EV. |
| Accommodate hydrogen refills in San Diego.<br>Offer local govt buyer incentives for vehicle purchase. Focus heavily on benefits to commercial vehicle buyers and convenience of use (trucks) |
| charging stations need bathrooms |
| I personally resent parking places being taken for electric vehicle charging that are always empty, I also detest the idea that some unelected SANDAG leader can disrupt gasoline powered vehicles flow, parking, etc., based on what they think is good for me. The one thing that bothers me the most is all of the effects of the push to ride bicycles, taking of vehicle lanes for bicycles that are not taxed or licensed and driven by people that disregard traffic control devices, such as red lights and stop signs. |
| Just stop telling people that the solution to climate change is for everyone to buy a $50,000 Tesla and put solar panels on the roof for $75,000. That's just irritating and return it out. |
| If they are not in lower income areas, it just reinforces the belief that EVs are for rich people. |
| Not practical for rural customers |
| No |
| Fix the grid first |
| Lower cost & increase availability of fast charging. |
| include EV parking on public streets |
| You cannot ignore the impediment that SDGE poses. They simply are too expensive, and do not support solar and EV enough. |
| I live in a rural area with frequent power cut-offs & fires. any charging station would require backup power sources to not be a safety issue |

**Question 9:** Would you like to provide additional, focused input on the A2Z Strategy? If 'Yes', you will be directed to answer seven open-ended questions on the A2Z Strategy. These questions are primarily geared toward agency and organization representatives that may be working toward increasing electric vehicle use in San Diego County, but all are welcome to answer these questions. If 'No', you will be directed to submit your form.[13]

*Figure 36 Results of Questionnaire 1 Question 9*




**Question 10:** Please provide your email address if you would like to receive email updates regarding the A2Z Strategy.[14]

- 15 responses provided

**Question 11:** What does successful integration of zero emission vehicles look like in your community?[15]

*Table 20 Results of Questionnaire 1 Question 11*

| |
|---|
| Every vehicle has low cost, convenient chargers |
| All residents, regardless of income or living situation, drive EVs |
| lead by example, all publicly owned vehicles should be ZEV, priority parking and charging widely available. |
| Solar EV charging stations at schools and workplaces. |
| places to charge for those unable to charge at home |
| Fewer gas and diesel vehicles on the road. Less noise and air pollution. |
| Making EVs affordable and making solar charging work financially with SDGE. |

**Question 12:** How receptive is your local community to driving Electric Vehicles and using electric transportation, such as buses, rideshare, and other options? Please note your local community in your response.[16]

*Table 21 Results of Questionnaire 1 Question 12*

| |
|---|
| Many people are interested but don't understand how to get set up for EV s. (Bankers Hill) |
| Very receptive, but feel purchasing their own EV is challenging (perhaps unattainable) |
| very open (Hillcrest) |

| |
|---|
| In Spring Valley, people feel positive about switching to personal EVs, but not about buses yet because it takes too long to get anywhere. |
| La Jolla seems receptive (I am a resident, filling out this form) |
| Scripps Ranch has a high penetration of electric vehicles. Buses are pathetically non-existent with the exception of a bus line that goes to Alliant University (and has no riders) and occasional MTS paratransit vehicles. I'm sure rideshare services are used fairly frequently though I've found that drivers often cancel before they arrive for a pickup, which is frustrating. |
| Unknown. Public transportation isn't an option and wouldn't be used if it was. |

**Question 13:** How does your agency or organization see the role of its partners in addressing these issues? Please note your agency or organization in your response.[17]

Essential. Agencies rely on support from entire region to ensure charging availability for residents and visitors.

**Question 14:** Please describe your future plans/campaigns/initiatives that are targeted towards the adoption of Electric Vehicles.[18]

*Table 22 Results of Questionnaire 1 Question 14*

| |
|---|
| I plan on my next car being electric, but I hope they become more affordable over the next few years. I am happy that all new cars will be electric by 2035. |
| Waiting for them to become affordable. |

**Question 15:** What would you like to see in the A2Z Strategy?

*Table 23 Results of Questionnaire 1 Question 15*

| |
|---|
| Streamlined permitting, electrical engineering resources, simple implementation direction for charger |
| rapid elimination of publicly owned and operated ICE vehicles |
| Rebates/help for people to buy electric vehicles. A limit to electric rate increases for people with and without solar. |
| charging stations at existing gas stations, including bathrooms |
| Rebates for EV adoption. |
| Practicality, not wishful thinking. |

**Question 16:** How can the A2Z Strategy be most useful for you and your work?[19]

*Table 24 Results of Questionnaire 1 Question 16*

| |
|---|
| Quieter streets and cleaner air |
| Rebates or other support can help low- and moderate- income people to purchase EVs. |
| Help lower costs. |

**Question 17:** What do you see as your role in supporting such a plan once released?[20]

*Table 25 Results of Questionnaire 1 Question 17*

| |
|---|
| Advocate |
| If the plan is helpful, I would like to be a customer and I would like to get my family and community on board with it. |

## D.5 Phase 1 Engagement Event Location Maps

*Figure 37 Event Locations and AB805 Disadvantaged Communities (SANDAG, 2020)*

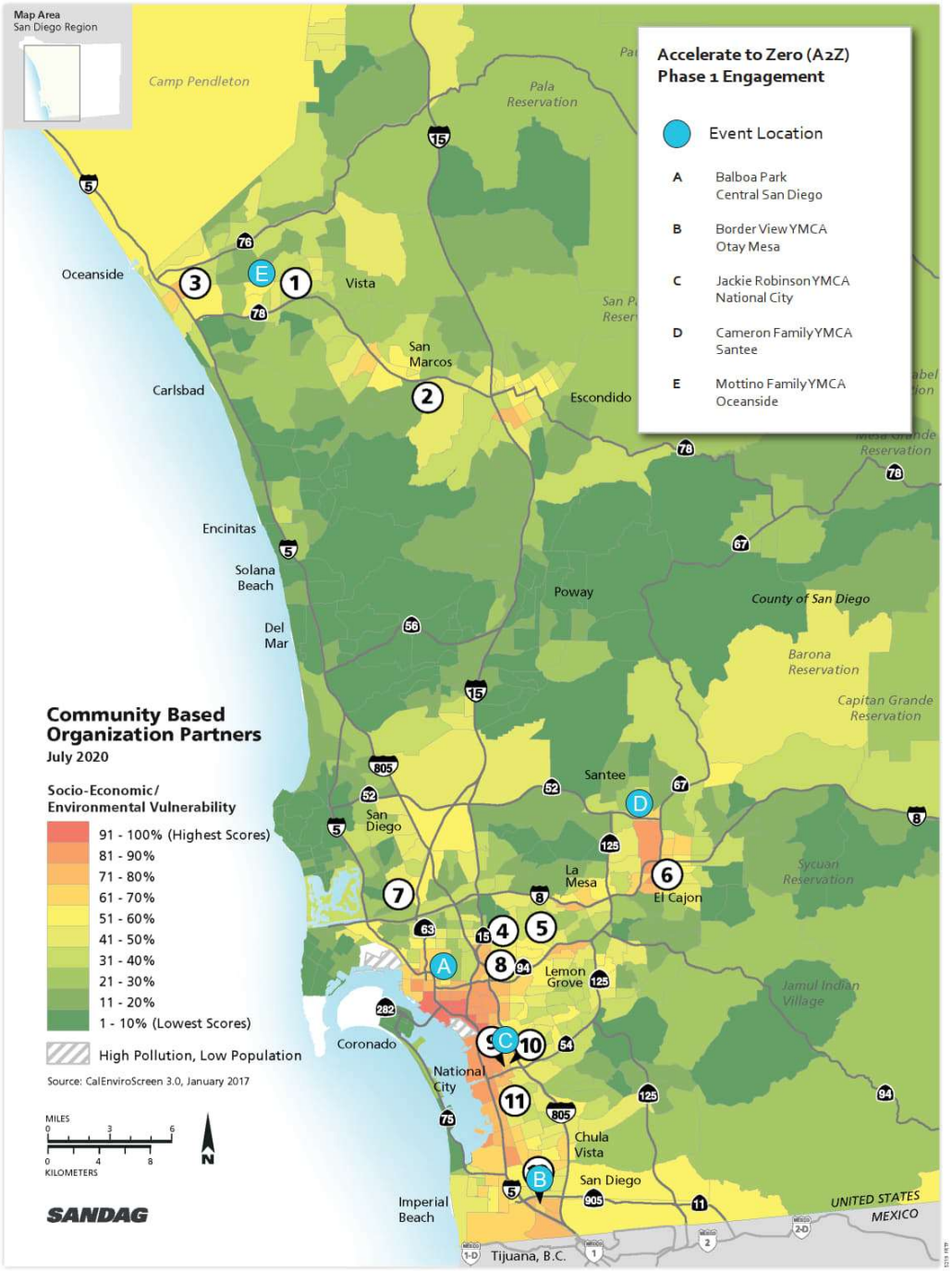
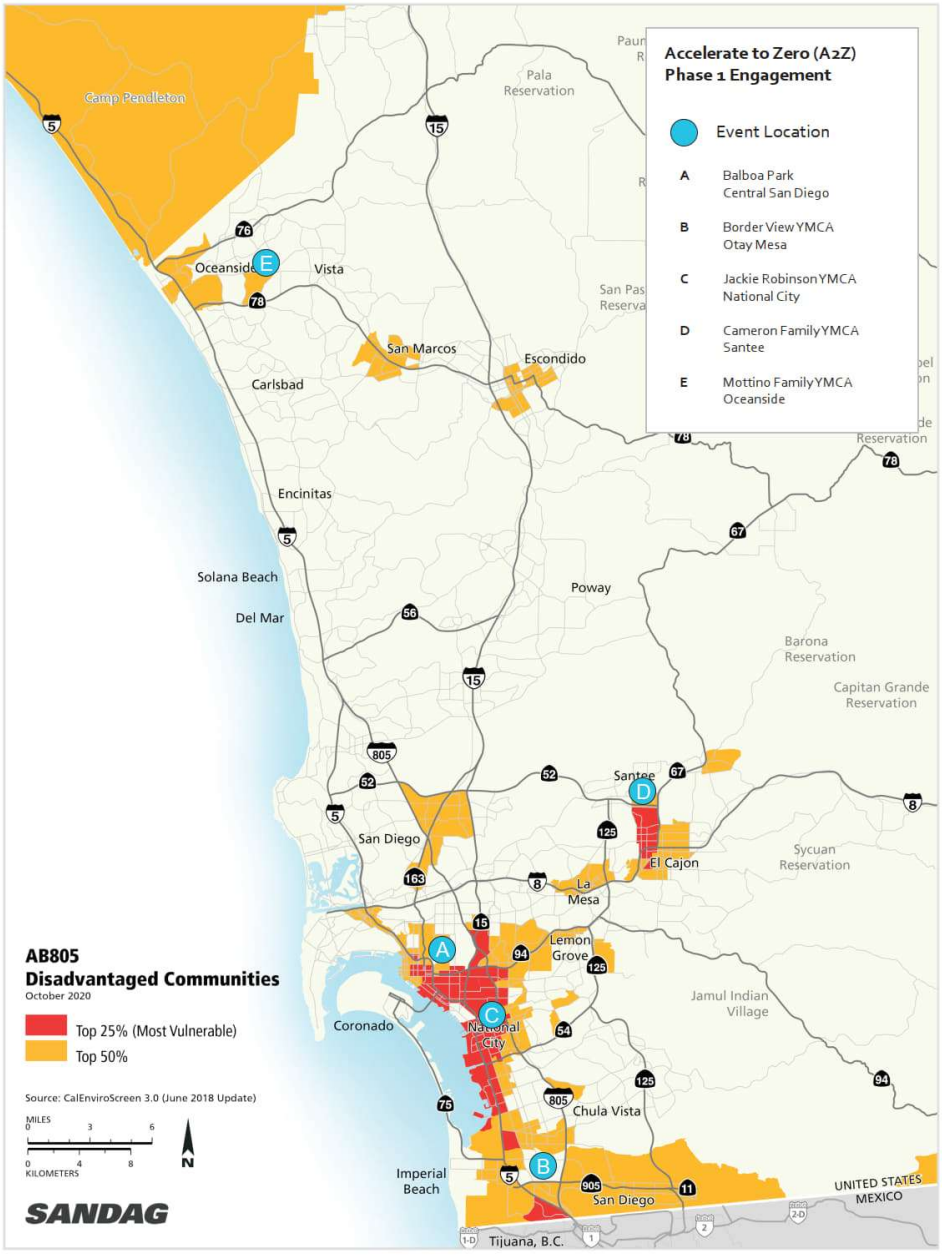


*Figure 38 Event Locations and Socioeconomic Vulnerability by CalEnviroScreen 3.0 (SANDAG, 2020)*



## D.6 Phase 2 Questionnaire Responses

**Question 1:** Which of the draft strategies do you like? Please elaborate.[21]

*Table 26 Questionnaire 2 Question 1*

| |
|---|
| I think these are most important: Increase the proportion of ZEVs on the road; Install ZEV chargers equitably across the San Diego region, especially in rural areas and communities of concern; Provide equitable and accessible opportunities to learn about ZEVs and ZE Infrastructure; Provide ZEV workforce training opportunities |
| None. The BEV push is too much too soon. |
| Increase the proportion of ZEVs in local government and business fleets and provide equitable and accessible opportunities to learn about ZEVs and ZE Infrastructure are the most important because they are realistic and can be implemented immediately. |
| Install ZEV chargers equitably across the San Diego region, especially in rural areas and communities of concern |
| Facilitate ZE Infrastructure in residential and commercial areas by creating new permit processes and updating building codes. My company installs, owns, and operates EV charging stations, so we are especially interested in developing more ways to remove barriers and increase installation of EV charging stations. |
| 2, 5, 6. Charging infrastructure is critical, and I think one of the biggest hurdles to widespread adoption. We have to get that right. |
| I think all of these strategies will help create an environment that is ZEV friendly, but ultimately, we are relying on citizens to purchase the vehicles. especially in "communities of concern" this process is daunting. the best step we can take as a coalition of agencies, is to prepare consumer support systems that help people understand what it means to own and drive ZEV and to find, fund, purchase, fuel, and maintain. |
| Increasing ZEV chargers equitably across the region and within rural areas and communities of concern. This should be prioritized to reduce barriers to access; however, it won't work effectively without also increasing the proportion of SEVs on the road. |
| I believe they're all very thoughtful strategies and look forward to further details. |
| Increase the proportion of ZEVs in local government and business fleets. Local government and business fleets account for the majority of regional vehicle miles traveled in comparison to consumer/commuter miles daily. |
| Make the installation of ZE Infrastructure more straightforward and accessible. Currently there is a lengthy process to obtain permits to get a project going. Ensure local utilities can handle an increase in ZEVs. We need to speed up the new utility timeline |
| The increase of EV on the road to minimize the use of gas |
| Install ZEV chargers equitably across the San Diego region, especially in rural areas and communities of concern |
| Increase ZEV on the road |
| While generally supportive of all strategies, those associated with an equitable, just transition towards ZEVs are most appealing. This ranges from the installation of ZEV chargers in communities of concern, the adoption of policies that encourage ZEV adoption, improved ZE Infrastructure permitting, and workforce training opportunities. |
| The increase the proportion of ZEV goals. This has a direct linkage to decarbonization transportation. |
| 1) "Install ZEV chargers equitably across the San Diego region, especially in rural areas and communities of concern" |

| |
|---|
| 2) "Provide equitable and accessible opportunities to learn about ZEVs and ZE Infrastructure"<br>3) "Support collaboration across local governments to meet regional ZEV goals"<br><br>I like these draft strategies, as they have a strong focus on equity and highlight the importance of infrastructure, education, and collaboration and sharing of information among stakeholders. Additionally, infrastructure in rural areas would ease range anxiety and most likely increase EV ownership. Collaboration between local governments would make educational campaigns and access to resources and incentives more straightforward. |
| All |

**Question 2:** Is there anything you would change about any of the draft strategies? Why?[22]

*Table 27 Questionnaire 2 Question 2*

| |
|---|
| I was an EV driver, and I am often dismayed at the condition of EVSE I find around the city. Is there some way to enforce maintenance of these charging stations? |
| Longer implementation times. We are willing to change but the current infrastructure can't support our current electrical needs. |
| No changes are needed |
| Collaboration with SDG&E will be essential to make sure there is infrastructure in place to support EV charging. However, an emphasis should be placed on load management strategies so that additional distribution infrastructure is installed only when necessary. |
| The process to install charges at any location has to be streamlined. Right now, it take too long and is too costly. I think the language in the strategies could be strengthened to make that a priority (for instance...straightforward and accessible...what does that actually mean). Permitting agencies and the utility have to work together to figure this out. |
| I would elaborate on ZEV workforce training opportunities to explain what that means. Can you list examples? Is this intended to address gaps in the workforce to provide support for the growing industry? |
| Not change per se...it would be great to see the role that the California Energy Commission (CEC), PUC, and other grant organizations play in these strategies. Which, I'm guessing, will come with further details. |
| Ensure local utilities can handle an increase in ZEVs, needs change to be specific in ensuring local utilities understand the locations at which there will be increases in ZEVs and what is the future demand at those locations. locations requiring large capacity infrastructure upgrades to utility systems should be prioritized with timelines provided to ZEV stakeholder government and business fleets. |
| I think there should be more focus on pushing the utility to provide new service to the infrastructure providers |
| No |
| Ensure local utilities can handle an increase in ZEVs REQUIRE local utilities should be already set in |
| No |
| There isn't anything I would change about the strategies themselves specifically. I think they clearly frame the multiple considerations when considering a transition to ZEVs. I would, however, underscore the ongoing need for locally relevant data/research that builds the case for why these strategies are important. For example, there isn't robust local ZEV/blue/green |

| |
|---|
| workforce data we can point to showing the specific workforce demands of our future energy and transportation economy. |
| More specify throughout. The more we can make these goals measurable the better. |
| "Make the installation of ZE Infrastructure more straightforward and accessible." -This could be applied to information on purchasing of EVs as well. Also feels very similar to the strategy regarding new permit processes and updating building codes.<br><br>"Support collaboration across local governments to meet regional ZEV goals"- collaboration with federal, state, and community-based organizations might be good to highlight as well. |

**Question 3:** Is there anything you would change about any of the draft strategies? Why?[23]

*Table 28 Questionnaire 2 Question 3*

| |
|---|
| I believe that DCFC is the future for charging in public spaces |
| Too much focus on BEVs. Should also account for renewable/synthetic fuels that are zero net carbon. |
| None |
| As mentioned in response to question 2, close collaboration with the distribution utility will be necessary. |
| See answer to #1 |
| Expanded outreach to the general population to explain what is happening and changes we all can anticipate. |
| A potential regional rebate program for converting vehicle owners who transition from ICE to EV. Most vehicles don't qualify for the Inflation Reduction Act of 2022 - and it will take a few years for current EVs to meet those requirements. Would be great to have a stop-gap for the interim 2-4 years...and San Diego could help lead other regions across the country with a robust and thoughtful interim solution. |
| Education for government and business fleets in identifying and designing appropriate charging infrastructure. Evaluation of scheduling/grid peak demand/quantity of spaces needed, to provide to Utilities. Encouraging government and business fleets to have electrification plans 5-year minimum, 10-year preferred. |
| I think there should be a focus on EV charging for condo/apartment residents. |
| No |
| More opportunities for ALL communities to have access to these programs |
| No |
| Perhaps a path to ensuring existing infrastructure, vehicles and/or workforce is sustainably and justly transitioned. For workforce, that could include job training and transition support opportunities. For infrastructure, being able to use existing infrastructure where possible, and finding sustainable ways of disposing of or repurposing old infrastructure. |
| Urban planning measures, active transportation, and tele-commuting are all areas that could be included and have direct roles in decarbonization transportation. I would encourage including at least one topic that can capture these areas for future discussion and pursuit. |

| |
|---|
| The Gap Analysis highlighted that a lack of regional data regarding EV owners and use makes it difficult to plan infrastructure deployment. Highlighting the importance of collecting this data in order to quantify a baseline, effectively allocate resources, and measure success might be useful. |

**Question 4:** Equity is an important component of this effort. Do you have feedback regarding how equity is addressed in the draft strategies?[24]

*Table 29 Questionnaire 2 Question 4*

| |
|---|
| Providing access to EV purchasing and charging in communities of concern is not at all like providing these in other communities. How residents of these communities purchase vehicles, drive and park them, and fuel them needs to be carefully examined |
| Hard to be equitable when BEVs are cost prohibitive for many drivers/families. |
| I believe we should use the Cal-Enviroscreen 4.0 |
| Prioritize public investments in areas the market will not invest in. Assisting multi-unit dwelling EV charging installation will be important to bringing more EV charging opportunities to communities of concern. |
| Yes |
| supporting second market is essential for equity |
| Yes, since addressing as many barriers to participation is part of this, is there a way to incorporate annual reporting to show where we are at identifying and addressing as many barriers as possible? |
| Equity seems to be addressed pretty thoroughly in the strategies. A rebate program based on income and/or other financial hurdles might facilitate an even greater transition to EVs. |
| No |
| Again, focus on those areas where garages are a luxury |
| The rebates make buying this type of vehicle more accessible |
| In the less fortunate areas of the federal region families are in need of more education more more accessibility to programs to that will help them achieve their goal OK |
| Offer more grants! |
| I see equity as an underlying theme in each of these strategies. As long as that is clearly articulated and reinforced from development to implementation, I have no concerns. |
| Point to the how you can make this measurable and achievable. Equity as determined by (e.g. Cal-Enviroscreen), as measured by (e.g. EVSE in DAC census unit). |
| I appreciate the careful consideration the strategies take in incorporating equity. It might be important to highlight the importance of equity not only in educational opportunities and infrastructure, but in ownership of ZEVs as well. I believe collaboration across local governments could also provide support for communities of concern. |

**Question 5:** Are there strategies that you would like to see prioritized for implementation in the San Diego region? Why?[25]

*Table 30 Questionnaire 2 Question 5*

| |
|---|
| Renewable energy sources beyond electricity. Electric shouldn't be the only answer for everything. (cars, houses, commercial) Maybe use diverse zero net energy sources. |

| |
|---|
| Provide ZEV workforce training opportunities because once people are familiar with ZEVs and how to repair them when needed, the faster people will buy them. It's important to provide training in order to create jobs. |
| Install ZEV chargers equitably across the San Diego region, especially in rural areas and communities of concern |
| Streamlined permitting. |
| I think access to charging at/near home for multifamily housing situations where at home charging isn't available is a future need, we should anticipate. |
| Electrification of public fleets (service vehicles, first responders, etc.) - that way communities are leading from the front. |
| Regional collaborations should include businesses, and the utility to design adequate infrastructure plans for deployment. Plans must target greatest VMT contributors. HIGH annual VMT agencies and businesses with less than 100 annual miles would be best suited for immediate targets, planning, and prioritization. |
| Focus on the rideshare community as well as condo dwellers |
| Lowering the cost of the vehicles to have more people have the opportunity to buy |
| Yes, because San Diego County are more and more about the South Bay area Nashville city center Cedar Hill vista and Imperial Beach are all in need more equitable implementations due to the areas lower Income families in the area |
| Those associated with an equitable, just transition towards ZEVs. |
| Additional EVSE siting and implementation. |
| Strategies relating to educational outreach and expansion of infrastructure seem to be of top priority to other stakeholders and would likely have the greatest impact in reaching EV related goals by 2025 and 2030. |

**Question 6:** Are you part of an agency or organization that interfaces with electric vehicle infrastructure and mobility issues, or are you interested in future opportunities to learn about the A2Z Strategy?
If so, please provide your email to stay involved as the A2Z Strategy moves toward implementation.[26]

**Question 7:** Is there anything else you would like us to consider as we finalize the strategies? [27]

*Table 31 Questionnaire 2 Question 7*

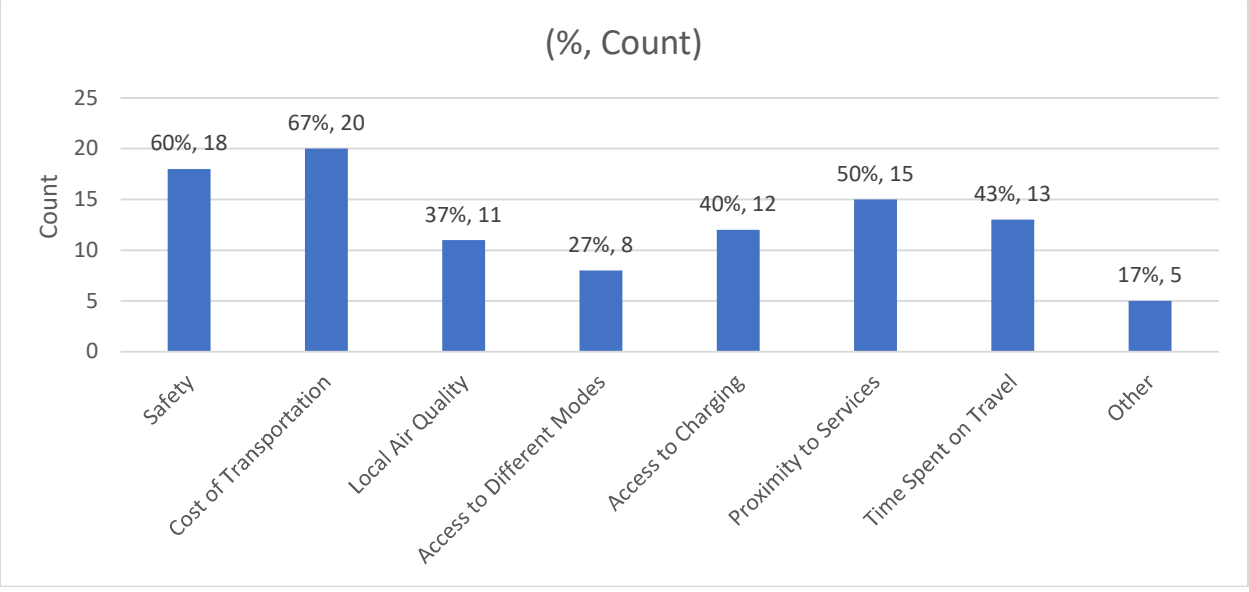
| |
|---|
| Take some power away from CARB to implement plans with zero legislative oversight. |
| Education for people about incentives from the Inflation Reduction Act and state incentives. This can be done on the bus, trolley, and social media. |
| The first strategy is really the ultimate goal. Not sure it is an actual strategy. Second should be Support the installation of chargers equitably...Fourth strategy should be...work with regional stakeholders (unions, community colleges, workforce development organizations, industry) to create ZEV workforce training opportunities. Support government policies that encourage ZEV adoption and facilitate the installation of ZEV charging infrastructure. Facilitate the installation of ZE Infrastructure in residential and commercial...Work with local utilities and other stakeholders to ensure the electrical grid can support an increase in ZEVs. |

| |
|---|
| I think the team is doing a great job of communicating strategies and fostering open dialogue. I work for Aptera - a solar electric vehicle company based in Carlsbad - and we look forward to partnering with the steering committee and other stakeholders to help the transition away from fossil fuels. |
| Build a private dog park with EV charging as an amenity |
| No |
| It is the best interest of your agency to be able to serve the entire community from the lowest standards to the highest we have a lot of people living in the same area but I'm living more comfortably than others and finding a good balance, so families won't be separated so families won't have to endure things like desperation of need of a vehicle |
| Not at this time. |
| Great work getting to here! |
| While strategies are high-level and sufficiently cover barriers identified in the Gap Analysis, they are somewhat abstract. Successful implementation would likely require more concrete, region-specific measures relating to these overarching strategies. |
| Electric transit- both buses and trains |

## D.7 Additional Phase 1 Questionnaire Responses Received Sep 20 – Oct 21, 2022

**Question 1:** When you think about your community, your family, and how you get around on a daily basis, what is most important to you? Please select all that apply. If 'Other', please specify. [28]

*Figure 39 Additional Questionnaire 1 Question 1*



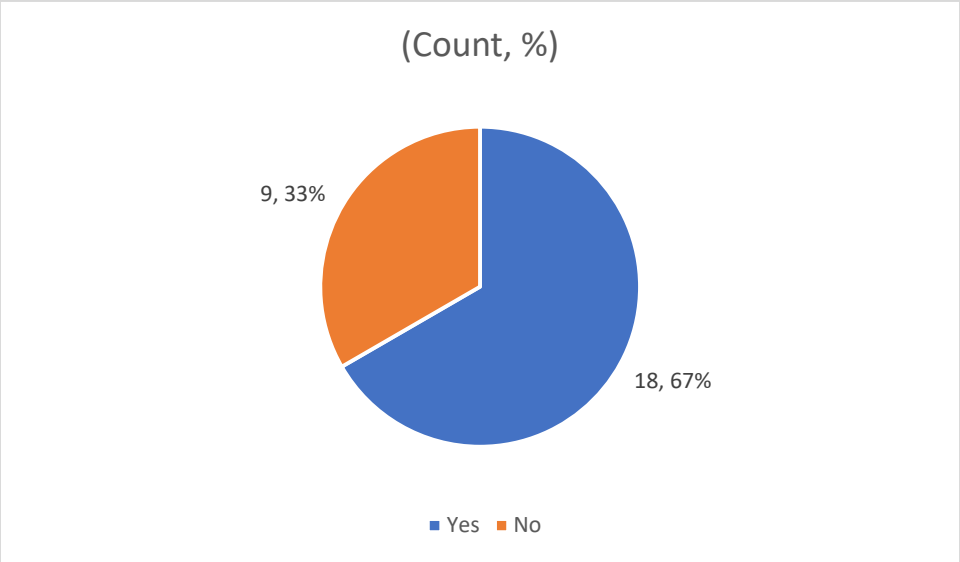
Other:

*Table 32 Additional Questionnaire 1 Question 1*

| |
|---|
| Greenhouse gas production |
| Being able to get from point A to point B |
| Other (not specified) (3) |

**Question 2a:** Have you considered purchasing an Electric Vehicle?[29]

*Figure 40 Additional Questionnaire 1 Question 2a*




**Question 2b:** What might affect your ability to purchase or lease an Electric Vehicle?[30]

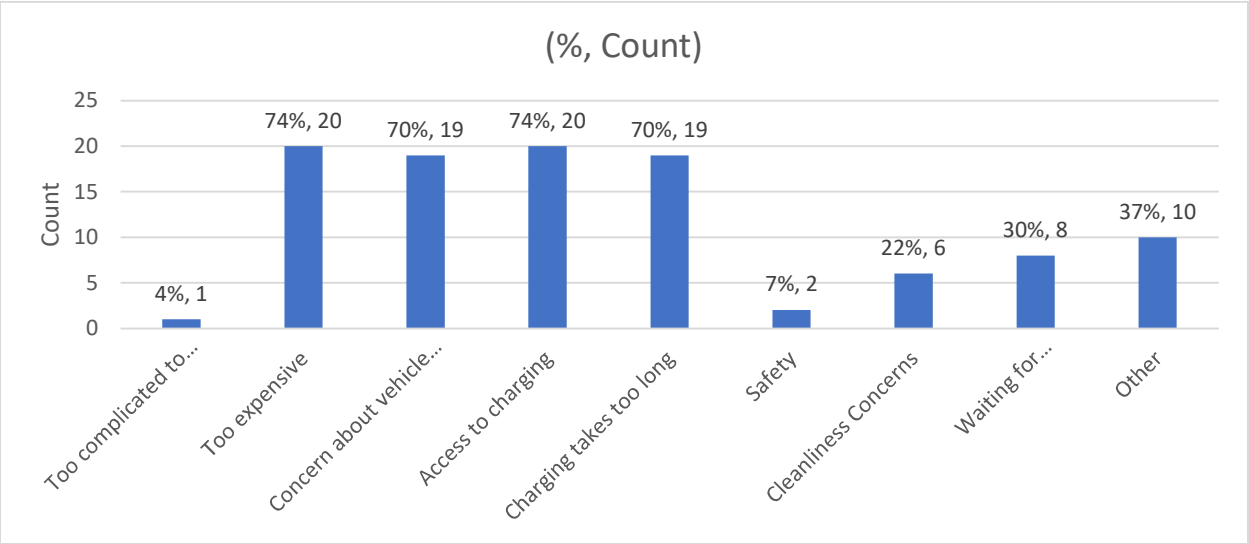
*Table 33 Additional Questionnaire 1 Question 2b*

| |
|---|
| Availability of electric chargers |
| Cost. Charging station availability. Driving range. Electrical charging cost and availability |
| Charging stations |
| Cost. I am retired on disability. Charging. My house is 80 yrs. old and I already have electrical problems, when plugging in too many devices. I also wonder how much pollution is caused by jet fuel AND cigarette smokers. Maybe those two issues need to be looked at, also. |
| Nothing, I won't buy one |
| Keeping the EV charged |
| Can't charge at home (apartment) or at workplace |
| Range concerns, 160+ range needed |
| Cost |
| Availability |
| Cost, rebates or discounts offered |
| Personal Credit |

| |
|---|
| I own an EV. I want another; however, range anxiety exists, and I won't buy another one with a battery that won't last 400 miles. |
| Income |
| Cost |
| Charging at work |
| Price, choice in cars/types of smaller cars, range, quick charging similar to gas station availability |
| Already bought one |
| Cost, lack of practicality, took heavy metals needed to create batteries are strip mined from countries causing greater damage to the environment than efficient fossil fuel vehicles. Entire premise is a fallacy. Plus, the state's power grid cannot accommodate every person driving an EV. |
| Hybrid is the answer not EV. total environmental cost of EV is more expensive that gas powered vehicle. |
| Cost, availability, ability to charge at home or apartment or neighborhood hub |
| Already own two plug-in vehicles plus installed solar on our house and primarily charge at home off peak... |
| Price of EV |
| I already own one. We're looking at purchasing another. |
| 1. When the technology actually catches up to the real world! 2. When this state can actually have enough electricity to keep the lights on. 3. When the experts tell me that it won't cost the equivalent of $3.50 a gallon to charge my car. 4. When an electric vehicle can have the same travel distance as a gas car, and I can charge it just as fast as I can fill up a gasoline car. |
| Convenience of maintenance and cost |
| Charging resources (or lack thereof) and affordability. |
| Senior financial support for the leasing and vehicle insurance required to switch to EV |
| Home charging stations |

**Question 3:** What may be stopping you or people you know from purchasing/driving an Electric Vehicle? Please select all that apply. If 'Other', please specify.[31]

*Figure 41 Additional Questionnaire 1 Question 3*



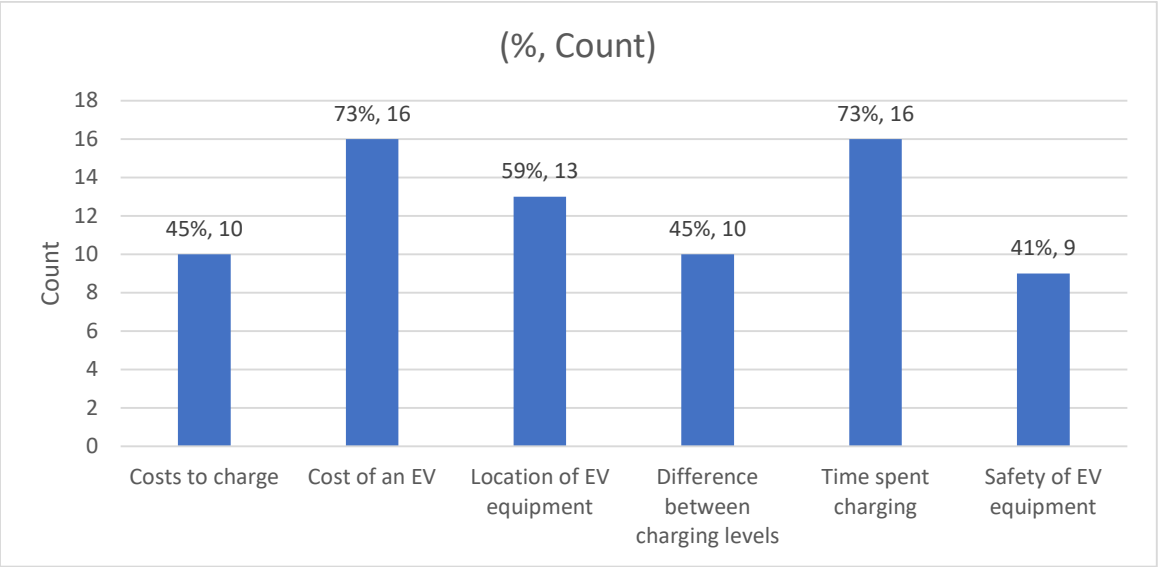

Other:

*Table 34 Additional Questionnaire 1 Question 3*

| |
|---|
| EV have a very low resale value. |
| Electric is generated by carbon emissions from power plants. |
| See 2b |
| It's a soulless appliance, it'll never be actually clean to make |
| Other (not specified) (6) |

**Question 4a:** What question(s) do you have about Electric Vehicles and Electric Vehicle equipment, such as chargers and hydrogen fueling?[32]

*Figure 42Additional Questionnaire 1 Question 4a*



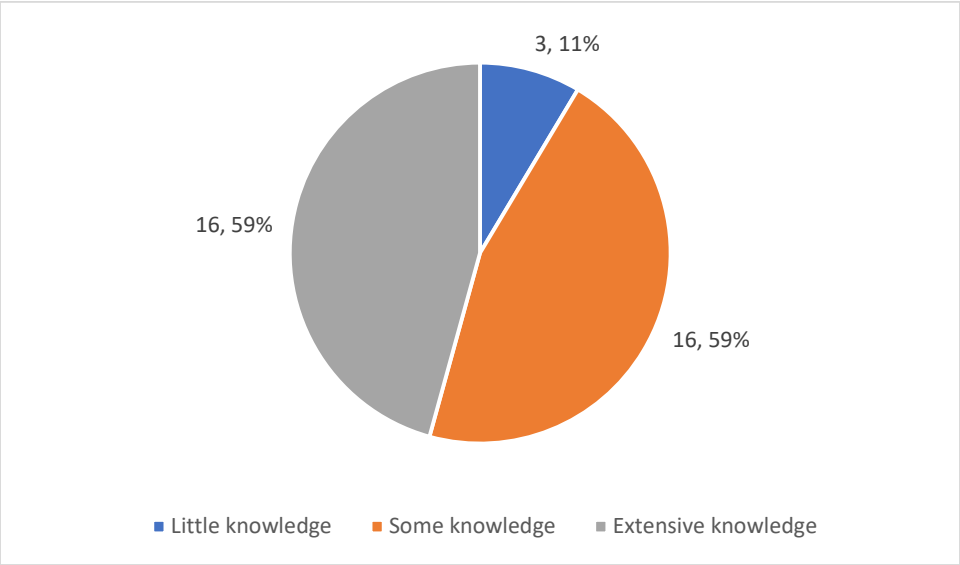

**Question 4b:** Do you have additional questions about Electric Vehicles and Electric Vehicle equipment that were not captured in the question above?[33]

*Table 35 Additional Questionnaire 1 Question 4b*

| |
|---|
| No |
| How much fossil fuel is used in creating electricity? |
| Yes, why is it being forced on me when I DONT WANT ONE? |
| No |
| In the recent heat waves, we were instructed to not charge. One would think as more people by EVs that we will here this message more and more. What is SDG&E's plan to procure generation to support the EV and infrastructure needs? |
| Costs of mechanic work vs. gas vehicle |
| Apparently, there are no accommodations being made for agriculture or any industrial uses of equipment and vehicles. |
| No, I have had an electric vehicle for 4 years and am already acquainted with these issues. |
| No |
| Are there senior and veteran discounts available? |
| Not at this time |

**Question 5a:** How much awareness do you have about Electric Vehicles?[34]

*Figure 43 Additional Questionnaire 1 Question 5a*




**Question 5b:** What are key benefits of Electric Vehicles, from your perspective?[35]

*Table 36 Additional Questionnaire 1 Question 5b*

| |
|---|
| Greenhouse gas reduction. Jobs. |
| reduction of usage of fossil fuels |
| I don't know of any. |
| None, there are no benefits |
| Low maintenance, emissions, operating cost. |
| Lowers toxic pollution |
| Cost of ownership lower |
| Cleaner air |
| Lower cost to operate, convenience |
| Safer, improved technology, better for the environment, cost savings ongoing term. |
| Cheaper fuel. If solar/alternative power can be used to help partially or ideally fully charge your vehicle, you're winning. Less parts for reduced possibility of problems. Full electric vehicles may prove to give slight range anxiety; however, problem is fairly easy to navigate to not be a major issue. I still drive a combustion engine vehicle & am very jealous I'm not getting anything in return for my braking/coasting. Regen feature on hybrids & electrics is outstanding. |
| No fuel costs / no pollution |
| None |
| Helping reduce GHG |
| Cleaner *tailpipe* emissions for local and regional air. Quieter operation. Better than gasoline to climate change goals. |
| Cleaner, cheaper per mile vs gas vehicles |
| None, the damage to environment by mining metals for batteries causes greater damage than a fishing fossil fuel burning vehicles. Additionally, the power necessary to charge the vehicles cannot come from renewable sources as of yet so there will be an overall lack of transportation, |

| |
|---|
| increase in cost of delivery of goods and decrease in people's ability to travel for work and recreation. |
| None at this time. |
| Cost of fuel, GHGs, air pollution |
| Less dependent on gas ⛽, Better air quality |
| Reduce GHG emissions |
| Decreased GHG production, cleaner air, quiet, able to charge at home |
| At this point in time NONE! |
| Reduce air pollution |
| Zero emissions. |
| Carbon Zero Living without depending on fossil fuels |
| utilizing sun free energy |

**Question 5c:** What are key drawbacks of Electric Vehicles, from your perspective?[36]

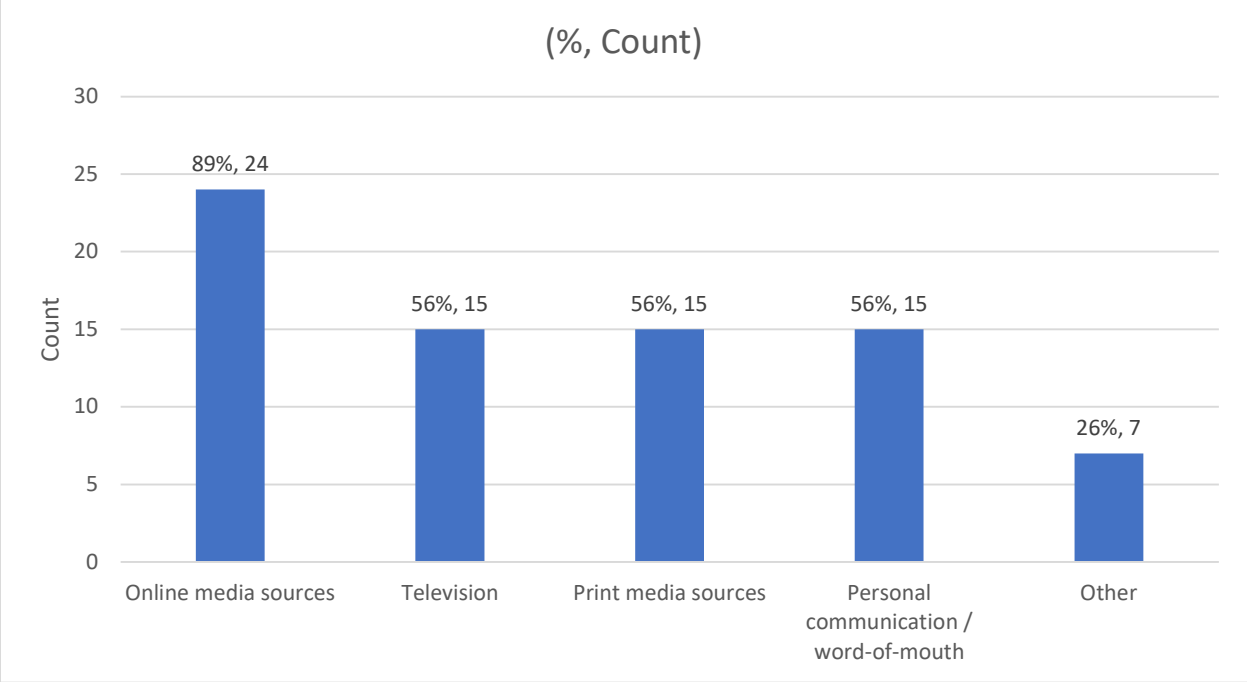
*Table 37 Additional Questionnaire 1 Question 5c*

| |
|---|
| Maintenance costs. |
| charging stations |
| Cost, no resale value, charging time, driving range on a charge, safety--no engine in front to prevent injury in collisions. How much money would it cost and how long would it take, to rewire trillions of apartments, homes, condo's, hotels/motels, workplaces to accept charging vehicles and WHERE is that money going to come from? |
| mining minerals for the batteries, hazard of battery once used up, battery flammability, charge time, weight, country of origin |
| Overly spartan, where to charge. |
| Energy grid, in hot summers |
| Upfront price |
| Power source and lithium battery production |
| Expensive to acquire, long charging times, unknown vehicle / battery life span |
| Availability of charge stations, time it takes to charge, pricey equipment and repairs. |
| Residential infrastructure. Vehicles designed to last approximately 10-15 years of time before needed replacement. Software/firmware & technological hardware are part of designed obsolescence. |
| Battery range / little infrastructure |
| Forcing people to switch is not the way in America. |
| Battery degradation, heavy metal weight of vehicle wearing the roads quicker than traditional, low range between charging, long charging times, high price of electricity, lithium-ion battery fires |
| Where to charge if no garage and no station at work |
| Range. Charging station availability, compatibility, fast charging. Reliable charging stations. |
| Charging options, price |

| |
|---|
| Non-existent technology for applications simple a-to-b transportation. Excessive cost of vehicles and total lack of interest and improving the efficiency and cleanliness of alternative fuel vehicles. |
| Expensive, range, environmental cost, battery replacement, where to dispose batteries |
| Lithium mining impacts |
| ??? Some vehicles are hard to get... |
| EVs are replacements for gasoline powered vehicles, which does not reduce either VMTs or road congestions. |
| Limited range and extra time required to charge when on a long trip. |
| Not enough room here to list!! |
| must have convenient charging stations nearby |
| Regionally, focus should be on reducing vehicles on streets--even EVs--to improve decarbonization. |
| Lack of affordability to seniors |
| The absence of in route charging via roof solar panels. |

**Question 6:** Where did you learn about Electric Vehicles? Please select all that apply. If 'Other', please specify.[37]

*Figure 44 Additional Questionnaire 1 Question 6*



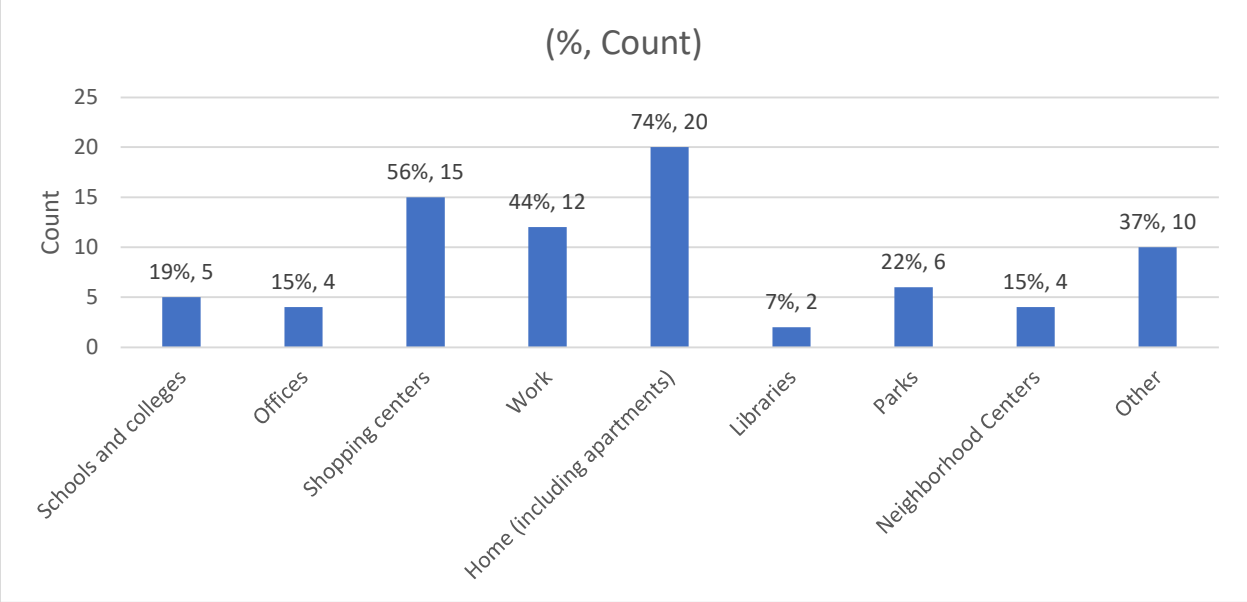

Other:

*Table 38 Additional Questionnaire 1 Question 6*

| |
|---|
| SDGE web site |
| Work in automotive service industry |
| Driving and examining actual electric vehicles via people who own them friends and family |
| Extensive online research, numerous science publications |
| Working for SDGE conservation programs |
| Other (not specified) (1) |

**Question 7:** Based on how you and those you know travel, where would charging stations and other Electric Vehicle-related infrastructure, including Electric and/or Zero-Emissions Vehicle transit access, be most useful in your community? Please select up to three (3) locations. If 'Other', please specify. [38]

*Figure 45 Additional Questionnaire 1 Question 7*




Other:

*Table 39 Additional Questionnaire 1 Question 7*

| |
|---|
| We currently farm in an agricultural zone. Practicality of off-site vehicle charging stations is not existent |
| Based on current charge rates and the time it takes to charge, how much open land are you going to need to meet the demand? |
| Other (not specified) (8) |

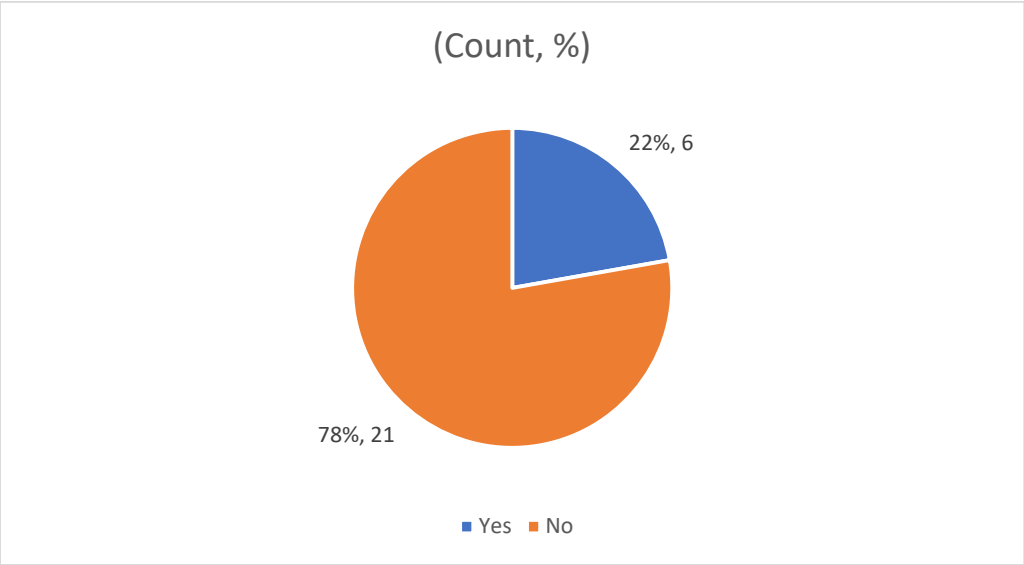
**Question 8:** Is there anything else you would like the project team to know as we plan for Electric Vehicle charging needs and locations across the region?[39]

*Table 40 Additional Questionnaire 1 Question 8*

| |
|---|
| How long does the avg. battery last? What does one do with the car, after the battery no longer charges and most junk yards won't accept an EV, due to the danger of fires? My neighbor around the corner has a PRIUS that hasn't been driven in 2yrs, because the battery died. It just sits parked, rusting away. Sounds pretty STUPID and poorly thought out, to me. OR, is the *real* plan to force people to walk, ride bikes and take filthy busses filled with violent, drug addicted homeless? Fine, if you aren't disabled. |
| How do you plan to keep the lights on adding all these electric cars? |
| Standardize charging interfaces, in-car map to charging stations near me. |
| Add more hydrogen fueling stations also hydrogen fuel cell for EV charging has less fire risk than battery charging for EV charging and better longevity. Both are zero emission. |
| People are at work 8-10 hours per day. That's the best place to put them. The largest employer at each city. |
| Examine the fact that the power grid and people's access to these vehicles is non-existent. |
| We have two electric cars and solar on our house and couldn't be happier... |
| Every parking lot including commercial parking lots like those managed by ACE parking should have EV charging stations based of the number of available parking spots. Also, we need to have EV charging equipment available at some of the street parking meters. |
| Quick, high level charging needs to be built into every vehicle and charging stations as or more widely distributed as gas stations. Manufacturers should all use the same charging plugs. |
| We are told continually by our top military personal in the country that if we go to war that EMP technology will most likely be employed, how well is an electric car going to handle that? |
| Most of us will need a lot more info/education to understand all of this |
| Safe, public locations in well lighted spaces |
| We currently farm in an agricultural zone. Practicality of off-site vehicle charging stations is not existent |

**Question 9:** Would you like to provide additional, focused input on the A2Z Strategy? If 'Yes', you will be directed to answer seven open-ended questions on the A2Z Strategy. These questions are primarily geared toward agency and organization representatives that may be working toward increasing electric vehicle use in San Diego County, but all are welcome to answer these questions. If 'No', you will be directed to submit your form.[40]

*Figure 46 Additional Questionnaire 1 Question 9*




**Question 10:** Please provide your email address if you would like to receive email updates regarding the A2Z Strategy.[41]

- 16 responses provided

**Question 11:** What does successful integration of zero emission vehicles look like in your community?[42]

*Table 41 Additional Questionnaire 1 Question 11*

| |
|---|
| Offering hydrogen and renewable fuels equally with EV. |
| Sorry, there are no zero emission vehicles. |
| Every street should have a charger |
| EV-based microtransit services for seniors and people without cars, which will take those people to neighborhood grocery stores, pharmacies, clinics, etc. |
| I live in Scripps Ranch. Many homeowners have EVs and roof solar. Some have battery backup systems. I am not aware of any public charging stations other than a Tesla station in our community. |
| Designated Mobile home park charging spaces |

**Question 12:** How receptive is your local community to driving Electric Vehicles and using electric transportation, such as buses, rideshare, and other options? Please note your local community in your response.[43]

*Table 42 Additional Questionnaire 1 Question 12*

| |
|---|
| Not very, my neighbors and community members have concerns of grid reliability, high price of electricity and only increasing with monopolized electricity and no alternative fuel options being pushed. |
| Not too excited |
| Very receptive |
| Rancho Penasquitos already has many EVs. However it lacks good access to public transit. But I believe that many residences are open to the idea of using public transit more often if access to public transit improves. |
| With the exception of a MTS Bus that services Alliant University, there is no public transit in Scripps Ranch. There is only one rideshare site in northern Scripps Ranch. As I mentioned EVs are widely distributed in this community. |
| Very receptive |

**Question 13:** How does your agency or organization see the role of its partners in addressing these issues? Please note your agency or organization in your response.[44]

*Table 43 Additional Questionnaire 1 Question 13*

| |
|---|
| SanDiego350 is working to improve availability of public transit for environmental justice and low income communities. Also, we are working to make EVs more affordable to the residences of those communities and pushing MTS and NTDC to accelerate their transitions to zero emission buses. |
| NA, retired |
| Senior citizens |

**Question 14:** Please describe your future plans/campaigns/initiatives that are targeted towards the adoption of Electric Vehicles.[45]

*Table 44 Additional Questionnaire 1 Question 14*

| |
|---|
| We will not push for EV. We will be focusing on Hydrogen- cars, suvs, trucks, trains, planes, boats. |
| Make conventional fossil fuel powered vehicles less attractive for driving on freeways, such as converting existing lanes to Transit Only lanes and HOV, and EV only lanes. |
| Voting for politicians who support Renewable projects |

**Question 15:** What would you like to see in the A2Z Strategy?[46]

*Table 45 Additional Questionnaire 1 Question 15*

| |
|---|
| An equal push of hydrogen and EV. San Diego has 1 hydrogen fueling station. Many more car companies are coming out with hydrogen vehicles- Toyota, Hyundai, BMW, Land Rover, Jaguar, Ford. The hydrogen infrastructure needs to be built to have more ZEV options to consumers. Hydrogen fueling is far faster than EV and most comparable to gas fueling when it comes to time constraints. |
| Address rural far flung communities and tribes |

| |
|---|
| Prioritize the environmental justice and low-income communities and help them to switch to EVs, and provide better accesses to public transit by implementing EV based microtransit services. |
| Financial aid for Senior citizens |

**Question 16:** How can the A2Z Strategy be most useful for you and your work?[47]

*Table 46 Additional Questionnaire 1 Question 16*

| |
|---|
| Push more hydrogen options- buses, trains, cars, trucks. Allow competition between hydrogen and EV to lower the price for consumers. |
| Make sure that the A2Z will not increase VMTs and sprawling. |
| Energy savings from costly gas prices, Zero emissions benefits, lowering vehicle maintenance costs |

**Question 17:** What do you see as your role in supporting such a plan once released?[48]

*Table 47 Additional Questionnaire 1 Question 17*

| |
|---|
| Purchasing a hydrogen vehicle. I do not have time to sit at an ev charger for 20-40 min. If I charge my car at night my electric bill will be through the roof. Cost of hydrogen will be $1 per kg by 2030. Cost of electricity in SD keeps rising. |
| Approach local cities and agencies and demand them to follow the A2Z strategy |
| I would inform the environmental orgs to which I belong. |

# E Evaluation Criteria for Initial Strategies

Table 48 shows the eight evaluation criteria used to rank the Initial Strategies, including a description and the qualitative and/or quantitative assessments for each of the score from 0 (negative impact) to 4 (greatest/direct benefit).

*Table 48 Evaluation Criteria and Scoring Matrix*

| Evaluation Criteria | Description | Qual vs Quant | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|
| **ZEV Adoption** | This criteria is evaluated both qualitatively and quantitatively based on the specific strategy and modeling data available. Modeling outputs from the Uptake Tool include the number of ZEVs adopted per dollar spent, but where a specific strategy was not modeled, a qualitative assessment is utilized. | Quantitative | Provides decrease in vehicle adoption compared to baseline | Provides no increase in vehicle adoption compared to baseline | Provides up to 0.5% increase in vehicle adoption compared to baseline | Provides between 0.5% and 3% increase in vehicle adoption compared to baseline | Provides greater than 3% increase in vehicle adoption compared to baseline |
| | | Qualitative | Negative impact on ZEV adoption | Negligible on ZEV adoption | Minor impact on ZEV adoption | Moderate impact on ZEV adoption | Significant impact on ZEV adoption |
| **Implementation Difficulty** | This criteria includes factors such as the number of stakeholders/organizations to coordinate with, if cross-functional cooperation is required, extent of approvals (internal/external) required, political and/or bureaucratic hurdles anticipated, etc. | Qualitative | Prohibitively difficult to implement due to coordination with stakeholders | Difficult to implement due to coordination with many stakeholders | Hard to implement due to coordination with multiple stakeholders | Medium difficulty and some coordination required | Easy/Minimal Effort to implement with mimial coordination required |
| **GHG/Air Quality Benefits** | This criteria is evaluated based on the strategy's ability to provide air quality benefits and/or greenhouse gas reductions. There is an inherent link to the ZEV Adoption criteria but this criteria evaluates more direct AQ/GHG benefits or impact. | Qualitative | Negative impact/Increase in emissions | Negligible impact on emissions/AQ | Indirect or minor benefit on emissions/AQ | Direct moderate benefit on emissions/AQ | Direct large benefit (emissions reductions/improved AQ) |
| **Support for and Engagement of CoCs** | This criteria is evaluated based on if the the strategy supports, engages with, provides direct benefits to, or otherwise improves Communities of Concern (CoCs) | Qualitative | Negatively impacts CoCs | No support/engagement of CoCs | Some/minor benefits to CoCs | Strong benefits to CoCs | Targetted strong benefits specifically for CoCs |
| **Timeline for Deployment** | This criteria is related to how long it will take to enact the proposed strategy, including any planning, procurement, development, etc. before the public can begin seeing the benefits | Qualitative / Quantitative | Unknown timeline due to unavailable technology in coming future | Long-term planning required (5+ years for deployment) | Mid-term until benefits (2-5 years) | Near-term benefits (6 months to 2 years) | Immediate action/benefit (within 6 months months) |
| **Capital & Operating Costs** | This criteria is evaluated based on the total upfront costs and ongoing costs required to implement the strategy. | Qualitative / Quantitative | Prohibitively expensive | Expensive but implementable (approx $5M+) | Moderate cost to implement (approx up to $1-5M) | Small cost to implement (approx under $1M) | Negligible costs to implement |
| **Availability of Funding** | This criteria is evaluated based on if funding is readily available for implementation of the strategy or if funding needs to be identified through potential grants or other funding sources. | Qualitative | No funding available | Funding available but difficult to obtain | Moderate funding needed but not yet obtained/identified | Some funding required, but already funded or easily identified/ appropriated | No funding required |
| **Economic/Workforce Impact** | This criteria is evaluated based on the strategy's potential to create economic opportunities, such as job creation. It also takes into consideration existing workforce needs to operate and maintain charging infrastructure. Strategies receive a boost if economic/workforce beneficial impact is in CoCs. | Qualitative | Removes jobs and/or economic opportunities | Does not create or remove any jobs or economic opportunities | Creates minimal to negligible jobs and economic opportunities | Creates moderate number of jobs and economic opportunities | Creates many jobs and economic opportunities |

Table 49 shows the final weighting of the evaluation criteria as determined through discussions with the Core Team and Steering Committee. Weighting began at all equal weights between the evaluation criteria but were adjusted up or down based on the overall intention of the A2Z Collaborative as well as understanding the interconnections between criteria as well as impact on success in the region.

Table 49 Weighting for Evaluation Criteria

| Evaluation Criteria | Weighting |
|---|---|
| ZEV Adoption | 18% |
| Implementation Difficulty | 15% |
| GHG/Air Quality Benefits | 14% |
| Support for and Engagement of CoCs | 18% |
| Timeline for Deployment | 12% |
| Capital & Operating Costs | 7% |
| Availability of Funding | 5% |
| Economic/Workforce Impact | 11% |

# F Key Modeling Inputs and Assumptions

## F.1 ZEV Uptake Modeling

ZEV Uptake modeling for this work entailed estimating the impact of key, quantifiable ZEV uptake factors on reducing the expected gap in ZEV adoption by 2030. Quantified impact metrics were a key feature in the approach to optimize policy, regulatory, and program settings. Metrics were used in this study to rank and prioritize identified best practice strategies and communicate their key benefits and trade-offs throughout stakeholder engagement with the Steering Committee and Advisory Committee.

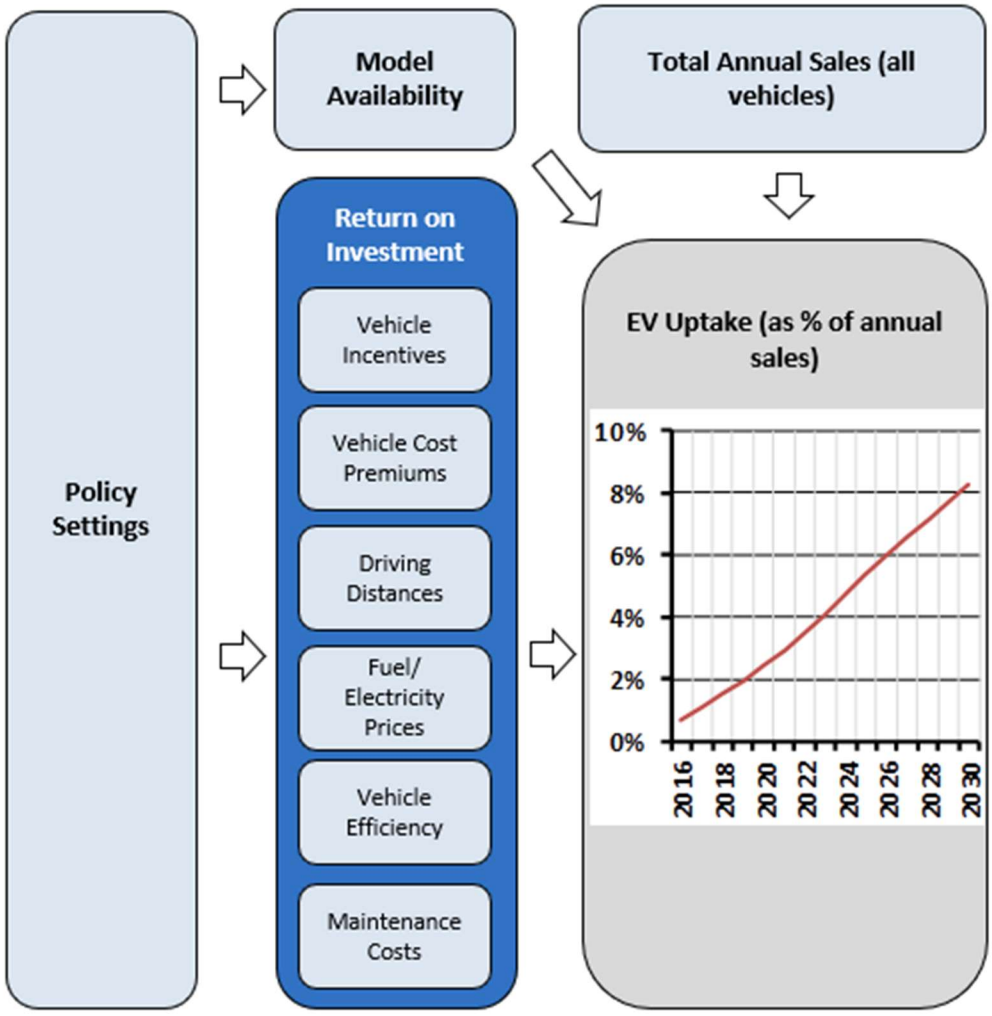
### F.1.1 Objectives

The A2Z ZEV Uptake model forecasts electric vehicle adoption by vehicle class through 2035 and provides insight on the impact of key factors on ZEV adoption. The model was configured as part of the development of this Report to assess the impacts of changed conditions since the A2Z Gap Analysis and estimate the potential impact of new Strategies on ZEV adoption. The results from the A2Z ZEV Uptake Analysis were also used in the configuration of a public charging infrastructure design tool, which forecasts infrastructure needs across San Diego County.

### F.1.2 Methodology

As shown in Figure 47, the ZEV Uptake model forecasts the adoption of ZEVs by segment based on policy, model availability, and financial drivers. Segments are defined as passenger vehicles; light, medium, and heavy-duty trucks; buses; and motorcycles. The A2Z model was configured based on current and forecasted conditions in San Diego County through 2035.

*Figure 47 ZEV Adoption Forecasting System*




Source: Energeia Modeling (2022)

The ZEV Uptake model forecasts ZEV uptake over time by vehicle type based on two primary factors:

- Financial Benefits – Calculations account for vehicle cost premiums and differences in annual running costs
- Model Choice/Availability –Calculated based on the total number ZEV models divided by the total number of ICE models available

### F.1.3 Key Inputs and Assumptions

The subsequent sections detail the key inputs and assumptions used in the ZEV Uptake model, including the following:

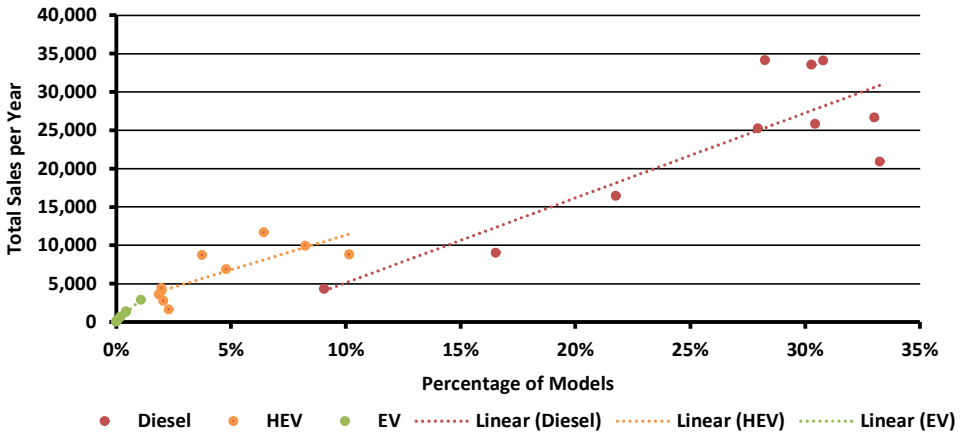
- Vehicle availability
- Cost premiums
- Fuel prices
- Efficiency
- Annual VMT

**Vehicle Availability**

Model choice and availability is a key factor of the applied transportation technology uptake since adoption is expected to increase among drivers as more ZEV models become available and ICE models are phased out.

Figure 48 shows historical technology adoption from 2011-2019 for passenger diesel, hybrid electric vehicles (HEVs) and ZEVs against the total number of sales per year.

*Figure 48 Vehicle Adoption vs. Availability*

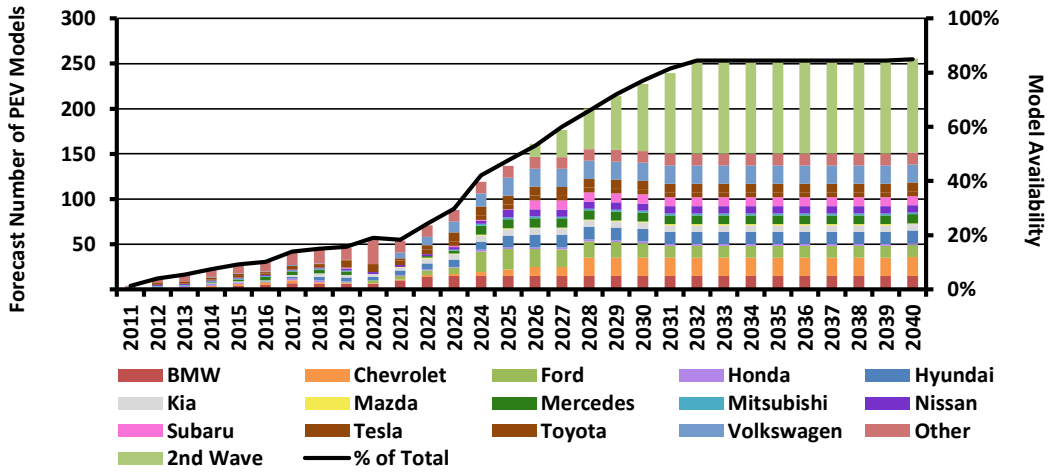



Source: Vfacts (2019), Energeia Modeling

Figure 49 presents the Project Team's forecast of model availability of ZEV models as a percentage of total models offered by a manufacturer over the period through 2040. The forecast is based on vehicle manufacturer announcements up to 2025, and the Project Team's assumptions based on trends to build out for the period of 2025-2040. Following 2026, the Project Team assumes a target of 255 total ZEV models will be reached in 2040, referred to herein as the "2nd wave." The estimate is based on manufacturers typically making market announcements 4-5 years in advance. This work is based on the assumption that ZEV models will continue to be introduced, comprising 70% of the vehicle market by 2030. This is a key assumption, and a significantly higher or lower level of model availability would result in a significantly higher or lower forecast ZEV uptake rate.

The Project Team notes that supply chain shortages from COVID-19 are likely to impact new model production, and any changes to model releases announced through 2022 have been reflected in Figure 49. Interviews with OEM's have found that they are expecting vehicle supplies to return to pre-COVID levels by 2026.

*Figure 49 Forecast of ZEV Model Availability by Vehicle Manufacturer*




Source: OEMs (2022), EV Adoption (2020), Energeia Analysis

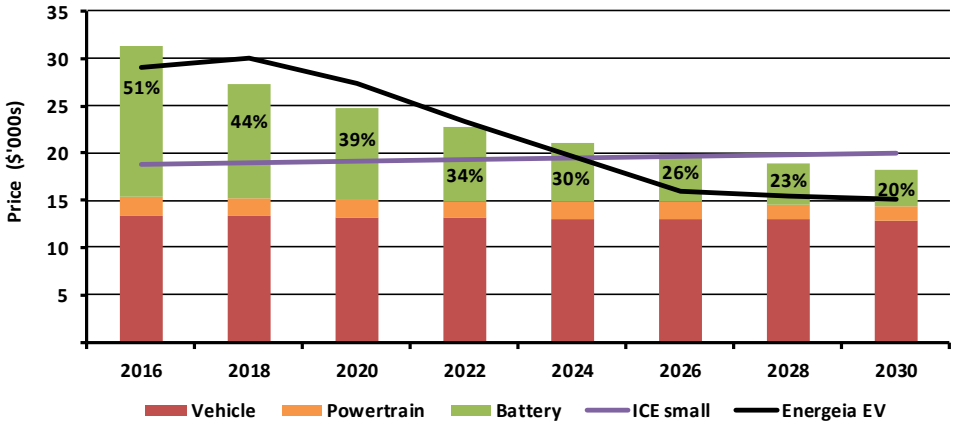
**Forecast Electric Vehicle Premium**

Financial incentives are the other key factor of ZEV uptake, and the cost of alternative transportation technology like BEV or PHEV electric vehicles compared to an equivalent ICE vehicle is the key input to this calculation.

The Project Team's ZEV[54]vehicle price forecast for a compact passenger vehicle is provided in Figure 50 as a black line. Also shown are the estimated costs of a ZEV from 2016 to 2030, broken out by battery, power train and vehicle costs. The forecast ICE cost for a comparable, compact passenger vehicle is shown in the purple line.

The forecast shows the underlying cost of the ZEV at scale to be about 20% below that of the ICE, including the power train but excluding the battery. As the cost of the battery falls due to industry learning effects as well as increasing energy efficiency reducing the size of the battery needed to achieve range parity, the overall purchase premium declines. The overall price forecast sees ZEV price parity between 2024 (Energeia EV) and 2026 (AFDC).

*Figure 50 Forecast of ZEV Cost Premium by Component*



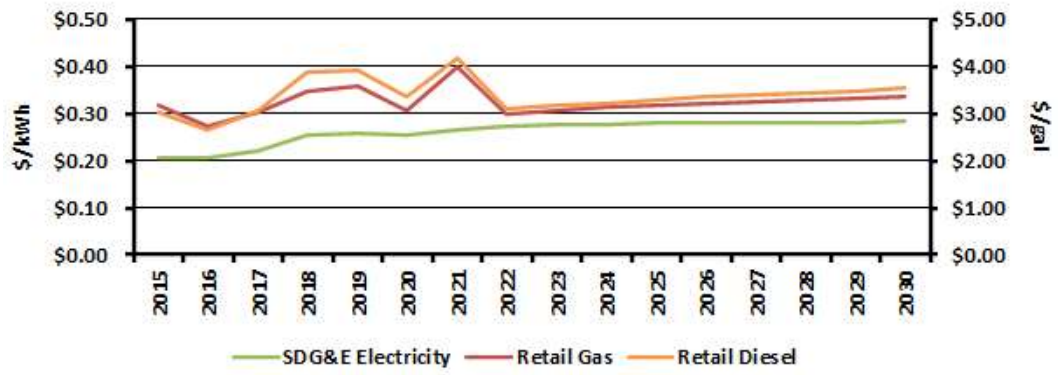

Source: AFDC (2016), Energeia analysis

If the price of lithium or the rate of energy efficiency improvements vary from expectations, then the forecast vehicle price premium will change, which could impact the rate of ZEV adoption. Currently, the IEA estimates that lithium shortages could be faced by 2025, which would increase battery prices and raise the cost premium of purchasing a ZEV.

**Forecast Electricity, Gas, and Diesel Price**

A forecast of SDG&E's retail electricity prices and California gasoline and diesel prices are presented in Figure 51. Gasoline and diesel prices were forecasted using a regression model driven by the EIA's projected West Texas Intermediate (WTI) oil prices[55]. SDG&E's electricity prices were forecasted using the CPUC's report on Utility Costs and Affordability of the Grid of the Future[56]. For an appropriate comparison of total cost of ownership (TCO), fuel prices are converted to kilowatt-hours and gallons consumed to annual fuel costs, impacting the total price of vehicle ownership and ROI calculation.

*Figure 51 Forecast of Electricity, Gasoline and Diesel Prices*




Source: CPUC (2021), EIA (2021)

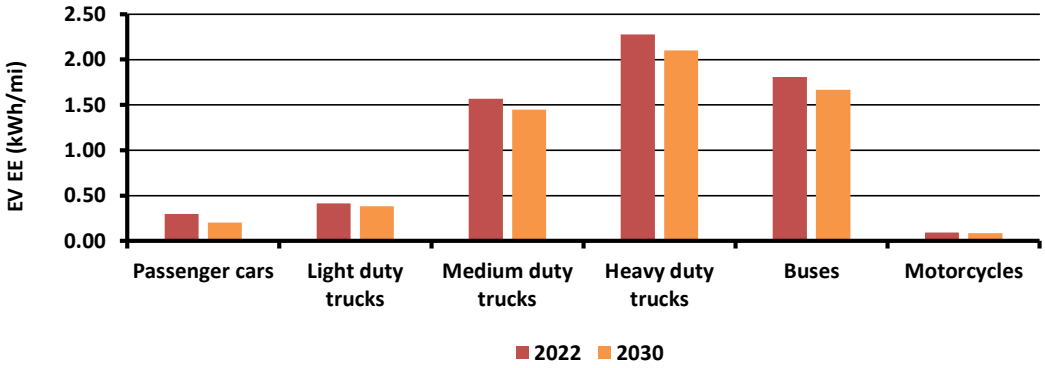
**Vehicle Efficiency**

Vehicle efficiency in terms of energy usage per mile (kWh/mi) traveled is used to size the battery needed to achieve a targeted driving range and to calculate annual fuel volumes, both of which feed into the TCO. The Project Team's view is that energy efficiency is likely to improve over time with battery technology advancements for all vehicle classes, with passenger vehicles following the path of best

practice efficiency levels from Mercedes Benz' Vision EQXX, which consumes less than 10 kWh of energy per 62 miles[57], over the next 10 years.

Figure 52 shows the expected change in ZEV energy efficiency over time by vehicle class. Note that a decrease in kWh/mile is an increase in efficiency since less energy is used per mile of travel.

*Figure 52 ZEV Energy Efficiency by Vehicle Class*




Sources: DOE (2022), Energeia (2030)

**Annual Driving Distances**

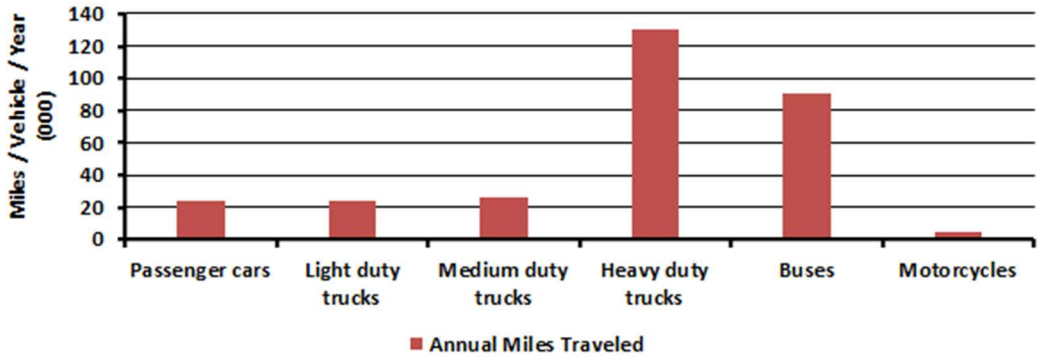
VMT is a key driver of the calculation of annual fuel costs between ICE and ZEV models. Annual VMT by vehicle class are provided in Figure 53. Annual miles traveled for San Diego were estimated overall using the University of San Diego's traffic congestion study[58] and by vehicle class using DOE's assessment of miles traveled by vehicle category[59].

Fuel costs per vehicle are determined by the annual miles traveled, vehicle efficiency (kWh/mile or mpg), and fuel price per kWh or gallon.

VMT is a key driver of the calculation of annual fuel costs between ICE and ZEV models. Annual VMT by vehicle class are provided in Figure 53. Annual miles traveled for San Diego were estimated overall using the University of San Diego's traffic congestion study[60] and by vehicle class using DOE's assessment of miles traveled by vehicle category[61].

Fuel costs per vehicle are determined by the annual miles traveled, vehicle efficiency (kWh/mile or mpg), and fuel price per kWh or gallon.

*Figure 53 Annual Miles Traveled by Vehicle Class*



Sources: University of San Diego (2021), DOE (2020)

## F.2 Charging Optimization

The A2Z Charging Optimization model was configured with ZEV forecasts from the ZEV Uptake model and San Diego County specific conditions, including the number of potential charging locations by type of charger and land use, to forecast EVSE needs and reduce the related ZE Infrastructure gap.

### F.2.1 Objectives

The A2Z Gap Analysis identified the availability of public charging infrastructure as a key barrier to adopting ZEVs for drivers without a convenient private charging option.

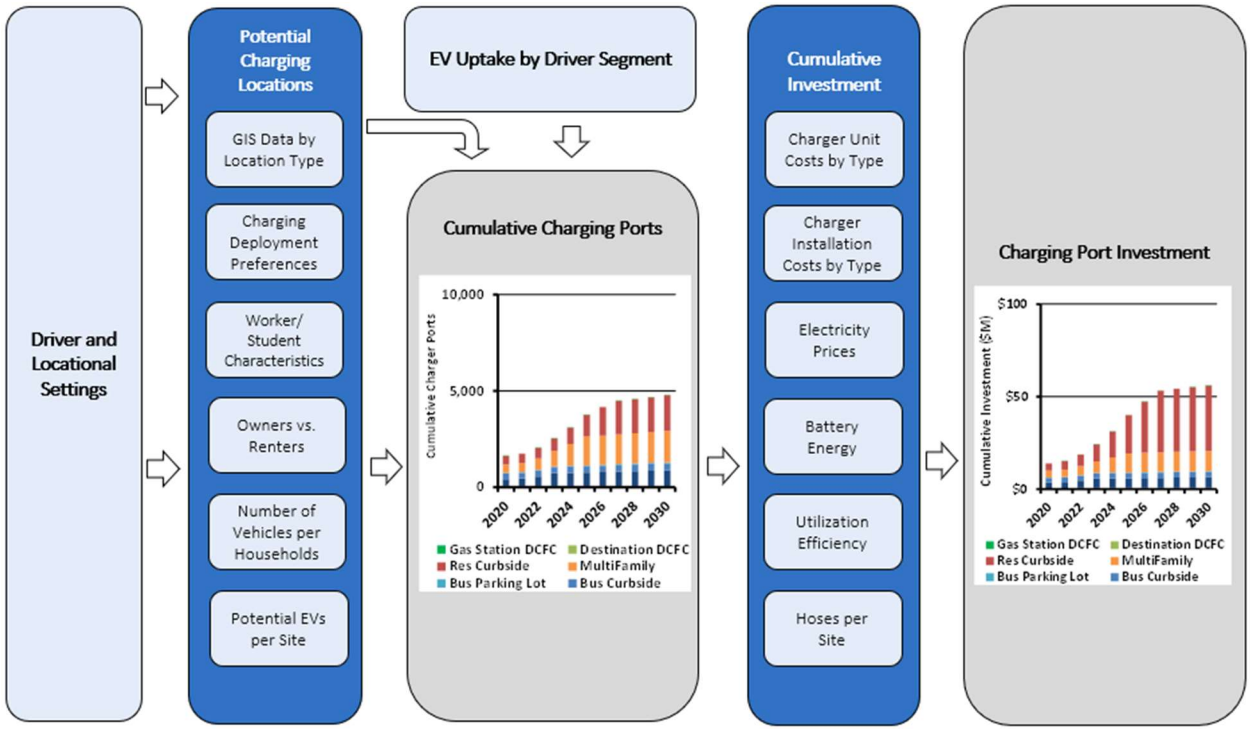
The A2Z Charging Optimization model was configured with San Diego County specific conditions related to the planned public charging infrastructure solution mix to forecast the number of required public charging stations and ports by public charging infrastructure solution type.

The model was also configured to estimate the cost impacts of targeting public charging infrastructure with higher utilization rates, which informed subsequent Strategy development and the impact assessment.

### F.2.2 Methodology

The key inputs, outputs, and modeling engines of the A2Z Charging Optimization model configured for San Diego County are presented in Figure 54.

*Figure 54 Charging Infrastructure Forecasting System*




Source: Energeia Modeling (2022)

### F.2.3 Key Inputs and Assumptions

The key inputs and assumptions of the charging model are described in the sections below and include the following:

- Charger technology trends
- Public charging locations
- San Diego current conditions
- Uptake forecasts by driving segment
- Charging solution allocations
- Equipment and installation costs

**Technology and Performance Cost Trends**

ZEV charging technology, including Level 1, 2, 3, wireless, and vehicle-to-grid, were reviewed for trends in capabilities and costs, as described in the following subsections.

**Charging Technology Options**

ZEV chargers mainly vary in terms of power output, input, and connector type. Power output drives vehicle charging time; the higher the power, the quicker the battery is charged. There are three main types of chargers (and associated output power levels).

- Level 1 chargers use a standard three-pronged, 120-volt outlet typically found in homes. Such chargers are well suited for over-night charging locations due to charging speeds of 2-5 miles of range per hour.[62] Due to larger battery sizes available on the market, Level 1 chargers are becoming less common compared to other levels.
- Level 2 chargers use 220-volt outlets, commonly used by dryers or air conditioners. The higher voltage allows these chargers to charge at a rate of 10-20 miles of range per hour.[62] Level 2 chargers are typically found at workplaces or destination parking spots.
- Level 3, or DC Fast Charging (DCFC), requires commercial power levels which allows for high charging speeds, at around 60-80 miles of range per hour. The increased power causes the most strain on the electrical grid. DCFC are best suited for gas stations or rest stops where adequate infrastructure capacity is in place due to the rapid charge time.

Wireless chargers are newer technologies that allow vehicles to charge without physical cables. Pilot programs are currently in place to use this technology to electrify streets, allowing drivers to charge their vehicles while driving. Vehicle-to-Grid (V2G) chargers are another new technology that provide

storage and export capabilities to send power back to the electrical grid. They operate within the same power ranges as listed above, and can also be wireless.

A summary of charging technology by level, voltage, power rating and connector is shown in Table 50.

Table 50 Charging Technology by Level

| Type | Voltage | Rating | Connectors | Examples |
|---|---|---|---|---|
| L1 Charging (AC) | 120 V | 1.4 kW to 1.9 kW |  |  |
| L2 Charging (AC) | 240 V | 3.7 kW to 17.2kW |  |  |
| DC Fast Charging (DCFC/L3) | 480 V | 22 kW to 350 kW |  |  |
| Wireless Charging | 240 V | 3.6 kW to 11 kW |  |  |
| Vehicle-to-Grid Charging (V2G) | 240 V | 7 kW to 25 kW |  |  |

Sources: Energeia, Manufacturer websites

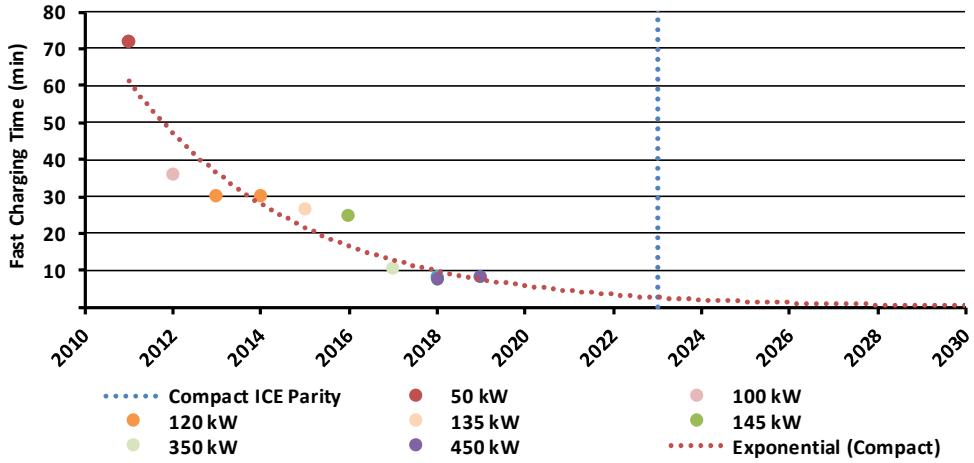
**DCFC Recharge Times**

DCFC technology has been rapidly evolving over the past 10 years, as shown in Table 51, which traces the decrease in charging times as charger power levels increase.

As charging times decrease, the number of ZEVs able to be served by a single charger can potentially increase, as well as the types of locations that could be used as a DCFC charging location based on dwell time. Locations with shorter dwell times not able to be considered as potential charging sites for level 2 chargers could be considered for faster DCFC chargers, expanding the number of potential charging

locations. However, higher recharging rates come with higher costs of equipment and materials due to high power needs.

*Table 51 Trends in DCFC Technology Recharge Times*




Sources: Energeia, Manufacturer websites

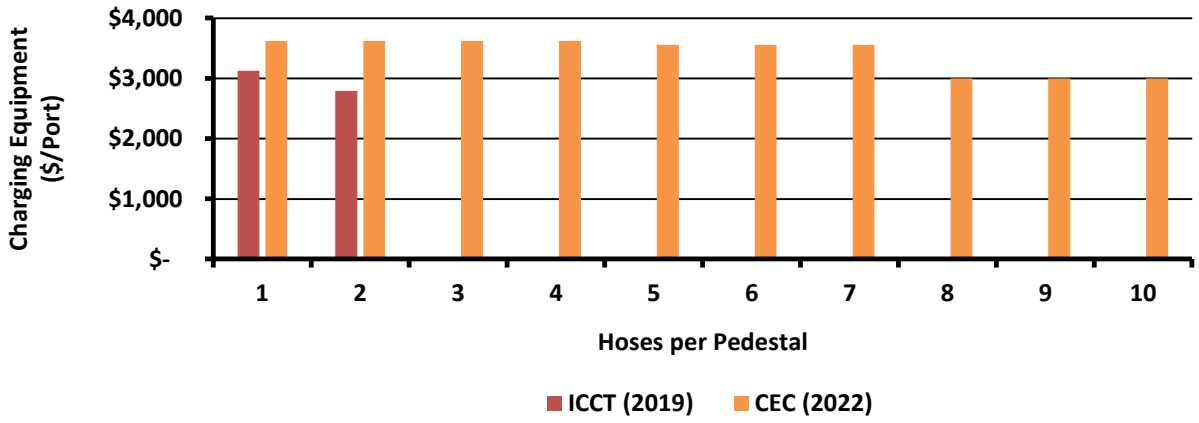
**Costs**

California prices per charger were estimated based on reports by the International Council on Clean Transportation (ICCT)[63] and the CEC's California Electric Vehicle Infrastructure Project (CALeVIP) cost data.[64] The 2019 ICCT report splits costs into installation and hardware costs, while the 2022 CALeVIP

data is split by unit costs and additional costs, an umbrella category covering installation labor, utility upgrades, electrical panels, trenching, conduits with pull ropes, battery storage and more.

Figure 55 below compares the ICCT and CEC's cost per L2 hose by number of hoses per pedestal, or number of chargers per site. The cost comparison is per hose and does not include installation costs.

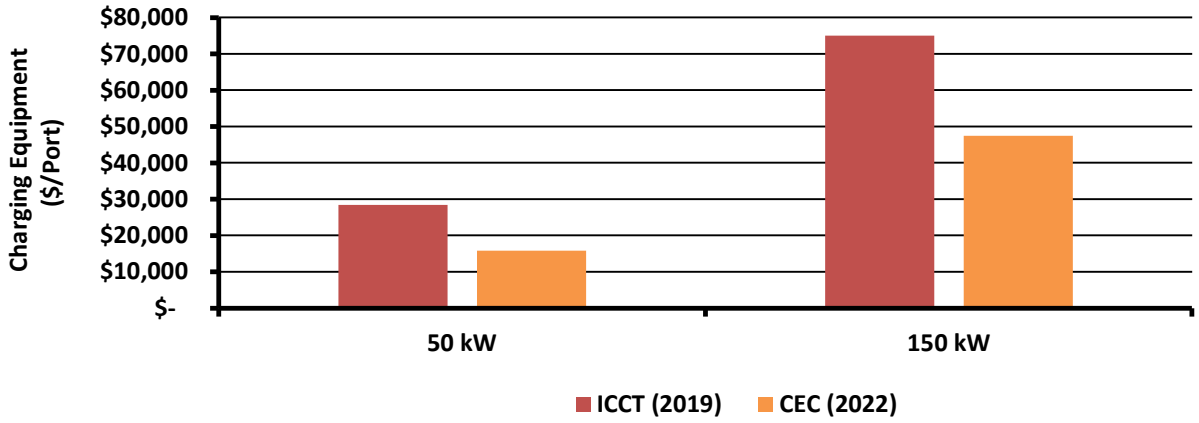
Figure 55 L2 Cost Comparison




Sources: ICCT, CEC

Figure 56 below shows a comparison of DCFC unit costs per hose by power level. The CEC's data showed an average DCFC unit cost of $316 per kW[1], which is scaled in the graphic below.

Figure 56 DCFC Cost Comparison

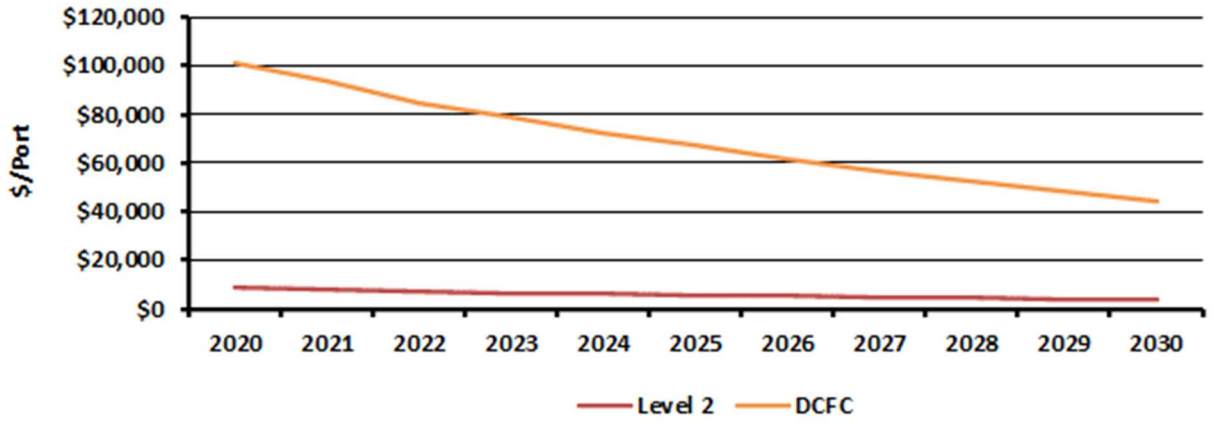



Sources: ICCT, CEC

The CEC's data shows higher costs for Level 2 chargers but significantly lower costs for DCFC chargers. The Project Team used the CEC's cost data as the primary source of prices per EVSE in the charging infrastructure model as it was the more recent report and specific to California.

The Project Team's forecast cost of charging equipment and technology costs per hose are provided in Figure 57. The decrease in forecast cost reflect the expected rate of industry learning, taken from studies of comparable technology, which are driven by the expected deployment of chargers to 2030.

Figure 57 Level 2 and DCFC Investment Costs ($/Port)




Sources: CEC (2022), Energeia analysis

The cost reductions expected for Level 2 and DCFC charging technology are roughly the same in relative terms, with a 56% decrease from 2020 to 2030 for both charger types.

**State and County Charging Trends**

The following sections describe trends in California and San Diego County level public charger deployments.

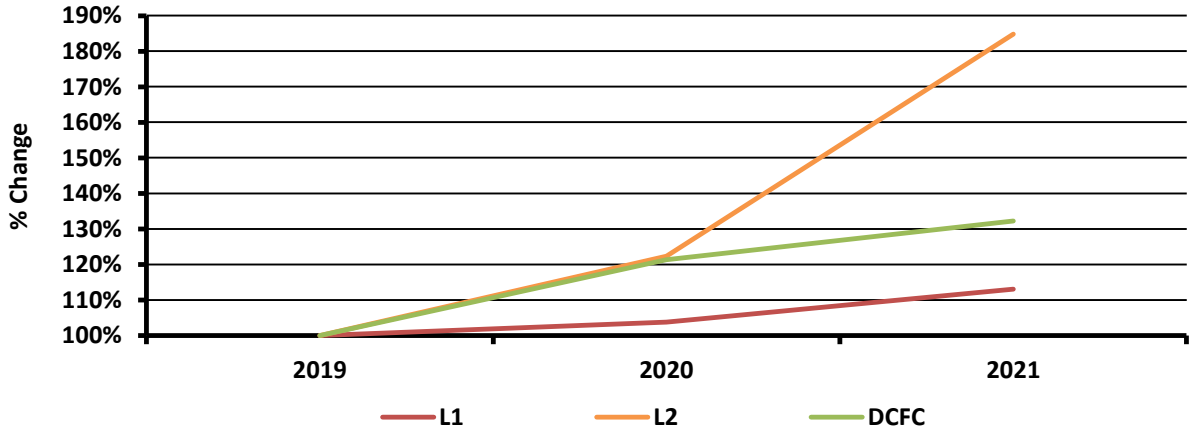
**Trends in Charging Deployments**

NREL's Electric Vehicle Charging Infrastructure Trend reports use data from the DOE's Alternative Fueling Station Locator to depict growth of EVSE ports by charger type and location.[65] Figure 58 and Figure 59 below show trends in public and private charger ports by type, private charger ports by type and location, and the number of public and private ports per charging station.

Although Level 1 chargers were previously a key part of NREL infrastructure targets, results from the Alternative Fueling Station Locator data show that they are currently growing at the slowest rate in California, as seen in the figure below. The trend is expected to continue as larger batteries allow higher

vehicle ranges and customers switch to installing Level 2 chargers at home in order to charge larger batteries at a faster rate.

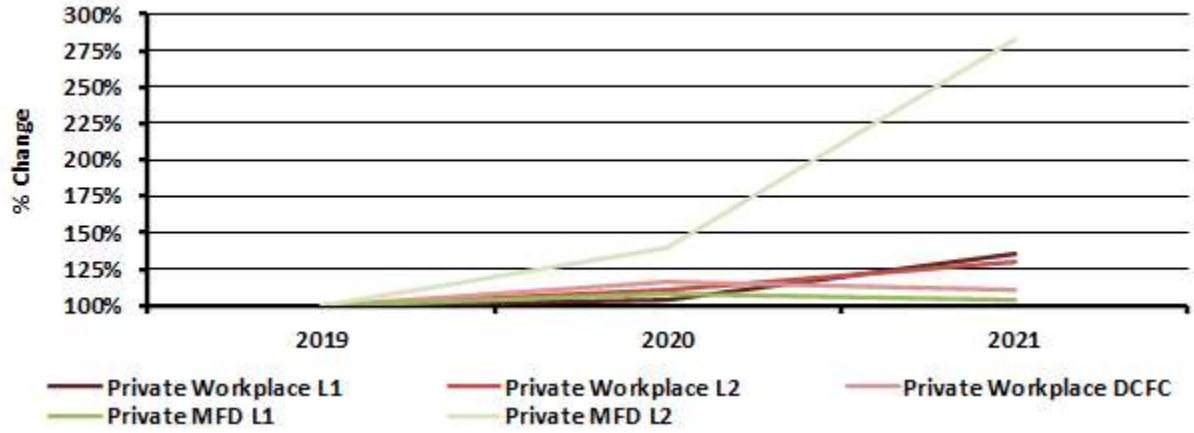
Figure 58 Annual Growth of EVSE Ports by Type in California




Sources: NREL, DOE

The graphic below shows that Level 2 chargers at multi-family dwellings (MFDs) are growing the fastest in California, mostly due to government grant programs focusing on this target market. The rate of workplace charger adoption is notably slower than MFDs.

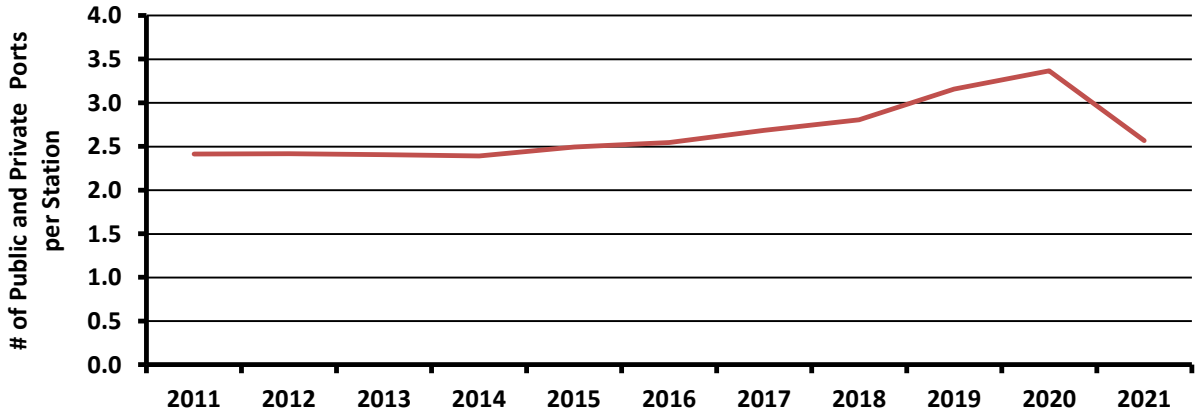
Figure 59 Annual Growth of Private EVSE Ports by Type and Location in California




Sources: NREL, DOE

Figure 60 demonstrates an upward trend in the count of ports to station, excluding 2020-2021, likely due to the relatively attractive economics of multiple ports per station.

Figure 60 California Count of Public and Private Ports per Station



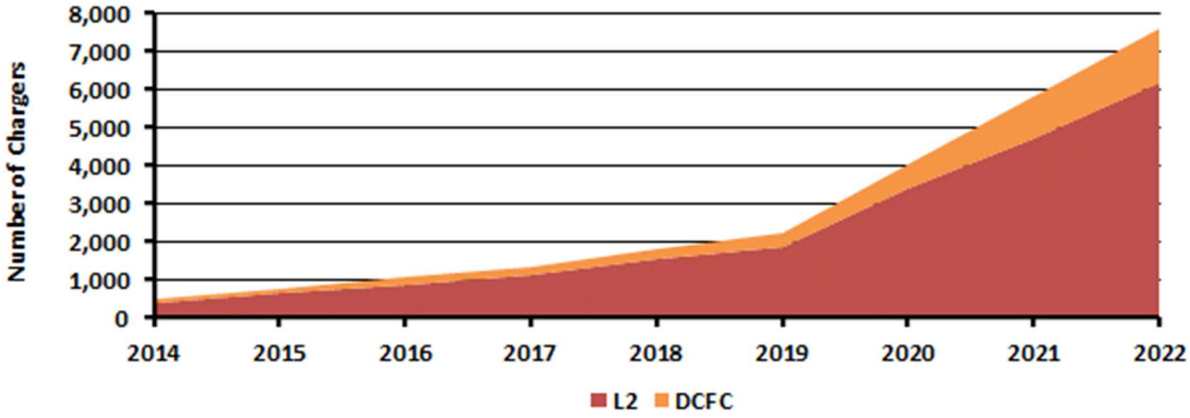

Sources: NREL, DOE

**San Diego County Trends and Status**

Data on historical public charger deployments was sourced from the San Diego Association of Governments' (SANDAG) and San Diego County Air Pollution Control District's (SDAPCD) presentation on San Diego County's CALeVIP Incentive Project results.[66] Deployment by charger type was estimated using the County EV Roadmap's Level 2 and DCFC splits.[67]

Figure 61 shows the resulting calculations of public chargers by type in San Diego County over time.

Figure 61 San Diego County Public EV Chargers by Type



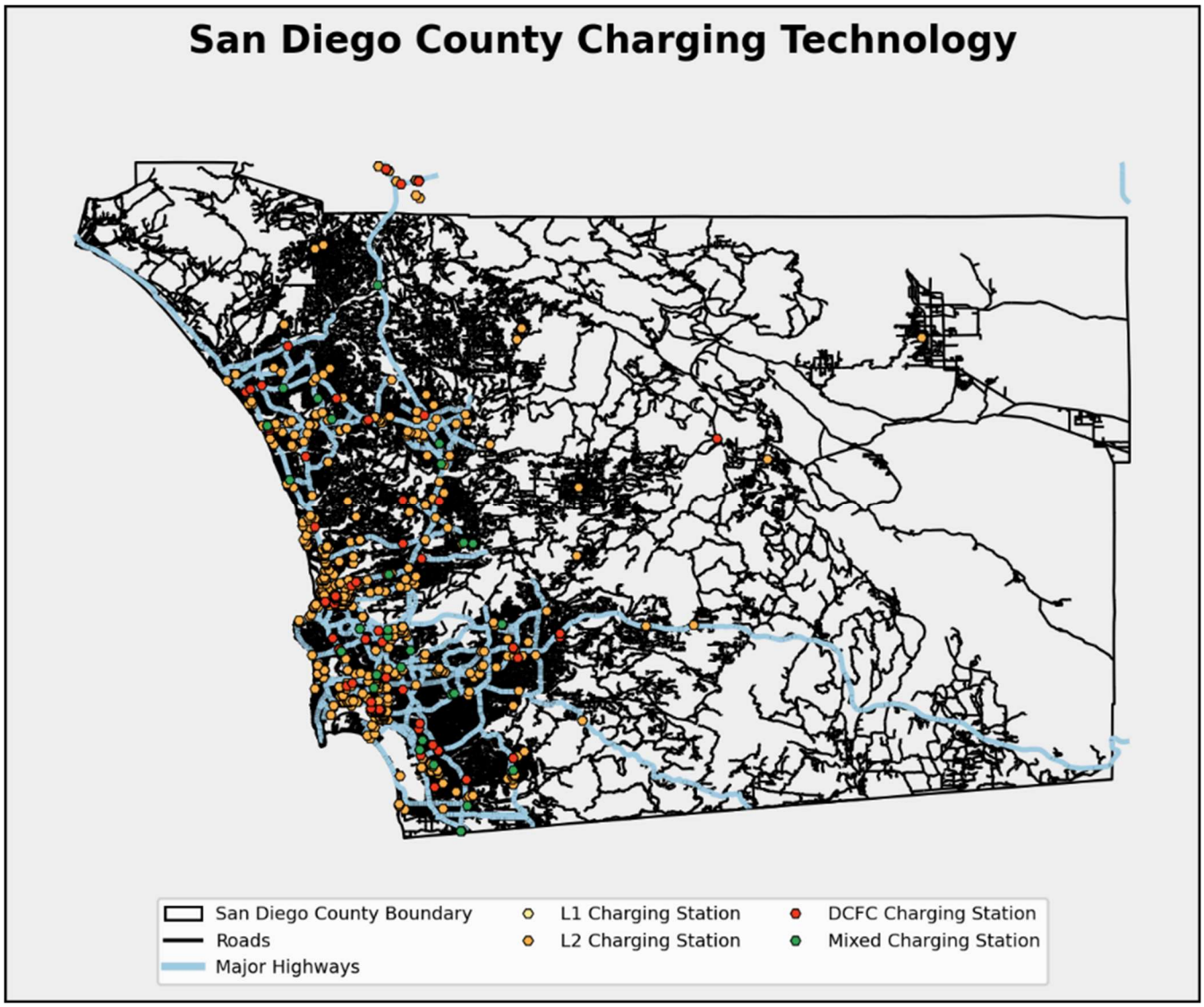

Sources: County of San Diego, SANDAG

The Project Team also developed maps showing current public infrastructure conditions in San Diego County using the DOE's Alternative Fueling Station Locator for charging station locations by type,[68] the

San Diego Open GIS Data Portal for county and city boundaries and roads,[69] and the National Highway Planning Network GIS data for highways.[70]

The results of the optimization modeling of current public charging infrastructure in San Diego County are shown in Figure 62.

Figure 62 San Diego County Current Public Charging Infrastructure




Sources: DOE, SANDAG, SanGIS, DOT

According to the DOE, there are currently 2 Level 1, 840 Level 2, and 89 DCFC public charging stations in San Diego County. As shown in the map, they are mostly located in urbanized areas and near to major highways and busy streets.

**San Diego Charging Needs by Segment**

The subsequent sections examine the key drivers of charging needs in San Diego County, including hours of charging needed, the percentage of drivers with access to overnight private charging, and where

renters and rivers with non-dedicated parking spend most of their time parked, which will influence the likely primary charging location.

**Charging Needs**

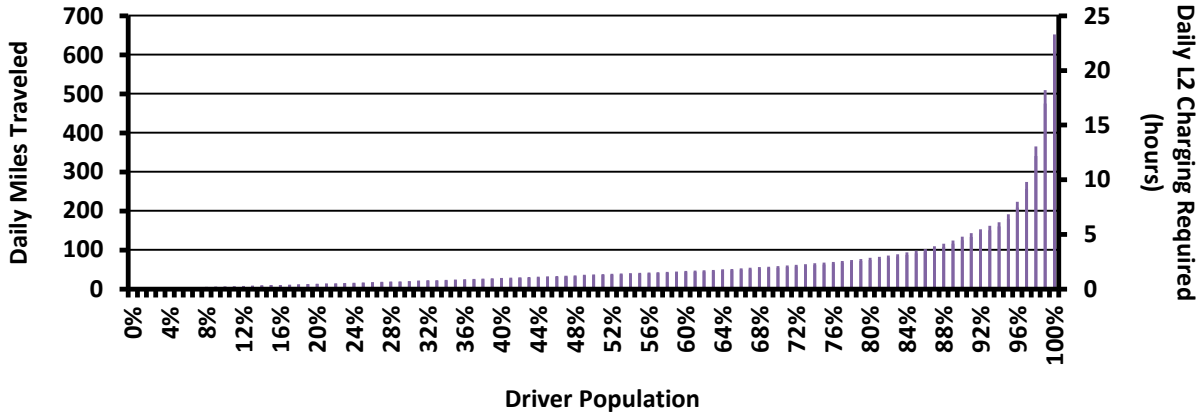
Charging needs for the San Diego region were analyzed using data from NREL's latest National Household Travel Survey, which provides data on the total trips taken in one assigned day for 26,095 households in California and was filtered for 2,228 households in San Diego County.[71]

The total distance and duration driven per day by household on average was converted into energy usage assuming a 0.24 kWh/mile conversion, and then translated into hours of charging needed assuming an average Level 2 power rating of 7.2 kW.

The resulting distribution of daily miles traveled, and consequent required hours of Level 2 charging, are shown in Figure 63 and Figure 64 Distribution of Daily Charging Hours Required. The graphics show that

60% of drivers in San Diego County will need a 1-2 hour Level 2 recharge per day, and 91% of drivers will need 5 hours or less per day.

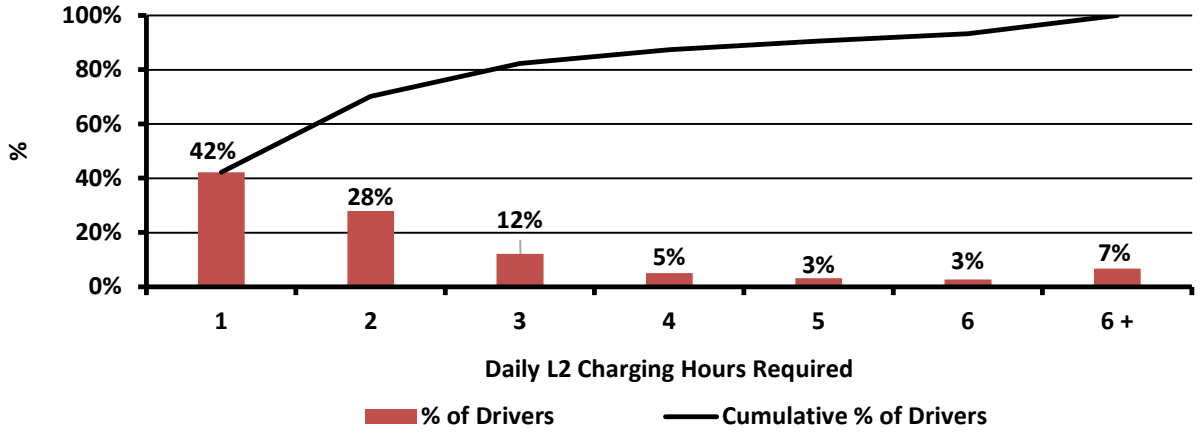
Figure 63 Driver Distribution by Daily Driving / kWh[72]




Sources: NREL, Energeia Analysis

In practice, drivers with larger batteries are likely to recharge less frequently.

Figure 64 Distribution of Daily Charging Hours Required




Sources: NREL, Energeia Analysis

**Access to Charging**

Dedicated and non-dedicated charging access was assessed for San Diego County using data on the number of vehicles available per household and owners vs. renters from the US Census Bureau.[73,74]

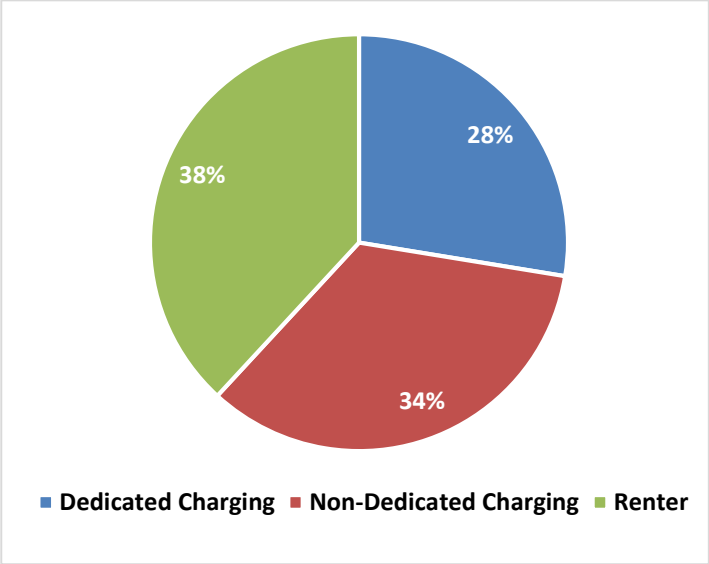
People with access to dedicated charging are expected to prefer overnight charging at home due to its relative convenience and cost and do not require the use of publicly available charging infrastructure other than for 3% or less of trips beyond their battery capacity. The rest of drivers are assumed to require a public charging solution.

The total driving population was also separated into four categories: full-time college students, full-time workers that commute, full-time workers that work locally, and not full-time workers. Not full-time

workers include people working part-time or not working at all, grouped together because neither have high dwell times at workplaces. Data on work status and college enrollment was also informed by the US Census Bureau[2,3].

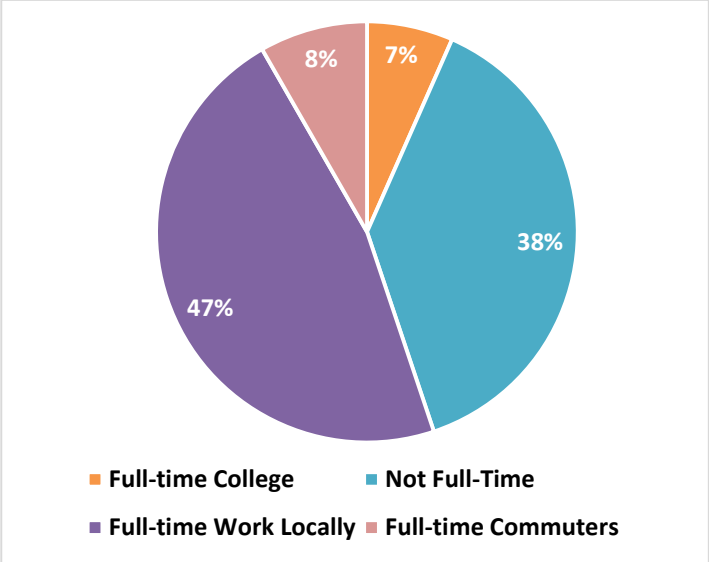
Charging access and driver segmentation is shown in Figure 65 and Figure 66.

Figure 65 San Diego County Access to Private Home Charging




Sources: Census, Energeia Analysis

Figure 66 San Diego County Segmentation by Driver Type




Sources: Census, Energeia Analysis

The estimated 72% of ZEV drivers in the San Diego region without a dedicated charging location are expected to need access to public charging infrastructure over the long-term.

The Project Team assumes that the best charging locations for these drivers are where their cars are parked for most of the time, which the second graphic shows is primarily at workplaces (54%) (including

the net inbound full-time commuters) and 7% at high schools, colleges and universities (i.e. full-time educational sites). Drivers that are neither at work or school on a full time basis are assumed to either primarily charge near home using a Level 2 charger or a DCFC charger at a destination parking lot or gas station.

**San Diego Charging Solutions**

A defined public charging solution includes specifying a level of charging technology (e.g. Level 2 or DCFC) and location options to address the requirements of a specific driving segment, e.g. part-time workers or students, retirees, the unemployed or under-employed, full-time workers, or full-time college students.[75]

In the charging model configured for the San Diego region, potential public charging location options were identified using parcel data, which located single family, multifamily, parking lots, businesses, and

specific destinations and gas stations. Curbside options were identified using a spatial grid that identified cells with both a residential or business parcel and a road curbside.

Table 52 lists the main public charging solution options and provides a summary of key differences between them:

- Operating hours – the typical operating hours for the site; the longer the operating hours, the more charging that can potentially be done per site
- Accessibility – whether the site can be accessed by the public, or whether the access is limited to private business or housing groups
- Technology type – whether a Level 2 (L2)[76] or DC Fast Charger (DCFC) is offered, and
- Charging power – expected charging power, reducing the length of time required to recharge, which also increases the number of drivers that can be served from the charger

Table 52 Public Charging Solution Options

| Category | Workplace | College | Business Curbside | Business Parking Lot | Destination Parking Lot | Multi-Family | Residential Curbside | Gas Station |
|---|---|---|---|---|---|---|---|---|
| Total Sites | 27,449 | 321 | 2,101 | 2,327 | 1,125 | 237,057 | 9,534 | 854 |
| Typical Hours | 7am-7pm | 7am-9pm | 7am-7pm | 7am-7pm | 7am-10pm | 6am-12am | 6am-12am | 6am-12am |
| Hours per Day | 12 | 14 | 12 | 12 | 15 | 18 | 18 | 18 |
| Days per Week | M-F | M-F | M-F | M-F | All | All | All | All |
| Potential EVs | 81 | 489 | 1,068 | 964 | 964 | 164 | 118 | 2,627 |
| Public | No | No | Yes | Yes | Yes | No | Yes | Yes |
| Type | Level 2 | Level 2 | Level 2 | Level 2 | DCFC | Level 2 | Level 2 | DCFC |
| kW (2022) | 7.2 | 7.2 | 7.2 | 7.2 | 125 | 7.2 | 7.2 | 125 |
| kW (2029) | 17.2 | 17.2 | 17.2 | 17.2 | 500 | 17.2 | 17.2 | 500 |

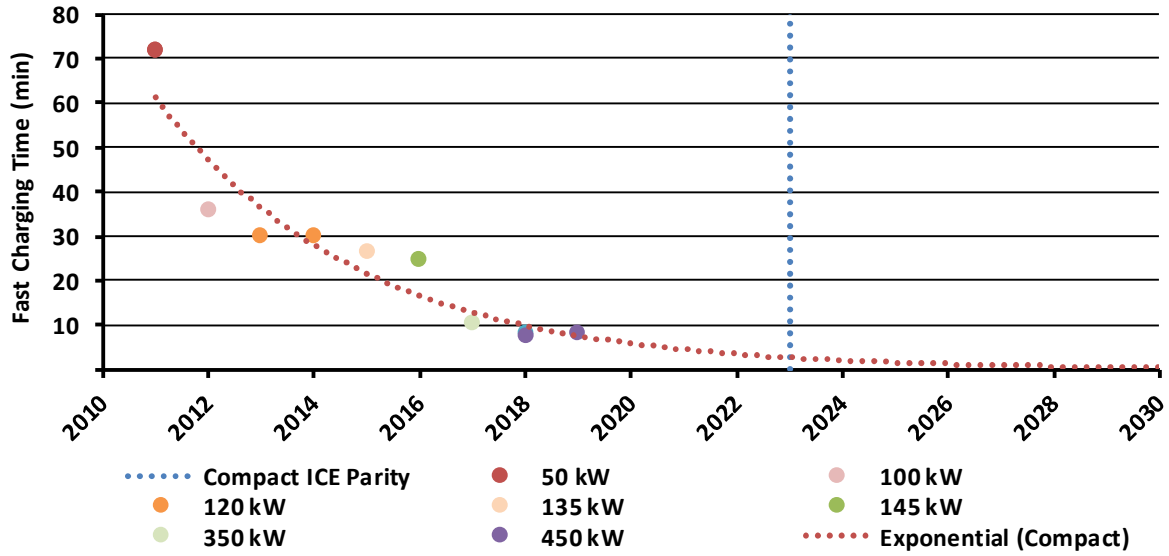
Sources: Energeia analysis

The numbers of ZEVs able to be supported per charging port is estimated based on the solution option's operating hours, accessibility, and charging power. The Project Team also applied a charging 'efficiency' factor that starts at 50% and increases to 80% over 10 years and accounts for inefficiencies in the

utilization of charging that are expected to decrease as technology advancements are made. This factor accounts for the immaturity in charging behavior and sets an effective maximum utilization that improves over time.

Figure 67 below shows the trend in DCFC charging rates, moving to refueling time parity with ICE vehicles. The analysis of improving charging rates was used to estimate charger capability kWs in 2029, as shown in the table above.

Figure 67 DCFC Maximum Charging Rates




Sources: Energeia analysis

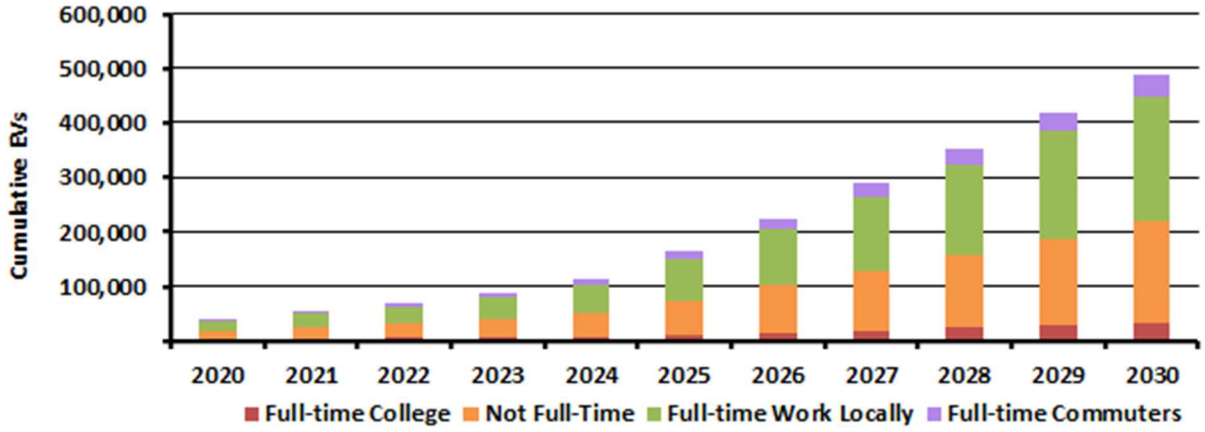
**San Diego Uptake Forecasts**

The A2Z ZEV Uptake Model was used to forecast the number of cumulative vehicles in San Diego County to 2030, which was then split into the number of estimated vehicles without dedicated access to home

charging and further segmented into the number of vehicles per driver type, using the allocations in the above section Access to Charging sourced from census data.

The expected number of ZEV's needing public charging infrastructure by driver type over time is shown in Figure 68.

Figure 68 Total Non-Dedicated EVs by Segment




Sources: Energeia Analysis

The charging locational options and preferences for each non-dedicated driver segment were allocated to potential charging solutions based on the Project Team's analysis and are shown in Table 53.

Table 53 Driver Segment to Charging Solution Options and Expected Preferences

| Key Driver | Level 2 | | | | | | | | | DCFC | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Business | | | | | Residential | | Community | | | |
| Segment | College | Workplace | Curbside | Hotel/ Motel | Parking Lot | Multi-family | Curbside | Community Centers | Parks | Gas Station | Retail Center |
| Full-time College | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Retired, Not-Full Time | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Full-time Work Locally | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Full-time Commuters | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Visitors | | | | ✓ | | | | ✓ | ✓ | ✓ | ✓ |

 = Top Ranked Solution  =Lower Ranked Solution

Sources: Energeia Assumptions

Public charging preferences were set largely based on where driving data[4] showed drivers spend most of their time, where drivers had the shortest distance to walk, and which option is expected to be the easiest to install (e.g. due to a supportive host), and potentially the most cost-effective.[77]

**Public Charging Solution Allocations**

Two different deployment scenarios were tested to compare charging infrastructure allocation results in San Diego County in terms of expected cost and geographical distribution. The first took a pro-rata approach based on the number of potential drivers per potential charging location, as shown in Table

4 NREL, 2017 National Household Travel Survey – California Add-On, 2019

54. DCFC to L2 technology allocation was fixed at today's estimated split of 6,500 L2 and 260 DCFC stations in San Diego County.[78]

Table 54 Pro-Rata Deployment

| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L2 | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% |
| College | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % | 100 % |
| Workplace | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% |
| Bus Curbside | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% |
| Bus Parking Lot | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% | 11% |
| MultiFamily | 65% | 65% | 65% | 65% | 65% | 65% | 65% | 65% | 65% | 65% | 65% |
| Res Curbside | 35% | 35% | 35% | 35% | 35% | 35% | 35% | 35% | 35% | 35% | 35% |
| DCFC | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% |
| DCFC - Destination | 55% | 55% | 54% | 55% | 54% | 55% | 55% | 55% | 55% | 55% | 55% |
| DCFC - Gas | 45% | 45% | 46% | 45% | 46% | 45% | 45% | 45% | 45% | 45% | 45% |

Sources: Energeia Analysis

The second deployment scenario was optimized based on discussion with the Core Team to ensure alignment with San Diego's local needs and preferences. The L2/DCFC split was developed to align with work previously done in the A2Z Gap Analysis, which estimated 6,500 L2 and 260 DCFC chargers in 2020,

52,600 L2 and 3,800 DCFC chargers in 2025, and 139,000 L2 and 16,200 DCFC chargers in 2030.[78] The resulting percentages are 96% L2 in 2020, 93% in 2025, and 90% in 2030, as shown in Table 55.

Table 55 San Diego Optimized Deployment

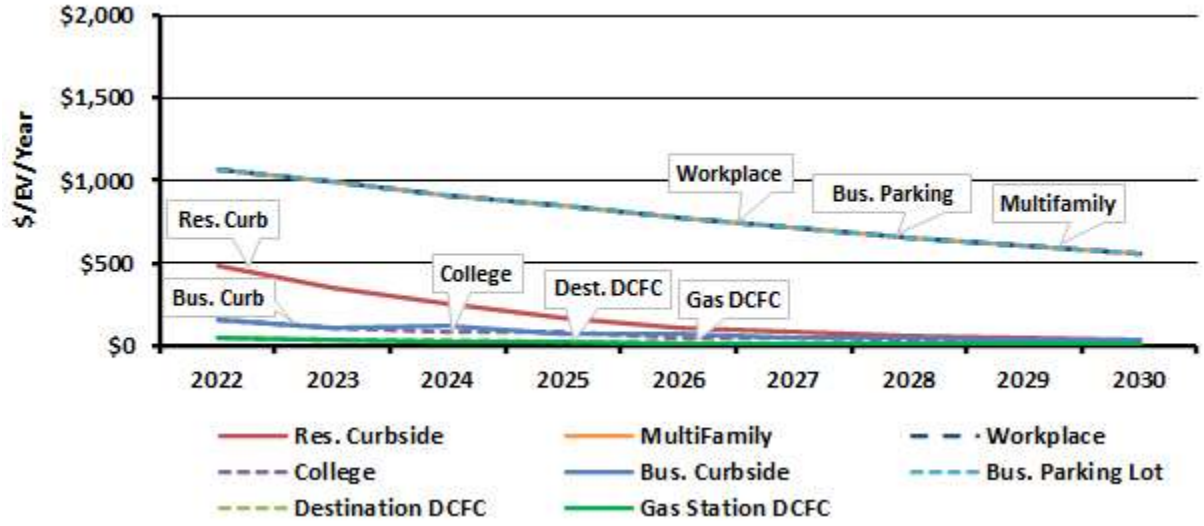
| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L2 | 96% | 96% | 95% | 94% | 94% | 93% | 93% | 92% | 91% | 90% | 90% |
| College | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Workplace | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% | 80% |
| Bus Curbside | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Bus Parking Lot | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| MultiFamily | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Res Curbside | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| DCFC | 4% | 4% | 5% | 6% | 6% | 7% | 7% | 8% | 9% | 10% | 10% |
| DCFC - Destination | 55% | 58% | 62% | 65% | 69% | 72% | 76% | 79% | 83% | 86% | 90% |
| DCFC - Gas | 45% | 42% | 38% | 35% | 31% | 28% | 24% | 21% | 17% | 14% | 10% |

Sources: Energeia Analysis, A2Z Collaboration

### F.2.4 Results

The resulting annual EVSE equipment costs are shown in Figure 69, calculated as a function of utilization rates, number of ZEVs, allocation and charging cost assumptions.

*Figure 69 Equipment Cost per Year*




Source: CEC (2022),

analysis

Note: within the legend, “Bus.” represents “Businesses” and “Res.” represents “residential”

Public infrastructure costs can be reduced by increasing the number of DCFC chargers relative to Level 2 chargers, particularly targeting drivers that would otherwise use relatively low utilization multifamily or workplace charging solutions. Charging solutions at land use types that are open to the most amount of drivers offer the lowest cost on a $/ZEV basis. Multifamily locations are considered more expensive because there is a limited pool of drivers that can use these locations, therefore the cost per ZEV is higher.

## F.3 ZEV Strategy Impact Assessment

The ZEV Uptake model described in Appendix F was configured for key factors to identify their relative impact on ZEV adoption over time. These key factors were then factored into the development of Preliminary Actions, where impact was assessed. The assessment results informed the Strategies presented in Section 4 of the report.

### F.3.1 Objectives

The objective of the A2Z Strategy Impact Assessment was to utilize modeling and data-driven insights to inform the Strategy development process in this work. The A2Z Impact Assessment looked at the relative impacts of upfront rebates, public charging infrastructure deployment, utility rate and program

design and other types of incentives including accelerated replacement programs, on overall ZEV adoption rates.

By understanding the relative impacts of Preliminary Actions, Strategy development could be optimized, enabling the overall impact of Strategies to be quantified. It should be noted that not all Strategies proposed in this work can be quantified through the aforementioned modeling, and impacts were assessed where applicable.

## F.3.2 Methodology

The methodology of assessing A2Z ZEV Strategy Impact entailed developing key factors of ZEV adoption, which were used to develop Preliminary Actions that could be toggled in the A2Z ZEV Uptake Model and quantify the impacts on ZEV adoption. Based on the output of this modeling, Preliminary Actions were used to write and finalize the Strategies and supporting implementation tactics.

### F.3.2.1 Key Factors

At the start of the action development process, a list of primary factors that accelerate ZEV adoption were identified to quantify their impact on ZEV uptake. These programs and settings are viewed as the

primary factors or barriers to adoption, and are included in the A2Z ZEV Uptake Model as settings that can be changed to see the incremental difference of each factor. Key factors included the following:

- **Purchase Discount –** Offering an additional purchase discount reduces the ZEV price premium and cost of ownership
- **Level 2 Rate Design** – Optimizing an electricity rate for Level 2 chargers based on charging patterns allows customers to take advantage of lower rates during off-peak
- **DCFC Rate Design** – Optimizing an electricity rate for DCFC chargers based on charging patterns allows operators to deploy more sites at lower cost and benefit from onsite batteries and solar PV
- **EV Charging DR Program** – Offering managed charging options to shift usage from peak periods to off-peak allows customers to control their energy usage and take advantage of monetary incentives
- **Public Charging Availability** – Accelerating the deployment of public infrastructure eliminates access, availability, and range anxiety barriers
- **Public Charging Mix** – Allocating public chargers to higher utilization, cost-effective locations increases charging accessibility
- **Accelerated Retirement** – Offering incentives to retire or trade-in ICE vehicles incentives adoption of ZEVs

#### F.3.2.2 Preliminary Actions

A list of Preliminary Actions with concrete assumptions was developed and validated with the A2Z Collaboration Core Team for each key factor to ZEV adoption to parameterize the A2Z ZEV Uptake Model. Rebates and discount percentages are based on best practice ZEV programs and tariff designs

that can be seen in the current market. Retirement incentives have been informed by a past $3 billion U.S. federal scrappage program, the Car Allowance Rebate System.

- **Purchase Discount** – Offering an additional $2,500 purchase discount for ZEVs until price parity is reached with a comparable ICE vehicle
- **Available L2 ZEV Rate** – Offering a tailored ZEV rate designed for L2 chargers, resulting in 20% lower electricity costs when charged outside of peak hours, and applying to 40% of customers using this tariff
- **Available DCFC ZEV Rate** – Offering a ZEV rate designed for DCFC chargers, resulting in 10% lower electricity costs, and 40% of customers using DCFC
- **Available DR Program** – Offering a demand response program, resulting in 25% lower electricity prices and 20% customer participation
- **Available Public Infrastructure** – Offering 100% available public infrastructure by 2027 compared to the baseline of 2030, enabling ZEV adoption by those without private overnight parking
- **Optimized Public Infrastructure** – Implementing a public charging infrastructure that delivers 100% available public charging at the lowest possible cost by optimizing location and technology mix, saving costs
- **Retirement Incentives** – Offering a $4,000 rebate to scrap ICE vehicles and replace them with ZEVs, resulting in a higher rate of vehicle replacement and adoption of ZEVs

The key factors and estimated impacts were used to quantity the impacts of the Preliminary Actions to inform specific implementation criteria and further refine the A2Z Strategies and supporting tactics.

### F.3.3 Key Inputs and Assumptions

The key inputs and assumptions used in the Strategy impact assessment include vehicle cost premium reduction, new ZEV rate designs, and public infrastructure availability.

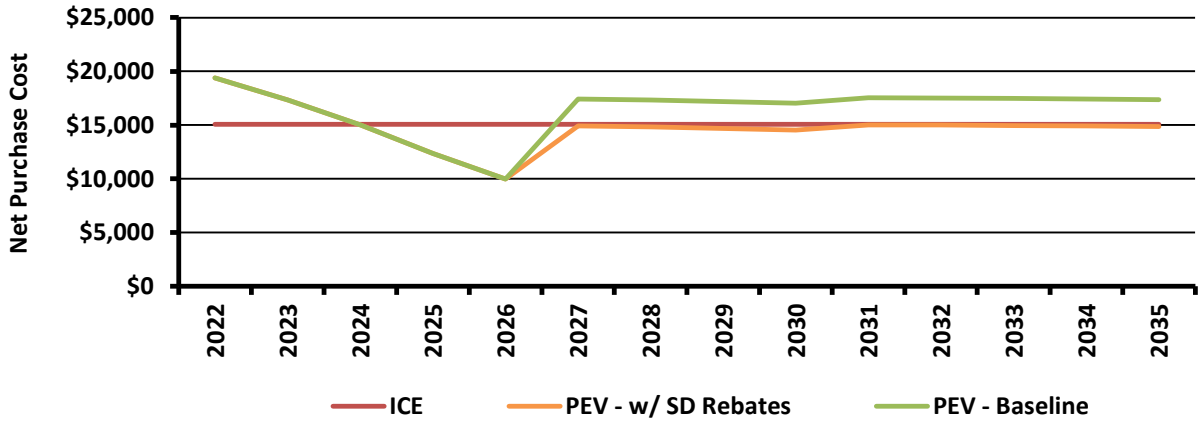
The key inputs and assumptions used in the ZEV Uptake model include vehicle cost premium reduction, new ZEV rate designs, and public infrastructure availability.

**Cost Premium Reduction Illustrative Strategies**

The first illustrative strategy modeled, Purchase Discount, reduced the ZEV cost premium by $2,500 until price parity was reached. The purchase discount was applied in the Uptake model as a San Diego-specific rebate, in addition to the existing federal, state and regional incentives included in the Baseline model. Figure 70 depicts the change in purchase cost by illustrative strategy setting versus the comparable gas-powered vehicle cost. The San Diego Rebates illustrative setting was applied to fill the gap between the cost of ZEVs and the equivalent ICE vehicle after 2027, due to the Federal EV Purchase

Tax Credit of $7,500 ending in 2026. Price parity is reached in 2027 and no additional incentives are applied afterwards outside of the baseline incentives from the Build Better Act.

*Figure 70 Net Purchase Cost by Illustrative Strategy Setting vs. ICE*




Sources: DOE, Energeia

**New ZEV Specific Rate Designs and Demand Response Programs**

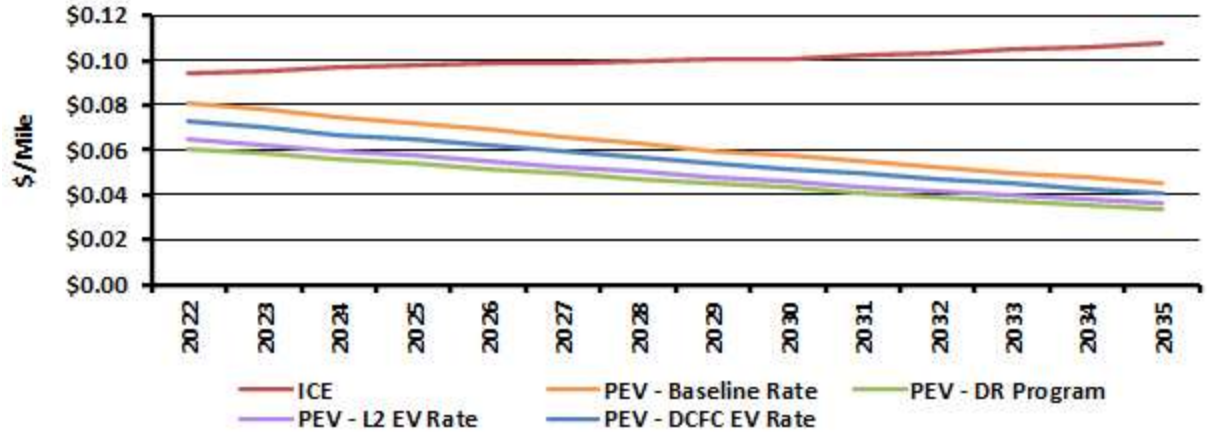
The next three Preliminary Actions of Available L2 Rate, Available DCFC Rate, and Available DR program modeled lowered electricity prices through either an L2 or DCFC rate design, or a new ZEV demand response (DR) program. The Project Team made assumptions on the effect of each setting on electricity prices, which included 20% lower costs/kWh for the L2 rate, 10% lower for DCFC, and 25% lower for a DR program.

The difference in fuel costs for each setting as compared to the equivalent gas-powered vehicle is shown in Figure 71.

Lowering electricity costs per kWh lowers annual fuel costs, assuming no change to efficiency or VMT. As shown in Figure 71, the DR program setting assumes the greatest decrease to electricity prices and therefore the lowest cost per mile.

Fuel costs are a function of energy efficiency (either in miles per gallon or kWh per mile) and fuel prices (either per gallon or per kWh). The energy efficiency of ICE vehicles was found through desktop research and forecasted based on the EIA's report on Motor Vehicle Mileage, Fuel Consumption, and Fuel Economy, while ZEV energy efficiency was forecasted based on the energy efficiency improvements of the Mercedes EQA, as described in Vehicle Efficiency. Retail gas costs were informed by the EIA and forecasted using a regression against oil prices, and electricity prices were informed by SDG&E's historical rates and the CPUC's forecasted rates.

*Figure 71 Average Fuel Costs per Year by Strategy*

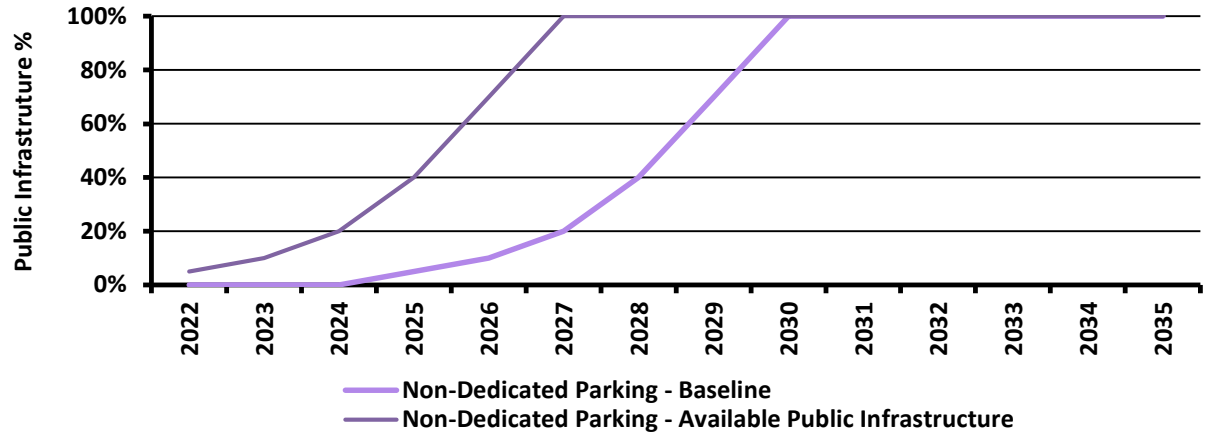



Sources: EIA, SDG&E, CPUC, Energeia

**Public Infrastructure Availability**

Public Infrastructure Availability is configurable in the A2Z ZEV Uptake Model as a percentage of infrastructure available compared to the total needed over time to eliminate access, availability, and range anxiety barriers. The baseline model assumes 100% availability by 2030, while the Available Public Infrastructure illustrative strategy progresses to 100% infrastructure availability in 2027. Figure 72 shows the difference in public infrastructure availability for nondedicated charging under Baseline and Available Public Infrastructure scenarios. Infrastructure availability is analyzed for drivers that have more than one vehicle or are renters because those who have one vehicle in a single-family dwelling are assumed to use dedicated charging at home.

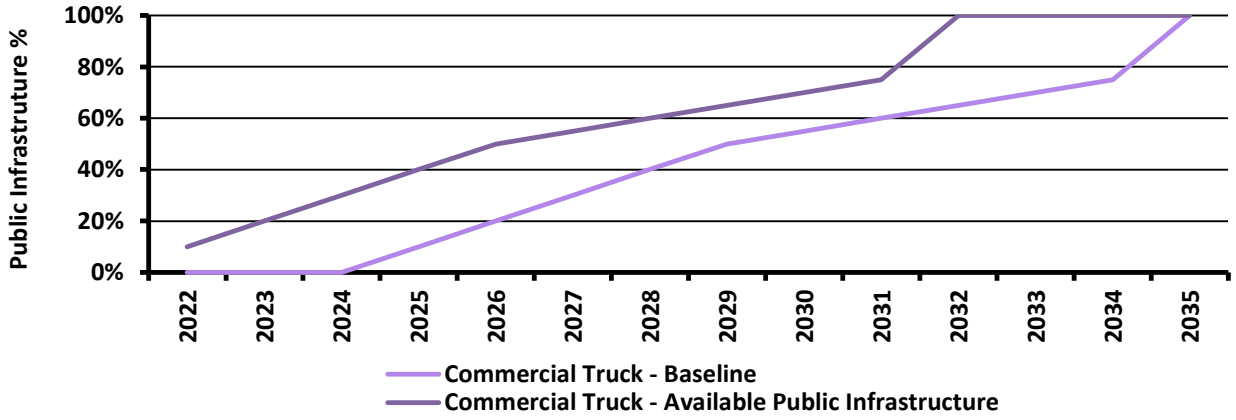
*Figure 72 Non-Dedicated Parking Charging Availability*




Source: Energeia

Figure 73 shows the difference in public infrastructure for commercial charging under Baseline and Available Public Infrastructure illustrative strategy settings. Commercial public charging is estimated to lag 5 years behind.

*Figure 73 Commercial Charging Availability*



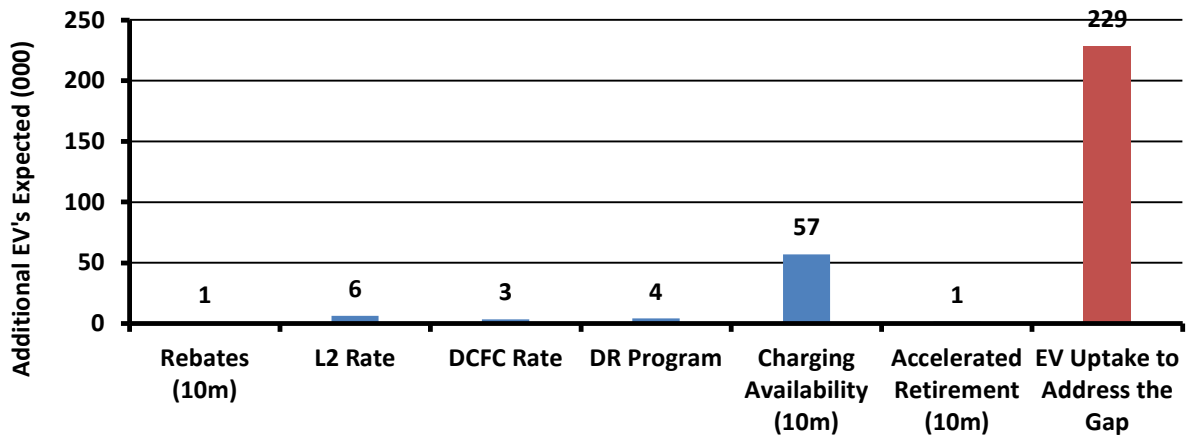

Source: Energeia

## F.3.4 Results

The result of each measurable Preliminary Action in terms of number of ZEVs is shown Figure 74. Results were normalized to a $10 million budget in investment to better compare options. Cumulative ZEVs from each scenario were compared to the baseline results to determine the incremental number of ZEVs forecasted. The ZEV uptake to address the gap refers to the gap between the Baseline Forecast of ZEVs and the 2030 projection from the A2Z Gap Analysis.

As shown, the Available Public Infrastructure Action has the greatest impact on ZEV uptake, with 57,000 additional ZEVs projected. The Accelerated Retirement action was calculated assuming a $4,000 rebate per vehicle, and 55% incremental retirements, as results showed from a previous federal program[79].

*Figure 74 Preliminary Action Impact Assessment Results*




Source: Energeia

# G Funding Opportunities

## G.1 Best Practices for Applying to Funding for ZEVs and ZE Infrastructure

When scanning, identifying, and applying for funding opportunities it is important to keep the following best practices in mind to ensure that the funding program meets the identified need for the funds.

- → Carefully review eligibility criteria for each funding program first to ensure an applicant is eligible for funding through the designated source.
    - Designated Federal funding recipients may receive funds through formula funding which can be combined with other eligible USDOT funding for EV projects is if the eligibility requirements are met for both programs and the total Federal cost-share does not exceed 80 percent. Formula programs with EV eligibilities include the Surface Transportation Block Grant Program (STBG)[80], Congestion Mitigation & Air Quality Improvement Program (CMAQ)[81], National Highway Freight Program (NHFP)[82], and the Carbon Reduction Program[83].
- → Stacking of funding programs may be required in order to fund a complete package of materials such as the purchase of an EV through one program and supplemental charging equipment through another program.
- → In California, many of the funding opportunities are a result of State bills which can increase the complexity of ensuring eligibility for a funding program and may increase barriers to access for a general user. Access to educational assistance and supplemental materials for disadvantaged communities is still being developed in response to these bills which may reduce barriers to application in the future.
- → If applicable, identify partners who are interested in funding a certain type of EV project to maximize resources and increase competitiveness. Some Federal discretionary applications may be strengthened through partnerships between Metropolitan Planning Organizations, the State, and/or nonprofits with a shared project interest.
- → For competitive opportunities, provide supporting documentation where applicable regarding the benefits to the community including reducing GHGs, supporting Climate Action Plans, serving disadvantaged (Justice40 communities), and access to workforce development trainings.

- Designated Federal funding recipients may receive funds through formula funding which can be combined with other eligible USDOT funding for EV projects is if the eligibility requirements are met for both programs and the total Federal cost-share does not exceed 80 percent. Formula programs with EV eligibilities include the Surface Transportation Block Grant Program (STBG)
- [84], Congestion Mitigation & Air Quality Improvement Program (CMAQ)[85], National Highway Freight Program (NHFP)[86], and the Carbon Reduction Program[87].

→ Stacking of funding programs may be required in order to fund a complete package of materials such as the purchase of an EV through one program and supplemental charging equipment through another program.

→ In California, many of the funding opportunities are a result of State bills which can increase the complexity of ensuring eligibility for a funding program and may increase barriers to access for a general user. Access to educational assistance and supplemental materials for disadvantaged communities is still being developed in response to these bills which may reduce barriers to application in the future.

→ If applicable, identify partners who are interested in funding a certain type of EV project to maximize resources and increase competitiveness. Some Federal discretionary applications may be strengthened through partnerships between Metropolitan Planning Organizations, the State, and/or nonprofits with a shared project interest.

→ For competitive opportunities, provide supporting documentation where applicable regarding the benefits to the community including reducing GHGs, supporting Climate Action Plans, serving disadvantaged (Justice40 communities), and access to workforce development trainings.

*Table 56.Federal Funding Opportunities - Electric Vehicles and Charging Infrastructure*

| **Federal Funding Opportunities** | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| USDOT Federal Highway Administration (FWHA) National EV Infrastructure (NEVI)[88] | Formula Funding Program – provides funding to strategically deploy Z charging stations and establish an interconnected network to facilitate data collection, access, and reliability | Designated formula funding State recipient: share of the program is equal to the State's share of combined amount that FHWA distributes in Federal-Aid apportionments<br><br>In California, the California Department of Transportation (Caltrans) is the designated lead agency for NEVI in partnership with the CEC | <u>Eligible Projects:</u><br>→ EV charging infrastructure that are directly related to EV charging infrastructure that is open to the public or to authorized commercial motor vehicle operators from more than one company<br>→ Operating assistance for costs to operate or maintain the infrastructure<br>→ Development phase activities | The Bipartisan Infrastructure Law appropriates $5.0 billion over the period of fiscal years 2022 to 2026. Of the $5.0 billion, $384 million has been allocated to California over the 5 year period with approximately $81M distributed per year<br><br>→ Funding is available contingent on approval by the FHWA for the EV Plan | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>5 (Accelerate Installations)<br>6 (ZE Adoption) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | → Traffic control devices and/or their installation<br>→ Data sharing<br>→ Mapping and analysis activities<br><br><u>Other Requirements:</u><br>Requires charging stations to be deployed along FHWA Alternative Fuel Corridors (AFCs)<br><br>Requires recipient to submit EV Infrastructure Deployment Plan state plan describing how they intend to distribute NEVI funds. | Funding is available for up to 80% of eligible project costs and requires a 20% local match | |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| USDOT Federal Highway Administration (FWHA) – Corridor Charging Grant Program [89] | Discretionary grant program for the deployment of publicly accessible EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure along designated Alternative Fuel Corridors | State Highway Agency;<br>Metropolitan Planning Organization; Local Government or Agency; Federally Recognized Tribe; Territories; and multi-jurisdictional groups | <u>Site Requirements:</u><br>Must be deployed along designated Alternative Fuel Corridors | Funding Available: up to $1.2 billion in set aside funding through the NEVI program | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>5 (Accelerate Installations)<br>6 (ZE Adoption) |
| USDOT Federal Highway Administration (FWHA) – Community Charging Program[90] | Discretionary grant program for the deployment of publicly accessible<br>EV charging infrastructure and hydrogen, propane, and natural gas | State Highway Agency;<br>Metropolitan Planning Organization; Local Government or Agency; Federally Recognized Tribe; Territories; and | <u>Project Considerations:</u><br>Community grants are focused on the installation of electric vehicle charging and alternative fuel in locations on public roads, schools, parks, and in | Funding Available: up to $1.2 billion in set aside funding through the NEVI program.<br>Funding is prioritized for rural areas, low and | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>5 (Accelerate Installations)<br>6 (ZE Adoption) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | fueling infrastructure in communities | multi-jurisdictional groups | publicly accessible parking facilities | moderate-income neighborhoods, communities with a low ratio of private parking spaces to households or high ratio of multiunit dwellings to single family homes | 10 (ZE Innovation) |
| Inflation Reduction Act (IRA) – Clean Vehicle Tax Credit (Section 30D) for new EVs[91] | The Inflation Reduction Act (IRA) is an amended version of the Build Back Better Act which authorizes a series of credits and rebates aimed towards clean energy and climate action | United States taxpayer purchasing a vehicle assembled in North America by a certified dealer<br><br>Income limits apply:<br>$150k Single \| $225k Head of Household \| $300k Filling Jointly | <u>Considerations:</u><br>→ In 2024, a taxpayer may elect to transfer a credit to a dealer; Requires purchase of EV's meeting critical mineral and battery component requirements to qualify for maximum available credits<br>→ Starting in 2024, vehicles cannot have | <u>MSRP Limits</u><br>$80k for SUVs, Vans, Trucks<br>$55k for other vehicles<br><br><u>Tax Credits: Max $7,500</u><br>→ EVs meeting the critical mineral requirement will be eligible for a $3,750 tax credit | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>6 (ZE Adoption) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | any battery components or critical minerals sourced from a foreign entity of concern, which includes China. | EVs meeting the battery component requirement will be eligible for an additional $3,750 tax credit | |
| Inflation Reduction Act (IRA) – Clean Vehicle Tax Credit (Section 25E) for Purchase of Used EV's[92] | The Inflation Reduction Act (IRA) is an amended version of the Build Back Better Act which authorizes a series of credits and rebates aimed towards clean energy and climate action | United States taxpayer purchasing a used EVs<br><br>Income limits apply:<br>$75k Single \| $112,500k Head of Household \| $150k Filling Jointly | <u>Considerations:</u><br>→ The sales price of a qualified used EV cannot exceed $25,000, and the vehicle must be at least two years old<br>→ A qualifying vehicle must also be propelled to a significant extent by an electric motor that draws electricity from a | Buyers can qualify for a credit that is the lesser of $4,000 or 30% of the sales price for used EVs weighing less than 14,000 lbs. | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>6 (ZE Adoption) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | battery, and which has a capacity of not less than 7 kWh, and is capable of being recharged from an external source of electricity<br><br>The transfer of the credit (at point of sale) to a dealer can happen after Dec. 31, 2023 | | |
| Inflation Reduction Act (IRA) – Clean Vehicle Tax Credit (Section 45W) for Commercial EVs[93] | The Inflation Reduction Act (IRA) is an amended version of the Build Back Better Act which authorizes a series of credits and rebates aimed towards clean | United States taxpayer purchasing a commercial EV for business purposes | <u>Considerations:</u><br>There are no battery or mineral sourcing requirements.<br><br>Defines incremental | The eligible credit amount per qualified commercial<br>EV is the lesser of 30% of the sales price or the incremental cost of the vehicle | 1 (ZE VMT)<br>6 (ZE Adoption)<br>10 (ZE Innovation) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | energy and climate action | | cost as the difference between the purchase price of the EV and a comparable internal<br>combustion engine vehicle | The tax credit is capped at $7,500 for vehicles with a gross vehicle weight rating (GVWR) of less than 14,000 lbs., and capped at $40,000 for vehicles with a GVWR of more than 14,000 lbs. | |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| Federal Transit Administration's Grants for Buses and Bus Facilities[94] | Discretionary program for project sponsors to obtain funding that will address significant repair and maintenance needs, improve safety of the system, and deploy connective projects that include advanced technologies | Eligible applicants include:<br>→ designated recipients that allocate funds to fixed-route bus operators<br>→ States (including territories and Washington D.C.)<br>→ Local governmental entities that operate fixed route bus service<br>→ Indian tribes.<br>Eligible subrecipients include all otherwise eligible applicants and also private nonprofit organizations engaged in public transportation | <u>Eligible projects include:</u><br>→ Replacement of buses and related equipment<br>→ Rehabilitation of buses, related equipment, and bus-related facilities<br>→ Purchase of buses, related equipment, and bus-related facilities<br>→ Lease of buses and bus-related facilities<br>→ Construction of bus-related facilities | Federal Share: 80% of the net capital cost<br><br>The Federal Share may exceed 80% for projects related to the Clean Air Act including the cost of leasing or purchasing low or no emission transit buses | 1 (ZE VMT)<br>4 (Workforce)<br>9 (ZE Fleets)<br>10 (ZE Innovation) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| Federal Transit Administration's Low or No Emission Vehicle Program[95] | Discretionary program for project sponsors to purchase or lease of low or no emission vehicles that use advanced technologies, including related equipment or facilities, for transit revenue operations | Eligible applicants include:<br>→ Direct or designated recipients of FTA grants;<br>→ States;<br>→ Local governmental authorities;<br>→ Indian Tribes. | <u>Eligible projects include:</u><br>→ Purchasing or leasing low- or no-emission buses<br>→ Constructing or leasing facilities<br>→ Purchasing charging equipment<br>→ Workforce development and training activities | Federal Share: not to exceed 85 percent of the total transit bus cost. However, the Federal share in purchasing low or no emission bus-related equipment and facilities is 90 percent.<br><br>Workforce Development: Required to spend 5% of award on training and workforce development activities | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>8 (Grid Capacity)<br>9 (ZE Fleets) |
| US DOT - Rebuilding American Infrastructure | Discretionary program for the investment in road, rail, transit and port | Eligible applicants include:<br>→ Public Entity<br>→ Municipality | <u>Eligible projects include</u><br>→ Public transportation projects | Minimum Award: $5M<br>Maximum Award: $25 M | 1 (ZE VMT)<br>9 (ZE Fleets) |

| Federal Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| with Sustainability and Equity (RAISE)[96] | projects that promise to achieve national objectives | → Counties<br>→ Port Authority<br>→ Tribal Government<br>→ MPO | → Intermodal projects<br>→ Highway, bridge, or other road projects<br>→ Passenger and freight rail transportation projects<br>→ Port infrastructure investments | No more than $250M can be awarded to a single State<br><br>Up to $75M of funds will be awarded to planning grants, including at least $15M to projects that are located in or benefit Areas of Persistent Poverty<br><br>The Federal share of project costs may not exceed 80 percent for a project in an urban area | |

*Table 57 State Funding Opportunities – Electric Vehicles and Charging infrastructure*

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| *CARB: Hybrid and Zero-Emission Truck and Bus Voucher Incentive (HVIP) Program*[97] | Vouchers are provided directly through vehicle dealers for ZE trucks and buses and applied at the time of purchase. Vouchers come on a first-come, first-serve basis and can apply towards any vehicle HVIP-approved | Any dealer or vendor affiliated with a manufacturer that produces HVIP-approved vehicles may become an HVIP-approved dealer. Purchasers must purchase the vehicle through an approved dealer | Vehicles purchased through the program must be domiciled in California for at least three years | Base funding is determined by a vehicle's weight class. Funds range from $7,500 for Class 2B vehicles to $120,000 for Class 8 vehicles<br><br>Voucher modifiers that increase the voucher amount include Class 8 Drayage truck early adopter, Class 8 fuel cell, disadvantaged community, public transit agencies, and school buses for public school districts<br><br>Voucher modifiers to decrease funds include plug-in hybrid and in-use converted/remanufactured vehicles | 1 (ZE VMT)<br><br>6 (ZE Adoption)<br><br>9 (ZE Fleets) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| *California Volkswagen (VW) Mitigation Trust: Bus Replacement Grant*[98] | The program offers grants for the purchase of zero-emission buses to replace old gasoline, diesel, CNG, or propane buses | Owners of transit buses, school buses, and shuttle buses. There are more requirements if agents lease or rent these buses. Old school bus engine must be 2006 or older. Old transit/shuttle bus engine must be 2009 or older | Existing equipment must be scrapped because funding can only be used to replace existing engines or vehicles. | Compliant old school bus: up to $400,000<br>Non-compliant old school bus: up to $380,000<br>Transit bus: up to $180,000 (battery), up to $400,000 (fuel cell)<br>Shuttle bus: up to $160,000 | 1 (ZE VMT)<br>6 (ZE Adoption)<br>9 (ZE Fleets)<br>10 (ZE Innovation) |
| *California Volkswagen (VW) Mitigation Trust: Zero-Emission Class 8 Freight and Port Drayage* | The program provides funds to support expansion of zero-emission truck availability in the heaviest weight | Public or private entities that own/operate eligible vehicles. The class 8 Freight Trucks must have an engine model from 1992-2012 | Existing equipment must be scrapped because funding can only be used to replace existing engines or vehicles | Maximum cap of $200,000 per equipment<br>Non-government: will pay up to 75% of cost<br>Government: will pay up to 100% of cost | 1 (ZE VMT)<br>6 (ZE Adoption)<br>9 (ZE Fleets)<br>10 (ZE Innovation) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| *Trucks Category*[99] | classes. Class 8 includes freight trucks, waste haulers, dump truck, and concrete mixers | | | | |
| *California Department of Transportation: Sustainable Transportation Planning Grants*[100] | The program provides grants annually to create plans that strengthen the connection between transportation and community goals | Sustainable Communities Competitive: MPO's with subapplicants, RTPAs, transit agencies, cities and counties with compliant housing elements, Native American Tribal Governments, other public transportation planning entities<br><br>Sustainable Communities Formula: MPO's | Sustainable Communities Competitive: 50% of grants will go to underserved communities<br><br>Sustainable Communities Formula: MPOs must have an RTP SCS that meets SB 373 GHG | Sustainable Communities Competitive: $17 million with money set aside for a technical project subcategory and Native American Tribal Governments<br><br>Sustainable Communities Formula: $12.5 million | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>10 (ZE Innovation) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | Sustainable Community Grants: to ultimately achieve state GHG goals<br><br>Climate Adaptation Planning Grants: to identify transportation climate related vulnerabilities<br><br>Strategic Partnerships | Climate Adaptation Planning: MPO's, RTPAs, transit agencies, cities and counties, Native American Tribal Governments, a joint exercise of powers established Ch. 5 of Division 7 of Title 1, local transportation authority pursuant of Division 12.5 or 19 of the Public Utilities Code<br><br>Strategic Partnerships: MPOs, RTPAs<br><br>Strategic Partnerships- Transit: MPOs, RTPAs | reduction targets, meet civil rights and environmental justice obligations, and have FHWA PL carryover at or below 100% of FHWA PL allocation | Climate Adaptation Planning Grants: $50 million<br><br>Strategic Partnerships Grants: $4.5 million | |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | Grants: to identify deficiencies of the state highway in partnership with Caltrans | | | | |
| *California Clean Mobility: Clean Mobility Options (CMO) Voucher Pilot Program*[101] | Program provides voucher-based funding for zero-emission carsharing, innovative transit services, and ride-on-demand services in historically | Mobility Project Voucher:<br>eligible applicants: government entity, nonprofit organization, California Native American Tribal Government<br><br>Needs Assessment Voucher:<br>Non-profits, local governments, transit agencies, and California Native American Tribal Government | eligible communities: disadvantaged community, AB 1550-designated low-income community, tribal land within AB-1550 or SB 535-designated disadvantaged community | Mobility Projects Voucher: worth up to $1,000,000<br>Money set aside for eligible tribal governments and applicants previously awards Needs Assessment Funding<br><br>Needs Assessment Voucher: worth up to $100,000 | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>6 (ZE Adoption)<br>9 (ZE Fleets) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | underserved communities | | | Money set aside for eligible tribal governments | |
| *California Electric Vehicle Infrastructure Project (CALeVIP) 1.0*[102] | This program provides financial incentives for EV charger installation to increase charging infrastructure<br><br>Helps address regional needs for EV charging infrastructure throughout California, while | Incentive projects available are posted on their website with specific counties/cities/regions having certain opportunities<br><br>To apply within one of these opportunities, applicants must be site owners or their authorized agent, be a business/nonprofit/Tribe/public government entity, have a valid CA business license (except public agencies and Joint Powers Authority Agencies), and follow any other guidelines of the specific area/region | There is CALeVIP eligible equipment which can be found on their website. There are also SCIP/SCIP2 and ACIP eligible lists for specific regions. | $164 million total<br><br>Level 2: up to $6,000/connector<br><br>DCFC: up to $80,000/charger | 1 (ZE VMT)<br>3 (Outreach/Education)<br>5 (Accelerate Installations)<br>6 (ZE Adoption)<br>8 (Grid Capacity) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | supporting state goals to improve air quality, combat climate change and reduce petroleum use | Site verification required within 5 days of applying and evidence of permit/utility application required within 60 days of applying. | | | |
| *California Electric Vehicle Infrastructure Project (CALeVIP) 2.0*[103] | State program that offers incentives for the purchase and installation of EV charging infrastructure (DCFC only) at publicly accessible sites | Site owner, business/nonprofit organization, public or government entity<br><br>Both Site Verification Form and Evidence of Permit/Utility Application required at application | Only DCFC for CALeVIP 2.0<br><br>Cannot be used to fund projects where construction has already begun, chargers are already installed, or transformer/utility | Up to $250 million total | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>5 (Accelerate Installations)<br>6 (ZE Adoption)<br>8 (Grid Capacity) |

| State Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | throughout California<br><br>Helps address regional needs for EV charging infrastructure throughout California | | work has begun<br><br>Program wants to avoid only funding projects in large metropolitan areas and have an equitable distribution of funds | | |

*Table 58 Local Funding Opportunities - Electric Vehicles and Charging Infrastructure*

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| SDG&E Power Your Drive – Schools[104] | Deployment of Level 2 chargers at K-12 campuses including public, private, and charter schools<br><br>Deployment of DC fast Chargers at higher education intuitions including vocational schools, community colleges, and universities | School (K-12); Higher Education Institution; accessible by the public and/or employees.<br><br>EVSE Ownership: Customer Choice | <u>Site Considerations</u><br>○ Site located in disadvantaged communities, preferred<br>○ Own or lease property where chargers are to be installed or be the customer of record associated with meter<br>○ Provide an easement, if required.<br>○ Must include location to deploy charging | Phase 1 spent $70.2 Million | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>5 (Accelerate Installations)<br>6 (ZE Adoption)<br>9 (ZE Fleets) |
| SDG&E Power Your Drive – State Parks and Beaches[105] | Deployment of Level 2 and DC fast chargers at 12 selected sites | State Park or beach; publicly accessible | | | |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | EVSE Ownership: SDG&E | equipment in cost-effective manner<br>Eligibility Considerations<br>○ Operate & maintain charging equipment for at least 8 years<br>○ Must provide charging data for 5 years<br>○ Must enroll in eligible Time-of-Use (TOU) pricing plan | | |
| SDG&E Power Your Drive – City and County Parks[106] | Deployment of Level 2 and DC fast chargers at 10 selected sites | City or County Park; publicly accessible<br>EVSE Ownership: SDG&E | | | |
| SDG&E Power Your Drive – Fleets [107] | Installation of make-ready charging | All SDG&E customers operating MDHD vehicles; requires | Site Considerations<br>○ Requires SDG&E physical | $107M for program duration. Low-no-cost make-ready | 1 (ZE VMT) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | infrastructure for MDHD electric vehicles for Class 2-8, on-road, and off-road vehicles | minimum of two vehicles to be eligible<br><br>EVSE Ownership: Requires Customer Ownership | inspection of location<br>○ Requires infrastructure and design package, necessary permits.<br><u>Eligibility Considerations</u><br>○ Customer required to commission EV charging stations<br>○ Customer responsible for ongoing maintenance of customer-owned infrastructure | charging infrastructure. EV-HP Rate: Fleet Friendly Charging Rates through EV-HP rate to choose power needed with a monthly subscription fee<br><br>Charger Rebates of up to 50% of the costs to purchase charging stations between $3,000 and $75,000 per charger depending on the EVSE power | 5 (Accelerate Installations)<br>9 (ZE Fleets)<br>10 (ZE Innovation) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| SDG&E Power Your Drive – Apartments and Condos[108] | Installation of chargers at or near apartments and condominium complexes at 100 locations<br><br>Among the sites, 50% will support underserved communities as outlined by California AB 841 | Owned or leased property where chargers can be installed and can attest to using the site of 5 years<br><br>EVSE Ownership: Requires customer owner | <u>Site Considerations</u><br>○ Owned or leased property<br><br><u>Eligibility Considerations</u><br>○ Charging infrastructure may be placed within 0.5 miles of the apartment/condo in a space where both sites will benefit from the EV | $47.85M for program duration. Apartments & Condos: SDG&E provides a rebate for up to 100% of the cost of the charging station (up to $5,000) and/or customer-side infrastructure<br><br>At underserved locations – SDG&E pays for 100% of the infrastructure and charger costs.<br><br>Workplaces: SDG&E provides a rebate for up to 100% of the cost of | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>5 (Accelerate Installations)<br>6 (ZE Adoption)<br>7 (Permitting & Building Codes) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | | the charger (in an underserved locations or small business & up to 50% of the cost of the charger if not in an underserved location. | |
| SDG&E EV Infrastructure Rule (Rule 45)[109] | Optional service pathway for separately metered EV charging sites outside of single family homes | An applicant must be located outside of a single family-home or an eligible multi-unit dwelling if the EV charging equipment does not take service on a residential rate<br><br>EVSE Ownership: Requires customer owner; SDG&E designs, installs, owns, and maintains all electrical equipment | <u>Site Considerations</u><br>○ Single-family home<br>○ EV charging may be installed in multi-unit dwelling if the equipment does not take service on a residential rate<br><br><u>Eligibility Considerations</u> | Electric Vehicle-High Power (EV-HP) rate which offers a lower utility rate through a fixed monthly subscription charge | 8 (Sufficient local grid capacity) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | ○ Requires installation of panel, conduit, and EV charging infrastructure<br>○ Agree to maintain equipment for at least 5 years<br>○ Applicant must pay for the cost of other requirements such as environmental studies.<br>○ Does not set a customer allowance based on future load and does not require customers to cover costs on the utility side of the meter | | |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | | | |
| Metropolitan Area Advisory Committee on Anti-Poverty of San Diego (MAAC) – Electric Vehicle Access Program[110] | Reduce carbon emissions and increase renewable energy usage in communities of concern through an increase in the adoption of EV's; a financial incentive program for income eligible households to purchase an EV | San Diego County Resident who meets income eligibility defined as a household of 1 to 7 members and a maximum gross annual income between $51,000 and $160,480<br><br>Be at least 18 years old; possess a valid California drivers license or AB60<br><br>No current or recent auto delinquencies or auto repossessions; Ability to repay loans and costs related to vehicle ownership | Program offers education and support applying for other incentives and rebates to purchase an EV vehicle and other EV ownership considerations including weatherization and charging.<br><br>Requires rebate stacking to maximize the incentive program. | Vehicle financing at 3.99 to 5.99% interest in partnership with Beneficial State Bank<br><br>Down payment assistance (varies)<br><br>Rebates of up to $11,000 for pre-owned and new EV's as plug-in hybrids. | 2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>5 (Accelerate Installations)<br>6 (ZE Adoption) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | | | | | |
| San Diego County Air Pollution Control District – Scrap Car Reimbursement Assistance Program (SCRAP)[111] | Program to provide incentive funding to residents in San Diego County to voluntarily retire their 1997 or older vehicles and reduce air pollution. | San Diego County Resident | Requires model year 1997 or older vehicle in operating condition and registered in San Diego County for the past 12 months.<br><br>Eligible vehicles include passenger car or small truck. | Qualifying applicants are paid $1,000 per retired vehicle, subject to funding availability | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>6 (ZE Adoption) |
| San Diego County Air Pollution Control District-Clean Cars 4 All[112] | Program to provide incentive funding for qualifying low-income residents of state-designated communities to trade in older | Applicant must fall below 300 percent of the Federal Poverty Level<br><br>Communities designated as Disadvantaged Communities (DACs) through CalEnviroScreen | Applicant must replace eligible light-duty vehicles to be eligible for funding | Up to $5,000,000 in total funding available | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>6 (ZE Adoption) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| | passenger cars and trucks to replace them with newer hybrid and EV's | | | | |
| **San Diego County Air Pollution Control District- Clean Air for All (Moyer, FARMER, CAPP)[113]:** | | | | | |
| *Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer)* | Program to help businesses, nonprofits, and government agencies swap their polluting heavy machinery and equipment for electric and low carbon emission alternatives | Owners of eligible equipment/engines or proponents of eligible infrastructure/public school projects<br><br>Particularly those in Environmental Justice Areas as defined by SB 535-Disadvantaged, AB 1550 – low income, and AB 617 communities census tracts | <u>Eligible Projects:</u><br>Ranked by cost-effectiveness and Environmental Justice status or scored and evaluated according to District Criteria.<br><br>May prioritize zero-emission or infrastructure projects or projects meeting | Maximum funding available varies by project category and project type with up to 100% of project costs available<br><br>For Moyer projects - 50% of the available funds must go to | 1 (ZE VMT)<br>2 (Equity & Accessibility)<br>3 (Outreach/Education)<br>6 (ZE Adoption)<br>9 (ZE Fleets)<br>10 (ZE Innovation) |

| Local Funding Opportunities | | | | | |
|---|---|---|---|---|---|
| **Program** | **Program Description** | **Eligible Recipient** | **Program Terms** | **Funding Available** | **Strategy Applicability** |
| *Funding Agricultural Replacement Measures for Emissions Reductions (FARMER)* | | Owners of eligible equipment/engines or proponents of eligible infrastructure and benefit agricultural equipment owners<br><br>Zero-emission Utility Terrain Vehicle (UTV) projects are eligible to replace either a gas/diesel UTV or a tractor less than 25 horsepower. UTV to be new and have a towing capacity of 500 pounds or greater, and a total vehicle weight of 700 pounds or greater | Climate Action Plan goals | Environmental Justice Communities<br><br>For CAPP Projects - 100% of the awards must go to projects based in SB 535 disadvantaged communities | |
| *Community Air Protection Program (CAPP).* | | Vehicles registered, domiciled, or operated in a SB 535-Disadvantaged Communities; Transit and school buses | | | |

# H Acronyms and Abbreviations

| | |
|---|---|
| A2Z | Accelerate to Zero Emissions |
| AB | Assembly Bill |
| ACC II | Advanced Clean Cars II |
| BEV/EV | Battery Electric Vehicle/Electric Vehicle |
| BIL/IIJA | Bipartisan Infrastructure Law/Infrastructure Investment and Jobs Act |
| CARB | California Air Resources Board |
| CEC | California Energy Commission |
| CPUC | California Public Utilities Commission |
| DCFC | Direct Current Fast Charging |
| DOE | Department of Energy |
| EO | Executive Order |
| EVCS | Electric Vehicle Charging Station |
| EVSE | Electric Vehicle Supply Equipment |
| FCEV | Fuel Cell Electric Vehicle |
| GHG | Greenhouse Gas |
| ICE | Internal Combustion Engine |
| IOU | Investor-owned utility |
| MSS | Mobile Source Strategy |
| NEVI | National Electric Vehicle Infrastructure |
| PEV | Plug-In Electric Vehicle |
| PHEV | Plug-In Hybrid Electric Vehicle |
| SANDAG | San Diego Association of Governments |
| SCE | Southern California Edison |
| SDG&E | San Diego Gas and Electric |
| TCO | Total Cost of Ownership |
| TNC | Transportation Network Company |
| VMT | Vehicle Miles Traveled |
| ZEV | Zero Emission Vehicle |
| ZE | Zero Emission |

# I Endnotes

[1] *Hydrogen's role in Transportation*. Energy.gov. (2022, February 25). Retrieved December 8, 2022, from https://www.energy.gov/eere/vehicles/articles/hydrogens-role-transportation
[2] *Hydrogen Fuel Cell Electric Cars*. DriveClean. (n.d.). Retrieved December 8, 2022, from https://driveclean.ca.gov/hydrogen-fuel-cell
[3] U.S. Department of Energy. (2021, August). At a Glance: Electric Vehicles.
[4] *Plug-in Hybrid Electric Cars.* California Air Resources Board (n.d.). From https://driveclean.ca.gov/plug-in-hybrid
[5] *Charging Your Electric Vehicle*. San Diego Gas & Electric. (n.d.). Retrieved January 4, 2023, from https://www.sdge.com/residential/electric-vehicles/power-your-drive/public-charging
[6] California Air Resources Board. (n.d.). Electric car charging overview. DriveClean. Retrieved January 4, 2023, from https://driveclean.ca.gov/electric-car-charging
[7] California Air Resources Board. (n.d.). Electric car charging overview. DriveClean. Retrieved January 4, 2023, from https://driveclean.ca.gov/electric-car-charging
[8] Fresno Council of Governments Electric Vehicle Readiness Plan. (2021, January). Electric Vehicle Readiness Plan.
[9] U.S. Department of Energy. (n.d.). Fuel properties comparison. Alternative Fuels Data Center. Retrieved January 4, 2023, from https://afdc.energy.gov/fuels/properties
[10] Zero-Emission Vehicle Market Development Strategy. California Governors Office of Business and Economic Development. (n.d.). Retrieved from https://business.ca.gov/industries/zero-emission-vehicles/zev-strategy/
[11] Income effect refers to the change in demand for goods based on a consumer's income or purchasing power.
[12] *Electric Vehicle Readiness Plan*. Kings County. (2020, April). Retrieved from https://www.kingscog.org/vertical/Sites/%7BC427AE30-9936-4733-B9D4-140709AD3BBF%7D/uploads/KCAG_EVRP_FINAL.pdf
[13] *Electric Vehicle Readiness Plan*. Fresno Council of Governments. (2021, January). Retrieved from https://www.fresnocog.org/wp-content/uploads/2017/06/FCOG-EVRP-2021-1.pdf
[14] *Executive Order N-79-20*. (2021, September 23). Executive Department State of California.
[15] *2020 Mobile Source Strategy*. CARB. (2021, October 28). Retrieved from https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf
[16] *Advanced Clean Cars II Rulemaking*. CARB. (2022). Retrieved from https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii
[17] *Clean Miles Standard*. CARB. (2022). Retrieved from https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/cleanmilesstandard/fro.pdf
[18] *Assembly Bill No. 2127*. (2018, September 14). California Legislative Information.
[19] *Electric Vehicle Charging Infrastructure Assessment – AB 2127*. CEC. (2021, July 14). Retrieved from https://efiling.energy.ca.gov/getdocument.aspx?tn=238853
[20] *Electric Vehicle Charging Infrastructure Assessment – AB 2127*. CEC. (2021, July 14). Retrieved from https://efiling.energy.ca.gov/getdocument.aspx?tn=238853
[21] *Assembly Bill No. 8*. (2013, September). California Legislative Information.

[22] *2021 Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development*. CARB. (2021, September). Retrieved from https://ww2.arb.ca.gov/sites/default/files/2021-09/2021_AB-8_FINAL.pdf
[23] Congress, H.R.3684 – Infrastructure Investment and Jobs Act, 15 Nov. 2021
[24] *Fact Sheet: The Biden-Harris Electric Vehicle Charging Action Plan*. (2021, December 13). The White House.
[25] *California Budget 2022-2023.* (2022, January). Department of Finance.
[26] *Resolution E-5167.* (2021, October 7). CPUC.
[27] *Fact Sheet: The Biden-Harris Electric Vehicle Charging Action Plan*. The White House. (2021, December 13). Retrieved from https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/13/fact-sheet-the-biden-harris-electric-vehicle-charging-action-plan/
[28] *White House Releases Updated State Fact Sheets Highlighting the Impact of the Infrastructure Investment and Jobs Act Nationwide*. The White House. (2021, August 4). Retrieved from https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/04/white-house-releases-state-fact-sheets-highlighting-the-impact-of-the-infrastructure-investment-and-jobs-act-nationwide/
[29] *California's Blueprint Budget has $6.1 Billion for Electric Vehicle Initiatives.* (2022, January 10). CBNC.
[30] *Resolution E-5167*. CPUC. (2021, October 7). Retrieved from https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M413/K061/413061383.pdf
[31] *Summary: The Inflation Reduction Act of 2022.* (n.d.). Senate Democrats.
[32] Minott, O. & Nguyen, H. (2023, February 24). Ira EV tax credits: Requirements for Domestic Manufacturing. Bipartisan Policy Center. From https://bipartisanpolicy.org/blog/ira-ev-tax-credits/
[33] Treasury releases proposed guidance on new clean vehicle credit to lower costs for consumers, build U.S. industrial base, strengthen supply chains. U.S. Department of the Treasury. (2023, March 31). https://home.treasury.gov/news/press-releases/jy1379
[34] *Electric Vehicle Roadmap*. (2019, October). County of San Diego. From https://www.sandiegocounty.gov/content/dam/sdc/sustainability/EV-Roadmap/EV-Roadmap-October-2019.pdf
[35] *San Diego Regional Decarbonization Framework.* County of San Diego. (2022). Retrieved from https://www.sandiegocounty.gov/content/dam/sdc/lueg/regional-decarb-frameworkfiles/RDF_Technical_Report_FINAL_2022.pdf
[36] *Sustainability Strategy.* SDG&E. (2020). Retrieved from https://www.sdge.com/sites/default/files/documents/SDG%26E Sustainability Report_0.pdf
[37] *2021 Regional Plan*. SANDAG. (2021, December 10). Retrieved from https://www.sandag.org/regional-plan/2021-regional-plan/final-2021-regional-plan
[38] *Plug-in Electric Vehicle (PEV) Readiness Plan.* SANDAG. (2014, January). Retrieved from https://learn.sharedusemobilitycenter.org/wp-content/uploads/policy-documents-2/CA_San_Diego_PEV_Readiness_Planning_Guide-2013_low-resolution.pdf
[39] *Plug-in San Diego Final Report*. (2022, January). SANDAG. From https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-038.pdf
[40] *Climate Action Plan*. (2022). City of San Diego. From https://www.sandiego.gov/sites/default/files/san_diegos_2022_climate_action_plan_0.pdf
[41]Port of San Diego. (2021, October). Maritime Clean Air Strategy. San Diego. From https://www.citationmachine.net/bibliographies/08582fd5-bf98-4d35-892c-ba24713cebc7

[42] The purpose of the regional strategy review was to identify plans that contained targeted information further defined as a budget, timeline, and similar strategies to the County EV Roadmap
[43] The San Diego ZEV Strategy in the RFP is assumed to mean the County EV Roadmap
[44] *Summary of Approved SB350 Transportation Electrification Priority Review Projects for SDG&E, SCE, and PG&E.* CPUC. (2018, January 11). Retrieved from https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/transportation-electrification/summary-of-priority-review-te-projects.pdf
[45] *Fresno Area Express (FAX) Zero-Emission Bus Rollout Plan*. FAX. (2020, December). Retrieved from https://ww2.arb.ca.gov/sites/default/files/2020-12/FAX_ICT_ROP_ADA122120.pdf
[46] *Electrical Grid Analysis Study.* FCRTA (2022, February). Retrieved from https://www.ruraltransit.org/wp-content/uploads/2022/02/FCRTA_Grid-Analysis-Study_FINAL.pdf
[47] *Mayor Garcetti Announces the City has Helped Install 10,000 EV Chargers*. Los Angeles Mayor. (2021, January 6). Retrieved from https://www.ladwpnews.com/mayor-garcetti-announces-the-city-has-helped-install-10000-ev-chargers/
[48] *Vehicle Registration & Fuel Type*. San Bernardino County. (2021). Retrieved from https://indicators.sbcounty.gov/transportation/vehicle-registration-fuel-type/
[49] *Executive Order 2021-09: Driving Accelerated Climate Action*. City of Seattle. (2021, September). Retrieved from http://clerk.seattle.gov/search/clerk-files/322146
[50] *Exploring Road Pricing*. Seattle OSE. (2022). Retrieved from https://www.seattle.gov/environment/climate-change/transportation-/exploring-road-pricing
[51] *Denver Electric Vehicle Action Plan*. City and County of Denver. (2020, April). Retrieved from https://www.denvergov.org/content/dam/denvergov/Portals/779/documents/transportation/DenverVehicleElectrificationActionPlan.pdf
[52] *80 x 50 Climate Action Plan*. City and County of Denver. (2018, July). Retrieved from https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/80x50/DDPHE_80x50_ClimateActionPlan.pdf
[53] *City Electrified Mobility Projects*. Denver Government. (2022). Retrieved from https://qa.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Department-of-Transportation-and-Infrastructure/Programs-Services/Projects
[54] ZEV and EV are used interchangeably in this report and include BEVs and PHEVs.
[55]*U*.S. Energy Information Administration. (2021, February 3). Annual Energy Outlook 2021 - Appendix A. From https://www.eia.gov/outlooks/aeo/pdf/appa.pdf
[56]California Public Utilities Commission. (2021, May). Utility Costs and Affordability of the Gird of the Future. From https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf
[57] *What Is the Mercedes-Benz VISION EQXX Concept?* Mercedes-Benz of Scottsdale. (2022, January 7). https://www.mbscottsdale.com/blog/mercedes-benz-vision-eqxx-release-date-and-design-specs/amp/
[58] *University of San Diego. (n.d.). Traffic Congestion.* University of San Diego: School of Leadership and Education Sciences. https://www.sandiego.edu/soles/centers-and-institutes/nonprofit-institute/signature-programs/dashboard/miles-traveled.php
[59] *U.S. Department of Energy. (n.d.). Maps and data - average annual vehicle miles traveled by major vehicle category.* Alternative Fuels Data Center. https://afdc.energy.gov/data/10309

[60] *University of San Diego. (n.d.). Traffic Congestion.* University of San Diego: School of Leadership and Education Sciences. https://www.sandiego.edu/soles/centers-and-institutes/nonprofit-institute/signature-programs/dashboard/miles-traveled.php

[61] *U.S. Department of Energy. (n.d.). Maps and data - average annual vehicle miles traveled by major vehicle category.* Alternative Fuels Data Center. https://afdc.energy.gov/data/10309

[62] Smith, M. (2016, July). Level 1 Electric Vehicle Charging Stations at the Workplace. Alternative Fuels Data Center. https://afdc.energy.gov/files/u/publication/WPCC_L1ChargingAtTheWorkplace_0716.pdf

[63] Nicholas, M. (2019, August 12). Estimating electric vehicle charging infrastructure costs across major U.S. metropolitan areas. International Council on Clean Transportation. https://theicct.org/publication/estimating-electric-vehicle-charging-infrastructure-costs-across-major-u-s-metropolitan-areas/

[64] California Energy Commission. (2022, October 19). California Electric Vehicle Infrastructure Project (CALeVIP) Cost Data. California Energy Commission. https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/california-electric-vehicle

[65] Brown, A., Schayowitz, A., & Klotz, E. (2022). (rep.). Electric Vehicle Charging Infrastructure Trends from the Alternative Fueling Station Locator: Third Quarter 2021. National Renewable Energy Laboratory. Retrieved July 24, 2023, from https://afdc.energy.gov/files/u/publication/electric_vehicle_charging_infrastructure_trends_third_quarter_2021.pdf.

[66] SANDAG and SDAPCD. (n.d.). San Diego County Incentive Project. CALeVIP. https://calevip.org/incentive-project/san-diego-county#:~:text=The%20San%20Diego%20County%20Incentive%20Project%20promotes%20easy%20access%20to,available%20funds%20over%20three%20years.

[67] Electric Vehicle Roadmap. County of San Diego. (2019, October). Retrieved from https://www.sandiegocounty.gov/content/dam/sdc/sustainability/EV-Roadmap/EV-Roadmap-October-2019.pdf

[68] U.S. Department of Energy. (n.d.). Alternative fueling station locator. Alternative Fuels Data Center. https://afdc.energy.gov/stations#/find/nearest

[69] SANDAG. (n.d.). San Diego Open Data Portal. SANDAG/SanGIS Regional GIS Data Warehouse Open Data Portal . https://sdgis-sandag.opendata.arcgis.com/

[70] U.S. Department of Transportation. (2022, June 13). National Highway Planning Network. Geospatial at the Bureau of Transportation Statistics. https://data-usdot.opendata.arcgis.com/datasets/usdot::national-highway-planning-network/explore?location=38.769308%2C-117.779119%2C5.93

[71] NREL. (n.d.). 2017 National Household Travel Survey – California add-on. Transportation Secure Data Center. https://www.nrel.gov/transportation/secure-transportation-data/tsdc-nhts-california.html

[72] 30 out of 2,288 households in San Diego County were removed from this analysis as outliers driving over 1,000 miles/day

[73] United States Census Bureau (n.d.). Total Population in Occupied Housing Units by Tenure. United States Census Bureau. https://data.census.gov/table?q=tenure%2Bby%2Bvehicles%2Bavailable%2Bin%2Bsan%2Bdiego%2Bcounty%2Bin%2B2019&tid=ACSDT1Y2019.B25008

[74] United States Census Bureau. (n.d.). Selected Housing Characteristics. United States Census Bureau. https://data.census.gov/table?g=040XX00US06_050XX00US06073&tid=ACSDP1Y2019.DP04
[75] Public includes shared and/or semi-public, such as workplace and multi-family dwellings, for the purpose of this report.
[76] Level 1 is not included as not expected to be a significant option in the future.
[77] Curbside charging can be the lowest cost due to utilization, but more difficult to install, due to parking and side-walk impacts.
[78] Black and Veatch. (2021, July). San Diego Regional Electric Vehicle Gap Analysis. San Diego. Retrieved from https://www.sdge.com/sites/default/files/2021-07/FINAL%20San%20Diego%20Regional%20EV%20Gap%20Analysis%20%281%29.pdf
[79] *Cash for Clunkers Results Finally In: Taxpayers Paid $24,000 per Vehicle Sold*. Edmunds. (2009, October 28). Retrieved from https://www.edmunds.com/about/press/cash-for-clunkers-results-finally-in-taxpayers-paid-24000-per-vehicle-sold-reports-edmundscom.html
[80] *Surface Transportation Block Grant Program (STBG*). U.S. Department of Transportation/Federal Highway Administration. (n.d.). From https://www.fhwa.dot.gov/specialfunding/stp/
[81] *Congestion Mitigation and Air Quality Improvement (CMAQ) Program*. U.S. Department of Transportation/Federal Highway Administration. (n.d.). From https://www.fhwa.dot.gov/environment/air_quality/cmaq/
[82] *National Highway Freight Program. U.S. Department of Transportation/Federal Highway Administration*. (n.d.). Retrieved December 9, 2022, from https://www.fhwa.dot.gov/fastact/factsheets/nhfpfs.cfm
[83] *Carbon Reduction Program*. U.S. Department of Transportation/Federal Highway Administration. (n.d.) From https://www.fhwa.dot.gov/bipartisan-infrastructure-law/crp_fact_sheet.cfm
[84] *Surface Transportation Block Grant Program (STBG*). U.S. Department of Transportation/Federal Highway Administration. (n.d.). From https://www.fhwa.dot.gov/specialfunding/stp/
[85] *Congestion Mitigation and Air Quality Improvement (CMAQ) Program*. U.S. Department of Transportation/Federal Highway Administration. (n.d.). From https://www.fhwa.dot.gov/environment/air_quality/cmaq/
[86] *National Highway Freight Program. U.S. Department of Transportation/Federal Highway Administration*. (n.d.). Retrieved December 9, 2022, from https://www.fhwa.dot.gov/fastact/factsheets/nhfpfs.cfm
[87] *Carbon Reduction Program*. U.S. Department of Transportation/Federal Highway Administration. (n.d.) From https://www.fhwa.dot.gov/bipartisan-infrastructure-law/crp_fact_sheet.cfm
[88] Bipartisan Infrastructure Law - National Electric Vehicle Infrastructure (NEVI) formula program fact sheet. Federal Highway Administration. (n.d.). From https://www.fhwa.dot.gov/bipartisan-infrastructure-law/nevi_formula_program.cfm
[89] US Department of Transportation: Federal Highway Administration, Bipartisan Infrastructure Law.
[90] Guidance to be released; monitor https://www.fhwa.dot.gov/bipartisan-infrastructure-law/evs.cfm for updates.
[91] U.S. Department of Energy. (n.d.). Electric vehicle (EV) and fuel cell electric vehicle (FCEV) tax credit. Alternative Fuels Data Center. From https://afdc.energy.gov/laws/409
[92] U.S. Department of Energy. (n.d.). Electric vehicle (EV) and fuel cell electric vehicle (FCEV) tax credit. Alternative Fuels Data Center. From https://afdc.energy.gov/laws/409

[93] U.S. Department of Energy. (n.d.). Electric vehicle (EV) and fuel cell electric vehicle (FCEV) tax credit. Alternative Fuels Data Center. From https://afdc.energy.gov/laws/409
[94] United States Department of Transportation. (n.d.). Grants for buses and Bus Facilities Program. Federal Transit Administration. From https://www.transit.dot.gov/bus-program
[95] United States Department of Transportation. (n.d.). Low or no emission vehicle program - 5339(C). Federal Transit Administration. From https://www.transit.dot.gov/lowno
[96] U.S. Department of Transportation. (n.d.). RAISE Discretionary Grants. U.S. Department of Transportation. From https://www.transportation.gov/RAISEgrants
[97] *Clean Truck and Bus Incentives*. California HVIP. (n.d.) From https://www.californiahvip.org
[98] *Bus Replacement Grant*. US Department of Energy. (n.d.) From https://afdc.energy.gov/laws/12513
[99]. *Zero-Emission Class 8 Freight and Port Drayage Trucks Category.* California VW Mitigation Trust. (n.d.). From https://xappprod.aqmd.gov/vw/zero-emission.html
[100] California Department of Transportation, Grant Application Guide, Fiscal Year 2023-2024.
[101] *Vouchers for Under-resourced communities.* Clean Mobility Options. (n.d.) From https://cleanmobilityoptions.org
[102] *Building EV Infrastructure.* Cal eVIP. (n.d.) From https://calevip.org
[103] California Electric Vehicle Infrastructure Project (CALeVIP) 2.0. California Energy Commission.
[104] *Power your drive for schools*. San Diego Gas & Electric. (n.d.). From https://www.sdge.com/residential/electric-vehicles/power-your-drive/power-your-drive-for-schools
[105] *SDG&E Power Your Drive- State Parks and Beaches.* San Diego Gas & Electric. (n.d.). From https://www.sdge.com/residential/electric-vehicles/power-your-drive/power-your-drive-for-state-parks-and-beaches
[106] *SDG&E Power Your Drive- City/County Parks*. San Diego Gas & Electric. (n.d.). From https://www.sdge.com/residential/electric-vehicles/power-your-drive/power-your-drive-for-city-and-county-parks
[107] *SDG&E Power Your Drive- Fleets.* San Diego Gas & Electric. (n.d.). From https://www.sdge.com/business/electric-vehicles/power-your-drive-for-fleets
[108] *SDG&E Power Your Drive – Apartments/Condos.* San Diego Gas & Electric. (n.d.). https://www.sdge.com/business/electric-vehicles/power-your-drive-apartments-and-condos
[109] *EV infrastructure rule*. San Diego Gas & Electric. (n.d.). From https://www.sdge.com/business/electric-vehicles/lovelectric/ev-infrastructure-rule#
[110] *Electric vehicle (EV) access program*. MAAC. (n.d.). Retrieved December 9, 2022, from https://maacproject.org/ev-access/
[111] SanDiegoCounty.gov. (2021, June 17). *San Diego County APCD Program Offers Financial Incentives to Retire Older Vehicles*. Climate Action Plan. Retrieved December 9, 2022, from https://www.sandiegocounty.gov/content/sdc/sustainability/news/APCD-SCRAP-Program.html
[112] CA.gov. (n.d.). *Clean Cars 4 All*. California Air Resources Board. Retrieved December 9, 2022, from https://ww2.arb.ca.gov/our-work/programs/clean-cars-4-all
[113] The San Diego County Air Pollution Control District. (2021, November). San Diego Clean Air for All Grants.https://www.sdapcd.org/content/dam/sdapcd/documents/grants/Clean%20Air%20for%20All_NOFA.pdf