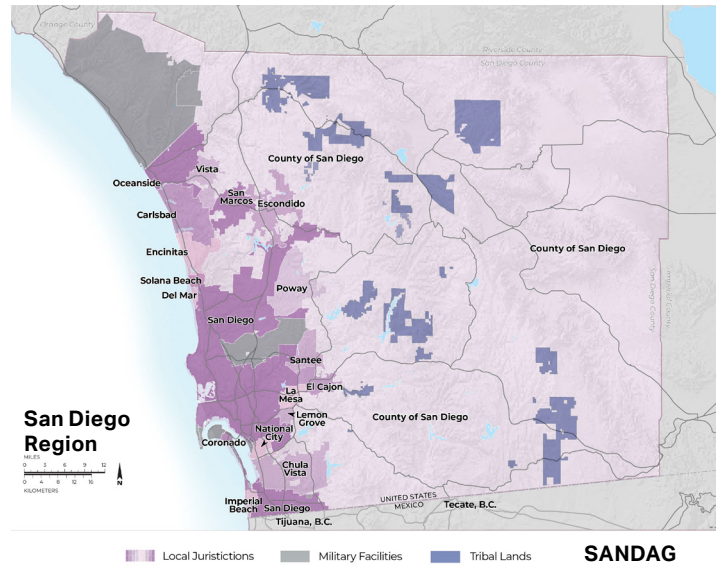




San Diego Regional Zero Emission Vehicle (ZEV) Strategy



ACCELERATE TO ZERO EMISSIONS

A Regional Collaboration to Curb Air Pollution and
Climate Change through Transportation Electrification

October 2023

Acknowledgements

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Executive Summary

The San Diego region is known for its natural beauty – pristine beaches, mountains, and climate – it is also home to two of the three busiest land border crossings in the nation. Preserving the region’s natural assets and ensuring resiliency of transportation networks in the face of climate change has never been more pressing. The correlation between greenhouse gas (GHG) emissions and climate risk is well documented and achieving regional decarbonization goals will be greatly impacted by the region’s ability to adopt zero emission vehicles (ZEVs) and implement the associated infrastructure. While California has become a nationally recognized leader in both emissions reductions strategies and ZEV adoption due to innovative programs and policies developed at the state level, regional collaboration is imperative to leverage statewide momentum, attract necessary investments, and capture local nuances and priorities.

Compared to other counties in the United States, San Diego County has higher than average ZEV adoption rates. Much of this is attributed to early adopters in the region utilizing the network of 2,827 public chargers located throughout the region¹. The county has a 24% higher median household income than the national average, a characteristic commonly correlated with higher ZEV adoption levels within communities². In California, current battery electric vehicle (BEV) chargers tend to be located in high-income urban neighborhoods, with these neighborhoods having 112 BEV chargers per 100,000 households compared to 24 BEV chargers per 100,000 households in low-to-moderate income neighborhoods³.

One of San Diego’s challenges in increasing ZEV adoption is ensuring the development of a robust and equitable ZEV public charging network. The current network tends to service mostly light duty ZEVs and early adopters from higher income neighborhoods. To create an equitable network that will promote ZEV adoption by all, ZEV infrastructure needs to be deployed across the region and include access in hard-to-reach communities such as tribal communities, Communities of Concern (CoCs), and rural communities. This network will ideally service a diversity of ZEVs including plug-in hybrid EVs (PHEV), hydrogen fuel cell EVs (FCEVs), and MDHD BEVs.

The San Diego Regional ZEV Strategy (Report) was developed by the [*Accelerate to Zero Emissions \(A2Z\) Collaboration*](#), a unique body formed in 2020 to accelerate investment in ZEVs in the San Diego region to meet and exceed State decarbonization targets. This Report was developed as a follow-up to the [*San Diego Regional Electric Vehicle Gap Analysis*](#) (A2Z Gap Analysis), released in July 2021. The A2Z Gap Analysis highlights the major market gaps the San Diego region will need to overcome to achieve State targets on ZEV adoption and ZEV infrastructure installation.

The Report presents ten Strategies (Strategies) to address identified ZEV challenges and detail the process for how the Strategies were developed. This includes a thorough existing conditions analysis, broad stakeholder engagement, and modeling the impact of key actions in increasing ZEV adoption in the region. The findings of this work indicate that the San Diego region can meet its 8% population share of State targets for ZEVs by 2030 by providing sufficient support to address ZEV adoption and increasing access to ZEV infrastructure. This Report includes Strategies that support achieving and exceeding State goals and align with the Core Principles outlined in the California ZEV Market Development Strategy.



The Report presents ten Strategies to address identified ZEV challenges:

- 1. Increase percentage of zero emission vehicle miles traveled (VMT)**
- 2. Achieve equitable/accessible siting of ZEV chargers in all San Diego communities**
- 3. Increase ZEV awareness and adoption**
- 4. Support workforce development**
- 5. Accelerate deployment of publicly accessible ZEV infrastructure**
- 6. Lower policy and financial barriers to ZEV adoption**
- 7. Deploy ZEV infrastructure for multi-unit dwellings (MUDs) and higher density residential and/or commercial areas**
- 8. Ensure sufficient local grid capacity for projected ZEV demand**
- 9. Encourage and support fleet transition to zero emissions**
- 10. Support innovative ZEV pilot projects**

The Strategies are intended to serve as a resource and provide guidance for regional and local government agencies, planning organizations, utilities, fleet operators, building owners, community-based organizations (CBOs), and others on how they can take action to increase ZEV adoption rates, address equity, and enhance accessibility of ZEV infrastructure within the San Diego region.

Modeling was conducted to assess the potential impact of the Strategies on ZEV adoption goals and demonstrated that their collective deployment could yield an increase of 189,000 ZEVs compared to the baseline forecast in 2035, with the greatest impact observed in accelerating publicly accessible ZEV infrastructure.

Overall, the most impactful actions were found to be those that made ZEV infrastructure more accessible and affordable. As such, impactful Strategies in this report include accelerating the deployment of public charging infrastructure, employing Demand Response programs that allow users to take advantage of monetary incentives, and optimizing electricity rates so customers can take advantage of lower rates during off-peak times. It should be noted that some of the Strategies included in this Report may have an indirect impact on ZEV adoption and not all Strategies were able to be modeled quantitatively as part of this work. However, all Strategies included in this Report are critical to ensuring the benefits of transportation decarbonization are widely experienced throughout the San Diego region.

This Report is intended to be a living document and recognizes that much of this important work is happening against a backdrop of transformative and rapid changes. Cumulatively, the Strategies are intended to support the San Diego region as it furthers the transition to zero emissions equitably.

1 Introduction

1.1 The Accelerate to Zero Collaboration

The A2Z Collaboration was established in the summer of 2020 by San Diego Association of Governments (SANDAG), San Diego Gas & Electric (SDG&E), the County of San Diego, San Diego County Air Pollution Control District (SDAPCD), and the City of San Diego. The A2Z Collaboration was developed to support transportation electrification within the San Diego region, develop and implement a regional ZEV Strategy, and accelerate both public and private investment in the region to support ZEVs and associated infrastructure. The A2Z Collaboration work is driven by an overarching commitment to encourage equitable access to ZEVs and ZEV infrastructure for all San Diegans and collaboratively position the region as a national leader in ZEV adoption.

The A2Z Collaboration is comprised of unique and diverse committees that helped develop and refine the Strategies, tactics, and recommendations noted in this Report. The Core Team is comprised of staff representing the five agencies that established the A2Z Collaboration. The Core Team is supported by a Steering Committee and an Advisory Committee. The Steering Committee includes staff from organizations throughout the region, including local jurisdictions, CBOs, business, and academia that are actively involved in advancing transportation electrification. The Advisory Committee includes diverse stakeholders that represent entities throughout the San Diego region interested in ZEVs including private companies, professional associations, and non-profits. Lastly, community members are an integral part of the A2Z Collaboration, and community input and feedback were considered throughout development of the Strategies. See Table 1 for an overview of the entity roles for the Report:

Table 1: A2Z Role Description

Entity	Organizations	Engagement Role
Project Team	AECOM, Energeia	Lead and execute engagement strategy and activities, project research, strategy formulation, and report development
Community-Based Organization Coordinator	San Diego Gas & Electric (SDG&E)	Work with Community-Based Organizations, Project Team, and Core Team to identify potential Community-Based Organization partners and events for each phase of engagement
Core Team	City of San Diego, County of San Diego, SDAPCD, SANDAG, SDG&E	Provide direction and general project oversight to Project Team on all tasks including stakeholder engagement activities, strategy formulation, report development, and report review Facilitate all A2Z collaboration meetings
Steering Committee	City of Carlsbad, City of Chula Vista, City of Santee, City of San Marcos, Cleantech San Diego, GRID Alternatives, MAAC, University of San Diego Energy Policy Initiatives Center (EPIC)	Provide input on engagement and support supplemental events where possible Review and comment on technical work Attend monthly meetings with A2Z Core Team
Advisory Committee	City of La Mesa, City of Escondido, EVgo, NCTD, San Diego International Airport, Shell Recharge Solutions, City of Coronado, Nuvve Corp., WiTricity, Baker Electric, City of Solana Beach, Tesla, Coalition for Clean Air, Port of San Diego, ASPIRE, American Lung Association, Beam Global, Black & Veatch, El Cajon Collaborative, Electric Vehicle Association, ENGIE, Groundwork San Diego, IBEW Local 569, San Diego Community Power, San Diego Metropolitan Transit System (MTS), San Diego Regional Climate Collaborative, SanDiego350, Superpedestrian, The San Diego Foundation, Xtelligent, Volta Charging, Aptera Motors, IKE, ProCal, Smart City, Verizon, WAVE Charging	Participate in questionnaires, workshops, and interviews Attend quarterly meetings with the A2Z Core Team and Steering Committee Share information with constituents and network Provide input on strategy formulation and resulting programs

Note: Interactive Kiosk Experience (IKE), North County Transit District (NCTD), Metropolitan Area Advisory Committee on Anti-Poverty (MAAC), San Diego Association of Governments (SANDAG), San Diego County Air Pollution Control District (SDAPCD), San Diego Gas & Electric (SDG&E)

1.2 Report Purpose

Approximately 50% of the San Diego region’s GHG emissions are attributed to the transportation sector including direct emissions from vehicle tailpipes, off-road transportation mobile sources, aviation, rail, and watercraft⁴. State and regional jurisdictions are taking aggressive and proactive steps to help curb emissions attributed to transportation. In August 2022, the California Air Resources Board (CARB) passed a rule requiring all new car sales in California to be 100% ZEV by 2035. Additionally, local government agencies across the region have established GHG reduction goals through Climate Action Plans (CAPs) and other sustainability initiatives to dramatically cut emissions in their communities.

Despite these important policies and commitments, barriers continue to exist that make it challenging for communities to adopt ZEVs or implement ZEV infrastructure. This Report presents Strategies that account for barriers identified in the A2Z Gap Analysis and additional challenges summarized in Section 4, and addresses how local, regional, community, and industry stakeholders can take action to meet and exceed State transportation electrification goals in the San Diego region⁵.

The Report presents the following information to support regional ZEV initiatives:

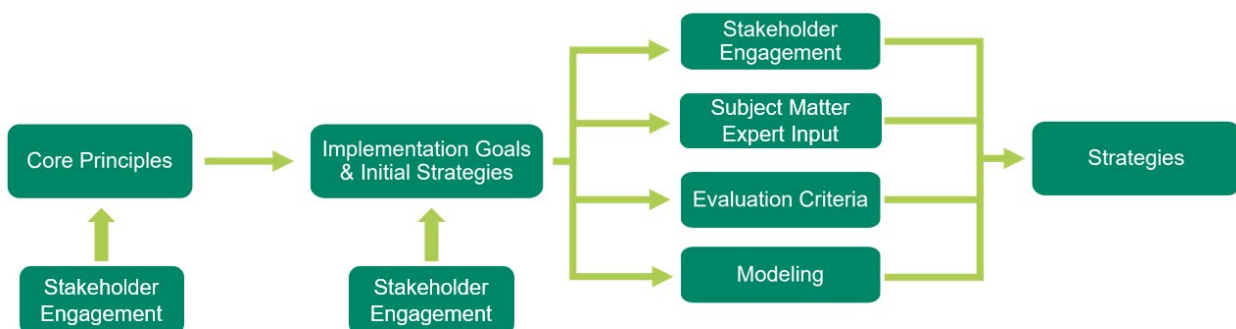
- Strategy development process
- Ten Strategies with tactics presented as a guide for stakeholders to leverage resources and act
- Funding opportunities for stakeholders
- Future considerations

This Report summarizes key findings and information that can be used by a broad audience to support regional ZEV initiatives. Additional background on ZEV and ZEV infrastructure technologies and analysis details are provided in the Report appendices.

1.3 Core Principles and Implementation Goals

Strategies included in the Report were developed with input from the Core Team, Steering Committee, Advisory Committee, and stakeholder feedback. Stakeholder input was integral to strategy development and was received throughout the entirety of the work conducted in developing this Report. In particular, the core principles, implementation goals, and initial strategies were refined after stakeholder review. The Strategy development process is presented in Figure 1.

Figure 1: Process Flow for Developing A2Z Strategies



The Core Principles were adapted from the [California ZEV Market Development Strategy](#) to ensure that A2Z Strategies are informed by, and aligned with, the overarching goals of the region and state⁶. The Core Principles are detailed below and emphasize the importance of equity and collaboration and shaped the direction of the Implementation Goals and Strategies.

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 actions drive private investments
5. Design for resilience & adaptation

The following Implementation 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

The Implementation Goals shown in Table 2 are detailed in Appendix B.2 and highlight main objectives of the Strategies. The initial list of strategies was developed from literature review findings, the A2Z Gap Analysis, and assessment of existing conditions. These preliminary findings were used as the basis to develop the Initial Strategies that were categorized under the relevant Implementation Goals.

Based on stakeholder feedback, input from subject matter experts, results from the evaluation criteria⁷ (described in Appendix E), and the modeling (described in Appendix F), the initial strategies were further refined into the final action-oriented set of ten Strategies, which are detailed in Section 4. The ten Strategies were paired with supporting tactics and actions that will help achieve the goals of the Strategies as shown in Table 2.

Table 2: Strategies Aligned with Implementation Goals

Strategy	Implementation Goals								
	Reduce Vehicle Emissions	Support Education and Collaboration	Reduce Barriers to ZEV Adoption	Provide Equitable Access to ZEV Infrastructure	Encourage Partnerships and Attract Investments	Innovate Utility Operations and Service	Enhance Grid Resiliency Promote Workforce Development	Promote Workforce Development	Anticipate Future ZEV Growth and Innovation
1. Increase percentage of zero emission vehicle miles traveled (VMT)	•		•						•
2. Achieve equitable/accessible siting of ZEV chargers in all San Diego communities	•	•	•	•	•				
3. Increase ZEV awareness and adoption	•	•	•	•	•				
4. Support workforce development	•	•	•	•	•			•	•
5. Accelerate deployment of publicly accessible ZEV infrastructure	•	•	•	•	•				
6. Lower policy and financial barriers to ZEV adoption	•	•	•	•	•		•		
7. Deploy ZEV infrastructure for multi-unit dwellings (MUDs) and higher density residential and/or commercial areas	•	•	•	•	•				•
8. Ensure sufficient local grid capacity for projected ZEV demand			•			•	•		•
9. Encourage and support fleet transition to zero emissions	•	•	•					•	•
10. Support innovative ZEV pilot projects	•	•	•		•	•			•

Note: Multi-Unit Dwelling (MUD), Vehicle Miles Traveled (VMT), Zero Emission Vehicle (ZEV)

2 Strategy Development Process

This section describes the following activities undertaken to develop the ten Strategies:

- A2Z Gap Analysis Review
- Regulatory Conditions Assessment
- ZEV Literature Review
- Public and Stakeholder Engagement
- ZEV Uptake Assessment

2.1 A2Z Gap Analysis Review

Much of this Report is built upon the San Diego Regional Electric Vehicle Gap Analysis (A2Z Gap Analysis), which was released in July 2021 and expanded upon previous ZEV planning efforts to identify existing conditions and barriers to adoption. Key assumptions and methodology regarding modeling and identified gaps from the A2Z Gap Analysis were evaluated and detailed in Appendix Section C.1. The A2Z Gap Analysis was peer reviewed to identify important differences in assumptions related to the gaps and modeling approaches.

At a high level, the A2Z Gap Analysis determined that the San Diego region could meet its share of the statewide ZEV adoption goal by 2030, however there were significant gaps in its ZEV infrastructure, policies, and deployment that would need to be closed to enable this. These gaps include access and availability to ZEV infrastructure, limited infrastructure-related policies and mandates, and lack of streamlined permitting for installations. Additional barriers and challenges are discussed in Appendix Section C.1.

2.2 Regulatory Conditions

Federal, state, and local ZEV policies and regulations were reviewed to account for developments since the release of the A2Z Gap Analysis and to determine their impact on the gaps (e.g., higher ZEV and infrastructure deployment targets) and/or strategies (e.g., programs and/or funding). Table 3 identifies developments from policies that were assessed for the A2Z Gap Analysis and are described in detail in Appendix C.2.1. Table 4 identifies helpful federal and state policies introduced after the gap analysis was published and are described in detail in Appendix C.2.2.

Table 3: 2021 A2Z Gap Analysis Progress and Regulatory Update

Policy or Regulation	Requirements/Targets	Key Progress and Updates	Implications for A2Z Strategies
Executive Order (EO) N-79-20, Executive Department State of California, (September 2020)	<ul style="list-style-type: none"> - By 2035: All new passenger vehicles sold required to be zero emissions - By 2035: Drayage and off-road vehicle sales will be zero emissions - By 2045: Medium- and Heavy-Duty vehicles will be zero emissions 	<ul style="list-style-type: none"> - CARB completed 2020 Mobile Source Strategy (MSS) to inform carbon and pollution reduction strategies - Advanced Clean Cars II (ACC II) program regulations establish requirements for post-2025 light-duty vehicles - Clean Miles Standard will establish requirements to transition ride-hailing fleets to ZEV in 2023 	<ul style="list-style-type: none"> - Regulations are currently in place to transition light-duty vehicles to ZEV after manufacturing year 2025 and ride hailing fleets to ZEV from 2023

Table 3: 2021 A2Z Gap Analysis Progress and Regulatory Update *continued*

Policy or Regulation	Requirements/Targets	Key Progress and Updates	Implications for A2Z Strategies
<p>Assembly Bill (AB) 2127, State of California, (September 2018)</p>	<ul style="list-style-type: none"> - 1.2 million chargers required for passenger ZEVs and 157,000 additional chargers for MDHD vehicles by 2030 	<ul style="list-style-type: none"> - California Energy Commission (CEC), AB 2127 Electric Vehicle Charging Infrastructure Assessment (Revised Staff Report), May 2021: - 73,000 public chargers installed - 123,000 public chargers planned by 2025 - Governor’s 2021-22 budget includes \$500 million to fill charging gap 	<ul style="list-style-type: none"> - Additional funding sources available to help bring down cost barriers - Increased installation of public charging infrastructure
<p>AB 8, State of California, (August 2013)</p>	<ul style="list-style-type: none"> - CEC to co-fund at least 100 retail hydrogen fuelling stations - CA to deploy 100 hydrogen fuelling stations by 2023 	<div style="display: flex; flex-direction: column;"> <div style="margin-bottom: 10px;"> <ul style="list-style-type: none"> - CARB, Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Deployment, Sept. 2021: - 52 total hydrogen stations installed as of June 2021 - Planned development will achieve AB 8 goals - Disadvantaged communities will be prioritized to receive convenient network access - Allow 4 times more FCEVs than currently estimated through industry surveys - CA fuel networks on track for at least 40% renewable hydrogen implementation </div> <div> <p>CEC, Joint Agency Staff Report on AB 8: 2021 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refuelling Stations in California, Dec. 2021:</p> <ul style="list-style-type: none"> - CEC to invest over \$275 million by the end of the project - 179 stations projected by 2027 with potential to service about 245,000 FCEVs, nearly 4 times more than CARB’s projection </div> </div>	<ul style="list-style-type: none"> - Reduces gap of 47 hydrogen fueling stations needed in San Diego by 2030 (only one currently operating) - Fuel Cell Electric Vehicle (FCEV) uptake may be higher than anticipated in the A2Z Gap Analysis - More infrastructure than expected could reduce the infrastructure availability gap and unlock higher than forecast FCEV uptake

Table 4: Federal and Statewide Policies and Plans since 2021

Policy or Regulation	Requirements/Targets	Key Progress and Updates	Implications for A2Z Strategies
<p>Bipartisan Infrastructure Law/ Infrastructure Investment and Jobs Act (BIL/IJJA), President Biden, (November 2021)</p>	<ul style="list-style-type: none"> - Build national network of 500,000 ZEV chargers - \$7.5 billion investment to build national network of ZEV chargers, including: - \$5 billion for states with a goal to build a national charging network - \$2.5 billion for competitive grant program to support chargers in communities and corridors 	<ul style="list-style-type: none"> - Released Electric Vehicle Charging Action Plan on December 13th, 2021 to plan steps towards goal of 500,000 chargers - Announcement of nearly \$5 billion made available under the National Electric Vehicle Infrastructure (NEVI) Formula Program on February 10th, 2022 - Funding available over 2022-2026 to help states create charging station networks 	<ul style="list-style-type: none"> - Additional coordination will accelerate and optimize deployment of 500,000 public chargers - Grant funding will help address the charging infrastructure cost barrier - Further development of a charging network will contribute to closing the charging infrastructure gap
<p>The California Blueprint (Governor's Budget), Governor Newsom, (July 2021)</p>	<ul style="list-style-type: none"> - \$6.1 billion for ZEV-related initiatives - \$3.9 billion for electrification of ports, heavy-duty trucks, schools, and public transit buses - \$1.2 billion on 40,000 passenger ZEVs and 100,000 new electric vehicle charging stations (EVCS) by 2023 and \$1 billion on other ZEV initiatives 	<ul style="list-style-type: none"> - The Blueprint's \$6.1 billion in additional funding creates a \$10 billion total ZEV package for the state 	<ul style="list-style-type: none"> - Grant funding will bring down vehicle and charging infrastructure cost barriers
<p>Resolution E-5167, California Public Utilities Commissions (CPUC), (October 2021)</p>	<ul style="list-style-type: none"> - Investor-owned utilities (IOUs) establish ZEV infrastructure Rules and associated cost tracking, in compliance with to AB 841's existing rules on charging infrastructure 	<ul style="list-style-type: none"> - All three IOUs proposed new rules are approved for installation of new electrical service and distribution system upgrades for customers installing separately metered ZEV charging equipment 	<ul style="list-style-type: none"> - Rules will enable streamlined installation processes, reducing barriers to deployment

Note: Bipartisan Infrastructure Law/Infrastructure Investment and Jobs Act (BIL/IJJA), California Public Utilities Commissions (CPUC), Electric Vehicle (EV), Electric Vehicle Charging Station (EVCS), Investor Owned Utility (IOU), National Electric Vehicle Infrastructure (NEVI), Zero Emission Vehicle (ZEV)

The San Diego region has made significant progress towards advancing transportation electrification with a number of plans and efforts spearheaded by local entities. A subset of regional plans, listed below, were reviewed to identify implications for mitigating gaps and implementing strategies.

- The County of San Diego's Electric Vehicle Roadmap⁸
- The County of San Diego's Regional Decarbonization Framework⁹
- SDG&E's Sustainability Plan¹⁰
- SANDAG's Regional Plan¹¹
- SANDAG's Regional Plug-In Electric Vehicle (PEV) Readiness Plan¹²
- SANDAG's Plug-in San Diego Project¹³
- The City of San Diego's Climate Action Plan¹⁴
- The Port of San Diego's Maritime Clean Air Strategy¹⁵

Detailed descriptions, findings, and implications of each of the eight reports above are presented in Appendix C.2.3.

The findings indicate that the biggest opportunities for achieving emissions reductions and climate goals revolve around three overarching initiatives:

1. Increase funding opportunities to address the high cost of ZEV charging installations and ZEV ownership
2. Involve community-based education and outreach to increase awareness and remove knowledge barriers
3. Increase deployment and accessibility of public ZEV infrastructure. These initiatives serve as the basis of the Preliminary Actions detailed in [Section 3.5](#)

It is important to note that this is not a comprehensive list of efforts in the region, as many other local jurisdictions are making strides in advancing electrification, such as the City of Encinitas' Goal 4.3 from their CAP (interim revision in November 2020)¹⁶ and the City of Escondido's 2021 CAP¹⁷. These jurisdictions, among others, are an essential part of the solution in addressing recognized gaps. For more in depth information on local government CAPs, please reference the San Diego Regional Decarbonization Framework (RDF)¹⁸.

2.3 ZEV Literature Review

The A2Z Gap Analysis and Regulatory review conducted as part of this effort set a baseline for current market and regulatory conditions as well as an understanding of regional and local plans already in place. The next phase of this work involved reviewing plans across the US to benchmark local performance against national best practices and initiatives. The following criteria was used for selection of these plans across the US:

- Was published in the last 3 years
- Included a specific budget
- Had a similar timeline to other ZEV-related planning efforts in the region (e.g., the County of San Diego's Electric Vehicle Roadmap)
- Contained strategies that can be used to address gaps
- Was comparable to the San Diego region in terms of size, equity focus, etc. (with at least two benchmarked plans from out of state)

The resulting evaluation yielded seven plans that were used as a guide for development of the Strategies. The plans were helpful in understanding the magnitude of implementation needed, the expected time frame of implementation to expect, and comparable regions' strategies for ZEV introduction. The specific scoring matrix and results, along with a detailed description of the identified ZEV plans, can be found in Appendix C.3.

Table 5 details how each plan compares against other ZEV-related planning efforts in the San Diego region. The findings of this analysis indicate that strategies outlined in existing ZEV planning efforts in the San Diego region align closely with other efforts across the country. Benchmarked plans indicated alignment with the region's efforts to reduce gas vehicles, accelerate deployment of public chargers, and promote EV ownership. 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 this Report.

2.4 Public and Stakeholder Engagement

This work recognized the importance of creating opportunities for community and stakeholder input on the development of the core principles and strategies by undertaking engagement efforts throughout the process.

Community and stakeholder input received in Phase 1 and Phase 2 are highlighted below and detailed in Appendices D and E, respectively.

2.4.1 Engagement Approach

A Community Engagement Plan (Engagement Plan) for the Strategies was developed to establish goals for the engagement effort, describe the overall approach and timeline, and identify roles and responsibilities for the various stakeholders involved in executing the engagement process.

The Engagement Plan consisted of two distinct phases:

Phase 1: Guiding Principles, Barriers, and Opportunities

April to June 2022

- Building upon the A2Z Gap Analysis, which provided a baseline understanding of barriers and opportunities associated with ZEV uptake, Phase 1 aimed to provide foundational information regarding EVs and the Strategies, understand community values, and identify high-level mobility patterns, community priorities, perceived barriers, and opportunities relative to ZEV uptake to inform the Strategies

Phase 2: Feedback on Draft Strategies

September to October 2022

- Phase 2 aimed to continue providing foundational information regarding ZEVs and the Strategies, summarize public and stakeholder engagement to-date, and collect feedback on the draft Strategies¹⁹.

Engagement activities were shaped by A2Z Collaboration members, which included the following committees:

- Core Team: provided direction and oversight regarding stakeholder engagement activities and supported supplemental events
- Steering Committee: provided in-depth input on engagement and supported supplemental events where possible
- Advisory Committee: participated in questionnaires, workshops, and interviews, and attended three meetings with the A2Z Core Team and Steering Committee, and helped share information with their constituents and network

2.4.2 Key Community Input

Table 6 provides a summary of key community input themes raised during Phase 1 engagement activities. Appendix D provides comprehensive information around community input conducted as part of this work.

Table 5: Best Practice Regional Strategies Summary Findings

Region	Plan	Targets	Timeframe/Schedule	Key ZEV Strategies from Regional Planning Efforts		
				Reduce Gas Vehicles	More Chargers in Public Areas	Promote EV Ownership
Central Coast (Ventura County, Santa Barbara County, San Luis Obispo County)	Electric Vehicle Readiness Plan for Ventura, Santa Barbara, and San Luis Obispo Counties (Central Coast)	Goal of 60,000 PEVs sold by 2025 Develop a public charging network with 100+ Level 1, 200+ Level 2, and 5+ DCFC stations	Goals to be achieved between 2014-2025	✓	✓	—
Fresno County	Electric Vehicle Readiness Plan (EVRP)	4,983 charging ports by 2030 1,600 public charging stations by 2025 217 charging stations in unincorporated areas	Level 2 chargers in the Fresno region to be installed by 2025 Direct current fast charging (DCFC) chargers to be added by 2030	—	✓	↓
Los Angeles County	Zero Emissions 2028 Roadmap	25% reduction in GHG emissions by 2028 Light-duty ZEVs to be 30% of all vehicles on road and 80% of all vehicles sold by 2028 Shift over 20% of all single occupancy vehicle trips to zero emissions by 2028	Zero emission and transport electrification goals to be achieved by 2028	✓	↓	✓
San Bernardino County	Zero-Emission Vehicle Readiness and Implementation Plan	44,846 ZEVs and 24,745 BEVs expected by 2025 100% zero emission bus fleet by 2040	Near term strategies (< 2 years) Mid-term (2-5 years) Long-term (5-10 years)	✓	✓	↓
Southern California Edison (SCE) Territory	SCE Clean Power and Electrification Pathway	Electrification of 24% light-duty, 15% medium-duty, and 6% heavy-duty vehicles by 2030	ZEV adoption and electrification goals to be achieved by 2030	✓	✓	✓
Denver, CO	Electric Vehicle Action Plan	15% of vehicle registrations electric by 2025, 30% by 2030, 100% of light-duty by 2050	Projects to be completed in waves with priority actions beginning first First wave: 2020 start Second wave: 2021-2023 start Third wave: beyond 2023	✓	✓	✓




Table 5: Best Practice Regional Strategies Summary Findings *continued*

Region	Plan	Targets	Timeframe/Schedule	Key ZEV Strategies from Regional Planning Efforts		
				Reduce Gas Vehicles	More Chargers in Public Areas	Promote EV Ownership
Seattle, WA	Clean Transportation Electrification Blueprint	100% of shared mobility, 90% of all personal trips, and 30% of goods delivery to be zero emission 100% of city fleet to be fossil-fuel free	All goals listed in plan targeted for 2030	✓	✓	✓

Note: Battery Electric Vehicle (BEV), Direct Current Fast Charging (DCFC), Electric Vehicle Readiness Plan (EVRP), Plug-In Electric Vehicle (PEV), Southern California Edison (SCE), Zero Emission Vehicle (ZEV)


Legend	
✓	Meets criteria
—	Partially meets criteria
↓	Not included or does not meet criteria

Table 6: Phase 1 Community Input on Guiding Principles, Barriers, and Opportunities

Key Theme	Community Input	Direct Quotes
<p>Broad interest in EVs</p> 	<p>Important factors when thinking about how communities, families, and individuals moved around daily were:</p> <ul style="list-style-type: none"> • The cost of transportation • Safety • Time spent on daily travel <p>Broad interest in personal EVs, citing most familiarity with hybrid gas-electric vehicles; continued interest in hybrids for some due to lack of range with battery EVs and other ZEVs</p> <p>Opportunity for education on shared EV mobility options such as buses and rideshare</p>	<p><i>Q14. Please describe your future plans/campaigns/initiatives that are targeted towards the adoption of Electric Vehicles.</i></p> <p><i>"I plan on my next car being electric, but I hope they become more affordable over the next few years."</i></p>
<p>Prominent barriers; inequitable access</p> 	<p>Prominent barriers in EV access were identified including:</p> <ul style="list-style-type: none"> • The costs of purchasing, charging, and maintaining an EV • Lack of access to charging infrastructure at home and around the community • Aversion to switch from their current vehicle and lack of availability of desired vehicle types <p>Perception that EV access was uneven across the county, with more affluent areas having substantial EV-serving infrastructure in their communities</p>	<p><i>Q3. What may be stopping you or people you know from purchasing/driving an Electric Vehicle?</i></p> <p><i>"I cannot put a solar panel on my roof because I live in a condo."</i></p> <p><i>"Have you seen how expensive they [EVs] are? \$800+ payment a month is twice what I pay for a new vehicle."</i></p> <p><i>"Cost. I am retired on disability. Charging. My house is 80 years old and I already have electrical problems when plugging in too many devices."</i></p> <p><i>"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."</i></p>
<p>Additional educational opportunities needed</p> 	<p>Lack of existing opportunities to learn about EVs and related infrastructure</p> <ul style="list-style-type: none"> • Online media sources and word-of-mouth were the most selected options through which people learned about EVs • Some interest in learning more about hydrogen-powered vehicles and infrastructure 	<p><i>Q12. How receptive is your local community to driving Electric Vehicles?</i></p> <p><i>"Many people are interested but don't understand how to get set up for EVs."</i></p> <p><i>"My neighbors and community members have concerns of grid reliability, high price of electricity and [it] only increasing with monopolized electricity and no alternative fuel options being pushed."</i></p>

Note: Electric Vehicle (EV), Zero Emission Vehicle (ZEV)

Table 6: Phase 1 Community Input on Guiding Principles, Barriers, and Opportunities *continued*

Key Theme	Community Input	Direct Quotes
<p data-bbox="169 264 437 344">Desire for widely available infrastructure and equipment</p> 	<p data-bbox="472 264 887 320">Strong interest in more widely available charging infrastructure</p> <p data-bbox="472 360 922 443">Charging stations were desired across all community location options with the most interest in:</p> <ul data-bbox="472 450 879 544" style="list-style-type: none"> <li data-bbox="472 450 879 479">• Homes (single-unit and multi-unit) <li data-bbox="472 486 716 515">• Shopping Centers <li data-bbox="472 521 584 551">• Work 	<p data-bbox="967 264 1436 376"><i>Q8: 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?</i></p> <p data-bbox="967 416 1404 528"><i>“People are at work 8-10 hours per day. That’s the best place to put [EV charging stations]. The largest employer at each city.”</i></p> <p data-bbox="967 568 1409 741"><i>“Every parking lot, including commercial parking lots... 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.”</i></p>

Note: Electric Vehicle (EV), Zero Emission Vehicle (ZEV)





Additionally, individuals were asked their thoughts benefits and drawbacks to ZEVs, and their answers are listed in Table 7.


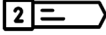
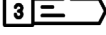
Table 7: Community Perception of ZEVs

Community-Perceived Benefits	Community-Perceived Drawbacks
Reduction in GHG Emissions	Higher Upfront Costs
Improved Air Quality	Difficult to fix or Maintain on your Own
Quieter Vehicle Operation	Lack of Desired Range
Savings from Fuel Costs	Lack of Access to Charging

Table 8 summarizes key community input themes raised during Phase 2 engagement activities. Please see Appendix D for a comprehensive understanding of community input.

Table 8: Phase 2 Community Input on Draft Strategies

Key Theme	Community Input	Direct Quotes
<p>General support for A2Z Strategies</p> 	<p>The three draft Strategies that garnered the most support were:</p> <ul style="list-style-type: none"> - Install ZEV chargers equitably across the San Diego region, especially in rural areas and CoCs - Increase the proportion of ZEVs on the road - Provide equitable and accessible opportunities to learn about ZEVs and ZEV infrastructure 	<p><i>Q1. Which of the draft strategies do you like? Please elaborate.</i></p> <p><i>"While generally supportive of all strategies, those associated with an equitable, just transition towards ZEVs are most appealing."</i></p>
<p>Suggested modifications to the A2Z Strategies</p> 	<p>Suggested modifications to the draft Strategies included:</p> <ul style="list-style-type: none"> - Lengthened implementation times to allow infrastructure to support additional load of increased ZEVs - Streamlining of planning, permitting, and installation of ZEV-serving infrastructure - Additional detail on how federal, state, CBOs, and grant organizations play a role in deploying the Strategies 	<p><i>Q2. Is there anything you would change about any of the draft strategies? Why?</i></p> <p><i>"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."</i></p>
<p>Additions to A2Z Strategies</p> 	<p>Additional draft Strategies that were desired included:</p> <ul style="list-style-type: none"> - Specific focus on ZEV infrastructure for MUDs - Expanded outreach to the general population - More focus on other ZEV types, including hydrogen and other renewable fuels 	<p><i>Q3. Is there anything missing from the draft strategies? If so, please elaborate.</i></p> <p><i>"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."</i></p>
<p>Comments on equity for A2Z Strategies</p> 	<p>Appreciation for the equity focus of the Strategies was shared; and some noted:</p> <ul style="list-style-type: none"> - Desire to see more grant and rebate programs based on income - Requests to see how equity is being measured and tracked in the deployment of Strategies 	<p><i>Q4. Equity is an important component of this effort. Do you have feedback regarding how equity is addressed in the draft strategies?</i></p> <p><i>"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."</i></p>

Key Theme	Community Input	Direct Quotes
<p>Prioritization of A2Z Strategies</p> <p>1 </p> <p>2 </p> <p>3 </p>	<p>Strategies desired to see prioritized for the San Diego region included:</p> <ul style="list-style-type: none"> - Streamlined permitting and siting of ZEV-serving infrastructure - Strategies for MUD residential charging - Workforce training and education opportunities - Grant and rebate programs - Diversification of energy sources beyond electricity (e.g., renewables) 	<p><i>Q5. Are there strategies that you would like to see prioritized for implementation in the San Diego region? Why?</i></p> <p><i>"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."</i></p> <p><i>"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."</i></p> <p><i>"Renewable energy sources beyond electricity. Electric shouldn't be the only answer for everything. (cars, houses, commercial) Maybe use diverse zero net energy sources."</i></p>

Note: Accelerate to Zero Emissions (A2Z), Community Based Organization (CBO), Communities of Concern (CoCs), Electric Vehicle (EV), Multi-Unit Dwelling (MUD), Vehicle Miles Traveled (VMT), Zero Emission (ZE), Zero Emission Vehicle (ZEV)

2.5 ZEV Uptake Assessment

Three modeling exercises were completed by the project team to assess the impacts of changed conditions since the A2Z Gap Analysis in 2021 and estimate the potential impact of Strategies on ZEV adoption and ZEV infrastructure installations at different land uses.

The objectives, methodology, inputs, assumptions, and results for these exercises are detailed in Appendix F.1-F.3.

- **A2Z ZEV Uptake:** modeling to forecast anticipated ZEV uptake within the San Diego region, to be used as a baseline for infrastructure needs
- **A2Z Charging Optimization:** modeling to allocate ZEV infrastructure installations by land use within the San Diego region and support equitable and accessible siting priorities by focusing on use type
- **A2Z ZEV Strategy Impact Assessment:** modeling to discern the impact of various Strategies on ZEV adoption within the San Diego region

As part of the A2Z ZEV Uptake Analysis, two forecasts were developed by the Project Team:

- **A2Z Baseline Forecast:** The Baseline Forecast is based on San Diego County specific data and assumes 100% ZEV public infrastructure availability by 2030, which is representative of business-as-usual activities. This indicates 100% infrastructure availability to eliminate range anxiety and access/availability barriers

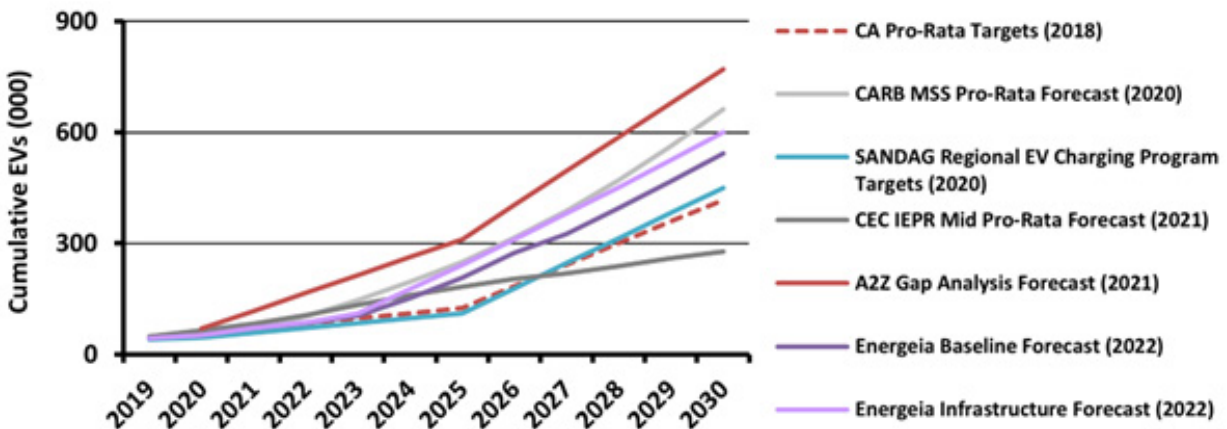
- **A2Z Infrastructure Forecast:** The Infrastructure Forecast assumes 100% ZEV infrastructure availability by 2027, which reaches 100% public infrastructure availability three years ahead of schedule resulting in a 6% increase in cumulative adoption of ZEVs.

Strategies were evaluated for their impact on ZEV adoption potential in 2030 and are listed below. Greater detail on the Strategies can be found in Section 4.

1. Increase percentage of zero emission VMT
2. Achieve equitable/accessible siting of ZEV chargers in all San Diego communities
3. Increase ZEV awareness and adoption
4. Support workforce development
5. Accelerate deployment of publicly accessible ZEV infrastructure
6. Lower policy and financial barriers to ZEV adoption
7. Deploy ZEV infrastructure for MUDs and higher density residential and/or commercial areas
8. Ensure sufficient local grid capacity for projected ZEV demand
9. Encourage and support fleet transition to zero emissions
10. Support innovative ZEV pilot projects

Energeia forecasts were compared against other regional ZEV Uptake forecasts in Figure 2.

Figure 2: Comparison of Uptake Forecasts



Sources: EO B-48-185, CARB, CEC, A2Z Collaboration, Energeia Modeling

The A2Z ZEV Uptake Modeling demonstrates that San Diego is on track to achieve its 8% population share of State targets for EVs, as indicated by the red dotted line in Figure 2. However, the resulting forecasts conducted for this work are 229,000 vehicles below the targets indicated in the A2Z Gap Analysis for the Energeia Baseline forecast and 170,000 vehicles below the target for the Energeia Infrastructure forecast. Development of Strategies for this work aims to increase ZEV adoption and reduce the gap between the current estimated Baseline forecast and the A2Z Gap Analysis target.

The A2Z Public Charging Infrastructure Optimization Model, detailed in Appendix F.2, was then 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 projects the amount of ZEV ports needed to serve forecasted ZEVs, along with the annual equipment cost per vehicle. The Findings indicate that college and business locations with Level 2 and direct current fast charging (DCFC) infrastructure are the most cost effective when considering utilization rates given ZEV uptake, allocation, and charging cost assumptions.

Using the results from the A2Z ZEV Uptake and A2Z Public Charging Infrastructure Optimization Models, six of the most impactful factors of ZEV adoption were selected in order to further quantify their impact on ZEV uptake in the San Diego region. These factors were then evaluated as Preliminary Actions shown in Table 9. Each action was normalized to a \$10 million budget in investment, and the impact was quantified as a number of cumulative ZEVs expected. The total impact of these independent actions sum to 72,000 additional ZEVs on the road by 2030. In order to reach the target of 771,000 ZEVs by 2030 in the A2Z Gap Analysis, 229,000 additional vehicles are required.

The Preliminary Actions were then applied to Strategies to determine the correlation between each action and its impact on the Strategy. In Table 9, the Strategies are assigned colored check marks based on the impact of the factor on each Strategy. High impact represents a 65-100% applicability of the factor to the Strategy, medium impact represents 16-64% applicability, and low impact represents an applicability below under 15%. Applicability can be defined as directly influencing the ZEV impact of each Strategy. It is important to note that the impact numbers are normalized based upon an assumption of a \$10M investment. In reality, this investment may vary, resulting in differing impact numbers and this is intended to represent a proportional magnitude.

Table 9: Most Impactful Factors of ZEV Uptake in San Diego

Factor	Preliminary Action	Impact (Additional ZEVs expected by 2035)	Impacted Strategies
			High, Medium, Low Impact indicated by color and number of check marks
Purchase Discount	Offering an additional \$2,500 purchase discount for ZEVs until price parity is reached with a comparable internal combustion engine (ICE) vehicle	1,000	Strategy 6 ✓✓✓ Lower policy and financial adoption barriers to ZEV adoption Strategy 1 ✓✓ Increase percentage of zero emission VMT Strategy 10 ✓ Support innovative ZEV pilot projects
Available Level 2 ZEV Rate	Offering a tailored EV rate designed for Level 2 chargers, resulting in 20% lower electricity costs when charged outside of peak hours, and applying to 40% of customers using this tariff	6,000	Strategy 8 ✓✓✓✓ Ensure sufficient local grid capacity for projected ZEV demand

Legend: Impact Levels High = ✓✓✓✓ Medium = ✓✓ Low = ✓

Table 9: Most Impactful Factors of ZEV Uptake in San Diego *continued*

Factor	Preliminary Action	Impact (Additional ZEVs expected by 2035)	Impacted Strategies
			High, Medium, Low Impact indicated by color and number of check marks
Available DCFC ZEV Rate	Offering an EV rate designed for DCFC chargers, resulting in 10% lower electricity costs, and 40% of customers using DCFC	3,000	Strategy 8 ✓✓✓ Ensure sufficient local grid capacity for projected ZEV demand
Available DR Program	Offering a demand response program, resulting in 25% lower electricity prices and 20% customer participation	4,000	Strategy 8 ✓✓✓ Ensure sufficient local grid capacity for projected ZEV demand
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	57,000	Strategy 5 ✓✓✓ Accelerate deployment of publicly accessible ZEV infrastructure Strategy 2 ✓ Achieve equitable/accessible siting of ZEV chargers in all San Diego communities Strategy 9 ✓ Encourage and support fleet transition to zero emissions
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	1,000	Strategy 6 ✓✓✓ Lower policy and financial barriers to ZEV adoption Strategy 1 ✓✓ Increase percentage of zero emission VMT Strategy 10 ✓ Support innovative ZEV pilot projects

Legend: Impact Levels High = ✓✓✓ Medium = ✓✓ Low = ✓

Note: Direct Current Fast Charge (DCFC), Electric Vehicle (EV), Internal Combustion Engine (ICE), Vehicle Miles Traveled (VMT), Zero Emission Vehicle (ZEV)

For example, as seen in Table 9, the Purchase Discount factor applies to three different Strategies that promote rebates and incentives – Strategies 1, 6, and 10. However, the Purchase Discount factor does not affect all of the aforementioned Strategies equally. As such, the distribution is done such that the Strategy most impacted received a higher designation than Strategies that are impacted less. In the case of the aforementioned example:

- **Strategy 6:** To lower policy and financial barriers to ZEV adoption, is impacted the most by this factor because of the focus on governmental policies to lower financial barriers, which is directly aligned with the Preliminary Action.
- **Strategy 10:** To support innovative ZEV pilot projects, is impacted the least since the focus of this Strategy is on leveraging emerging funding sources for innovation applications.

Another example is the Public Charging Availability factor, which impacts Strategies 2, 5, and 9. In this case:

- **Strategy 5:** Focused on accelerating public ZEV infrastructure in all communities, is impacted the most by public charging availability.
- **Strategy 2:** Focused on ZEV infrastructure in hard-to-reach communities, is not as impacted because of its focus on specific communities.

- **Strategy 9:** Focused on transitioning fleets to zero emission, is also not as impacted because fleet infrastructure is expected to lag behind public infrastructure.

The key quantifiable factors for the Strategies were configured in the A2Z ZEV Uptake Model to estimate the incremental number of ZEVs adopted under each Strategy. See Table 10 for the projected ZEV adoption numbers for each Strategy in 2035. Strategy 5, focused on accelerating public ZEV infrastructure, shows the greatest impact, with about 34,000 additional ZEVs expected by 2030, or around 55,000 by 2035, from implementation of that Strategy alone, representing around half of the targeted increase in ZEVs over the designated time period.

Table 10: ZEV Adoption Attributed to Each Strategy

No.	Strategy	ZEVs Increase over the Baseline in 2030	ZEVs Increase over the Baseline in 2035	Percent (%) Increase over the Baseline in 2035
1	Increase percentage of zero emission VMT	7,000	11,000	1%
2	Achieve equitable/accessible siting of ZEV chargers in all San Diego communities	18,000	29,000	3%
3	Increase ZEV awareness and adoption	Modeling limitation, unable to be quantified	Modeling limitation, unable to be quantified	N/A
4	Support workforce development	Modeling limitation, unable to be quantified	Modeling limitation, unable to be quantified	N/A
5	Accelerate deployment of publicly accessible ZEV infrastructure	34,000	55,000	6%
6	Lower policy and financial barriers to ZEV adoption	18,000	29,000	3%
7	Deploy ZEV infrastructure for MUDs and higher density residential and/or commercial areas	Modeling limitation, unable to be quantified	Modeling limitation, unable to be quantified	N/A
8	Ensure sufficient local grid capacity for projected ZEV demand	28,000	46,000	5%
9	Encourage and support fleet transition to zero emissions	11,000	18,000	2%
10	Support innovative ZEV pilot projects	7,000	11,000	1%

Note: Multi-Unit Dwellings (MUDs), Vehicle Miles Traveled (VMT), Zero Emission Vehicle (ZEV)

It is important to note the two central limitations of this modeling exercise.

- Only quantitative factors were able to be modeled; this excludes qualitative factors including equity and economic growth. The project team notes that these qualitative factors are also of immense value, particularly when ensuring that ZEV charging infrastructure is deployed in ways that are equitable. Preliminary Actions in line with these factors include deploying ZEV infrastructure in hard-to-reach communities, addressing adoption gaps faced by vulnerable community groups, and training local workforce to support the increase in ZEV adoption. For this reason, some Strategies were not able to be modeled in this exercise.
- The assumptions made in developing the Preliminary Actions are considered to be conservative. Local impact will be more/less depending on actual program rebates/discounts at the local and regional levels. This provides an opportunity for regional and local leadership to provide larger rebates and incentives to accelerate progress in the region.

Ensuring all communities have access to the ZEV economy was a driving force in the development of each Strategy. The San Diego region's current ZEV adoption rates are primarily attributed to early adopters. To achieve widespread adoption in the region, it will be crucial to ensure all communities, especially CoCs, rural communities, and tribal communities have access to ZEVs and ZEV infrastructure.

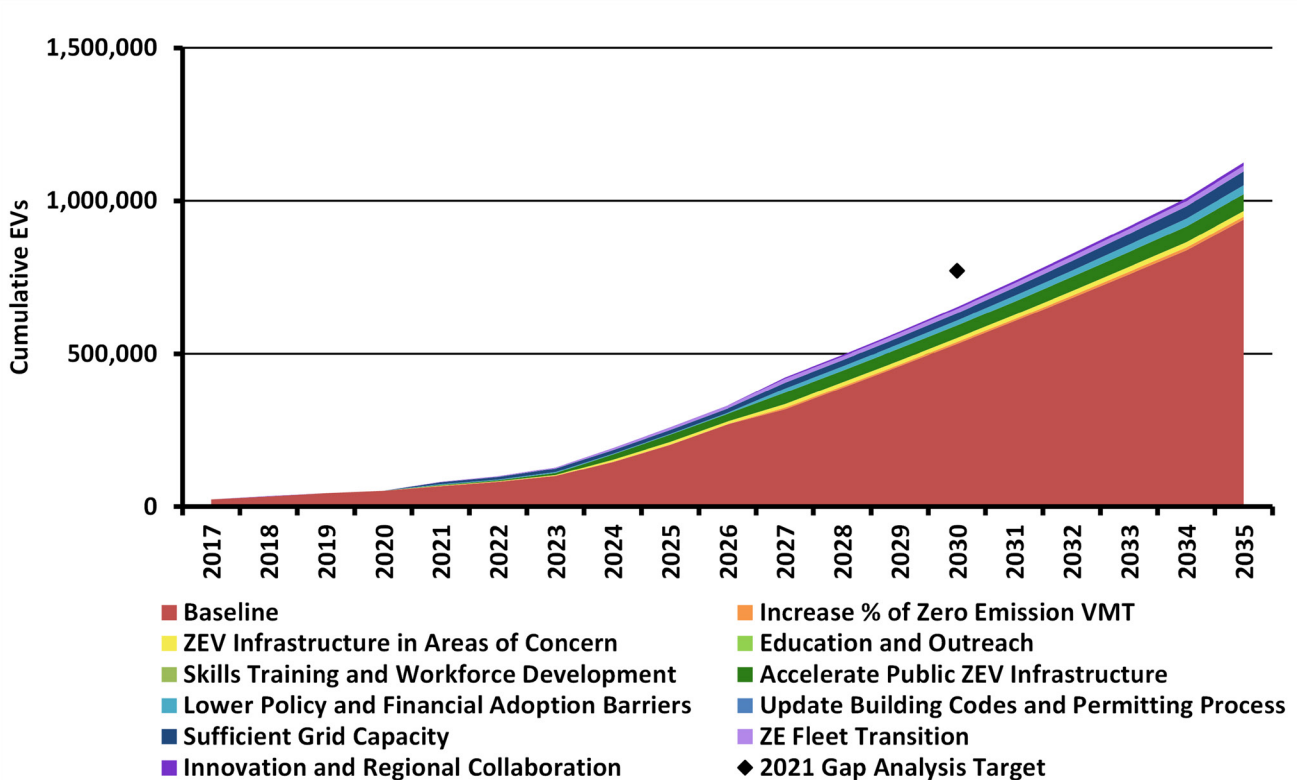
Specific Strategies that contribute to equity and economic growth goals are listed below:

- **Strategy 2:** Achieve equitable/accessible siting of ZEV chargers in all San Diego communities
- **Strategy 3:** Increase ZEV awareness and adoption
- **Strategy 4:** Support workforce development
- **Strategy 6:** Lower policy and financial adoption barriers to ZEV adoption
- **Strategy 7:** Deploy ZEV infrastructure for MUDs and higher density residential and/or commercial areas

As shown in Figure 3, effectively applying the Strategies could result in a cumulative increase of approximately 122,000 ZEVs in 2030 and 199,000 ZEVs in 2035. The target from the A2Z Gap Analysis is also shown to provide a visual marker of the 771,000 ZEVs projected by 2030, which this forecast is about 107,000 vehicles under. In order to close this gap, the following actions should be prioritized in the next decade:

- Increasing incentive amounts for ZEV purchase beyond \$2,500 and increasing retirement amounts beyond \$4,000
- Tailoring rate design for Level 2 chargers to further incentivize ZEV infrastructure installation
- Prioritizing CoCs, rural communities, and tribal communities in rebates, incentives, policies, and initiatives

Figure 3: Incremental ZEV Adoption by Strategy



3 Regional ZEV Strategies

This section presents the details of the Strategies, including a general description, impact statement, and a set of implementation tactics that serve as supporting actions for each Strategy. Where relevant, examples and case studies are presented.

It should be noted that transportation emissions can be greatly reduced by planning for and promoting mobility options that reduce vehicle miles traveled (e.g., biking, walking, and taking transit) in addition to supporting the transition of cars, trucks, and buses to zero emission. As presented in Section 2.3, the ten Strategies were developed based on the Core Principles and Implementation Goals from the State's ZEV Market Development Strategy published in February 2021 by the California Governor's Office of Business and Economic Development (GO-Biz), and adjusted based on stakeholder feedback, input from subject matter experts, results from the evaluation criteria²⁰, and modeling described in detail in Appendix F.

Since many Strategies can be implemented on a number of scales, ranging from broader regional efforts to more localized and community-based initiatives, implementation scales are provided.

Implementation of each Strategy will have its own nuances and characteristics that must be accounted for. Even for community or locally-driven initiatives, alignment with regional efforts and collaboration with regional stakeholders is important to ensure implementation captures broader synergies and accounts for overarching guidelines or requirements at a regional level. The A2Z Collaboration plans to support such coordination by being a resource and conduit for collaborative implementation of the presented ten Strategies and supporting tactics.



Regional implementation focuses on collaboration across local jurisdictional lines to deliver broad reaching programs and facilitate regional initiatives. Key stakeholders include:

- SANDAG
- Local utilities (SDG&E and community choice aggregators)
- SDAPCD
- County of San Diego (through the San Diego Regional Decarbonization Framework)

The Strategies are intended to serve as a guide and resource for the role stakeholders may play, rather than a prescriptive assignment of responsibility.



Local Jurisdictions/Government implementation focuses on specific jurisdictions city or county-wide to deliver tailored programs, resources, and service offerings for residents. Key stakeholders include:

- Tribal Governments
- County of San Diego
- City Jurisdictions



Community implementation focuses on community-driven initiatives that deliver resources, services, and support to specific community groups with unique challenges and needs. Initiatives are led by community residents to utilize funding opportunities at the local and regional levels to support community goals. Key stakeholders include:

- Fleet operators (depending upon footprint of fleet)
- Educational institutions
- Building owners
- CBOs
- Non-profit organizations



Industry implementation focuses on the involvement of businesses, the local workforce, and organizations that can educate and connect this workforce to growing businesses in the ZEV industry.

- Workforce organizations
- Unions
- Electric vehicle service providers (EVSPs)
- Vehicle manufacturers
- Advocacy groups

For each Strategy, a table is provided that summarizes the implementation tactics and timeline associated with each tactic.

The terminology in Table 11 is used to describe the timeline:

Table 11: Timeline Terminology

Timeline	Assumption
Near-term	Begin between 1-3 years
Medium-term	Begin between 3-5 Years
Long-term	Begin within 5+ Years
Ongoing	Action that has already begun or can begin now and should be revisited regularly

Note: Most strategies require continued implementation and/or monitoring once initial implementation has occurred.

The following best practices were gathered from industry experience, stakeholder engagement, and the A2Z Collaboration. When implementing the tactics for each Strategy, these best practices should be followed:

Accessibility: Beyond the actual siting of ZEV infrastructure is ensuring the accessibility of these chargers in communities where they are installed.

- This includes consideration of extended hours of operation to account for during and after normal business hours. Hours should be in accordance with times that best suit targeted users.
- ZEVs and ZEV infrastructure, their associated training materials, and guides should be accessible in multiple languages, recognizing that some community members do not speak English or English may not be their first language.
- All public charging investments must address the [Americans with Disabilities Act](#) (ADA) standards²¹ and [California's EV Charging Stations Accessibility Regulations](#) in both physical deployment and outreach materials on ZEV infrastructure. This includes having chargers physically accessible for those who use mobility devices (e.g., wheelchairs, walkers, canes) as well as accessible communication features and operable parts for those who are hearing and/or visually impaired. An example of a barrier wheelchair users face is high curb plates. Ramps and height adjustable screens should be considered to make screens easier to access. Any chargers with information and communication technology should be compliant with [Section 508 standards of the Rehabilitation Act of 1973](#).

- ZEV infrastructure should be accessible by those without a cellular device, an ability to open applications, or a data plan. Instructions should be clearly presented on the monitor for clarity for those that are not familiar with how to operate the charger or who may be technologically challenged.
- ZEV infrastructure should be easily accessed by those who are unbanked. Alternative payment options to debit and credit cards include cash, prepaid debit cards, which can be purchased with cash at participating retail stores, and commuter benefit cards that can be loaded with pre-tax dollars through participating employers.

Safety: Beyond siting ZEV infrastructure in convenient locations close to other businesses and public facilities, charging stations should incorporate safety features to make users feel comfortable charging at any time.

- Consider safety features such as closed-circuit TV, locks, fencing, security personnel, lighting, and signage. To reduce costs, it is optimal to locate chargers in areas where there is already sufficient lighting or closed-circuit TV (e.g., parking lots). Sites should be assessed so entities can determine security needs and identify appropriate funding streams to support such features.

Challenges

Despite having higher ZEV adoption rates compared to the national average, there are a number of challenges the San Diego region faces in ZEV adoption and ZEV infrastructure deployment. Many were covered in detail in the A2Z Gap Analysis, reviewed in Section 3.1.

One of San Diego's primary challenges is ensuring the development of a robust and equitable ZEV public charging network that includes access for tribal communities, CoCs, and rural communities. These communities have their own sets of challenges that are further detailed in this section. Additionally, the current market has limited existing ZEV infrastructure for hydrogen fuel cell EVs (FCEVs) that support MDHD fleet electrification. Another major challenge is lack of ZEV education in the region, leading to concerns about owning ZEVs and ultimately low adoption rates. Lastly, the high costs associated with owning a ZEV for the consumer and the costs associated with installation of ZEV infrastructure for MUDs and businesses is major barrier to adoption in the region.

A summary of fifteen challenges facing the region follows, and are covered in detail in the A2Z Gap Analysis and in each of the Strategies in this section:

- **ZEV Affordability and Ownership Cost Premium:** Kelly Blue Book reports that the average price of a new EV was \$53,000 in July 2023, 10% higher than the average cost of a new gasoline-powered vehicle at \$48,000. These prices continue to be exacerbated by low supply in the 2022 and 2023 market. However, as of 2022, there are six models of light duty electric vehicle models under \$40,000 on the market, and with federal and state rebates like the [Clean Vehicle Credit](#)²², this can further reduce the initial capital costs of these vehicles. Research and market studies have demonstrated that BEVs require 31% less maintenance than their gasoline counter parts, and when BEVs do need repairs, the bill can be up to 22% less²³. Pricing for MDHD can range from \$100,000-\$200,000 for a Class 4-6 vehicle or delivery truck, a much higher capital investment that contributes to slower adoption of these vehicles. For a Class 8 over-the-road truck, \$300,000 or more is expected²⁴. However, projections indicate that MDHD vehicles will follow a similar cost decline as light-duty vehicles with increased model availability and market competition.
- **ZEV Charging Infrastructure Availability:** ZEV charging infrastructure needs to be available and accessible to all communities, residents, and visitors. Fleet operators need dedicated charging infrastructure which requires detailed planning and a large capital investment.
- **Customer Perception:** To build readiness towards purchasing a ZEV, customers first need to feel comfortable operating and relying on ZEVs to support their current lifestyle needs. According to a 2022 Consumer Reports survey on EV attitudes, only 36% of Americans surveyed plan to buy or lease an EV as their next vehicle. Of those respondents, 50% have a friend, relative, or coworker that owns an EV, and an additional 20% had driven an EV²⁵. With drivers facing vehicle purchase decisions once every 12 years, it becomes all the more critical to educate and inform buyers about the benefits of ZEVs.
- **Rural Community Challenges:** The low-density of residents often discourages significant investment in infrastructure, particularly in new and emerging technologies such as ZEV fueling infrastructure. Because many in rural communities have longer travel times, driving range needs are higher, and 'range anxiety' can be more of a concern among consumers than in other more densely populated areas.
- **CoCs Challenges:** Expanding charging infrastructure in these communities is challenging as some community members can view fueling installations as a symbol of displacement and gentrification, especially if communities are not involved in the planning process. Additionally, charger installations need to focus on accessibility and acknowledging that installations may require additional features to ensure that they are well suited for the community (e.g., installing proper lighting or security measures for neighborhoods where residents may be concerned for their safety). CoCs also have more MUDs which make it difficult to install ZEV infrastructure.
- **Tribal Communities Challenges:** San Diego County is home to more tribal communities than any other county in the United States. There are 18 Native American reservations in the region, represented by 17 tribal governments, mostly in rural areas. Several have identified the need for more ZEV infrastructure and ZEVs but need funding and other support. SANDAG and Southern California Tribal Chairmen's Association (SCTCA) developed the Intraregional Tribal Transportation Strategy (2022 Update) including a framework to have timely and meaningful involvement with tribal governments on regional transportation needs.
- **Funding Competition:** With a large amount of focus on providing funding in such areas, there is competition to secure funds with other rural, tribal, and CoCs areas in the state. Additionally, San Diego programs have been historically fully subscribed, requiring potential applicants to reapply in later cycles.
- **ZEV Operations and Maintenance Learning Curve:** There is a learning curve for how ZEVs are operated and maintained differently than ICE vehicles. For example, EVs can utilize regenerative braking to maximize the range of the vehicle. This can be controlled by the driver when deciding how much to accelerate before needing to brake. Another example is proper management of the torque, which when used properly can accelerate the vehicle at a steady speed, reduce tire wear, and maintain battery charge for longer²⁶. Additional safety considerations will also need to be accounted for including the quiet nature of ZEVs which pedestrians and drivers alike should be wary of to avoid potential collisions.

- **Disaggregated ZEV Information** on ZEVs is disaggregated across many sources, at both the public and private sector level, requiring additional time and effort for consumers to access needed information. Moreover, consumers are often left to interpret available information on their own. The lack of a ZEV consumer advocate at traditional car dealerships inhibits a consumer's ability to appropriately consider and compare all vehicle options²⁷.
- **Information Access Barriers:** Information about ZEVs, or even ZEV funding opportunities, can typically only be found online and primarily in English. This is not the most effective way to educate communities, especially in areas like the San Diego region where Spanish is frequently a primary language amongst residents. Ensuring that materials are also disseminated beyond digital means is a way to ensure that community members have access to information in a way that accounts for the digital divide and the fact that not everyone has access to internet.
- **Limited Training Programs:** As a rapidly emerging area, training programs relevant to ZEV and ZEV fueling infrastructure have been introduced but are still fairly limited and are often not widely accessible. Some of this has been attributed to limited curriculum development and funds available to support such programs. To support broad ZEV adoption, specialized training is required to transition workers who are familiar with internal combustion engine vehicles to ZEVs due to the differences in operability and maintenance, and training programs will need to be built out and more accessible. This should account for ensuring equitable training access, with particular emphasis on workforce training for CoCs and tribal communities.
- **Property Owner Lack of Awareness in ZEV infrastructure Installation:** Property owners may lack the time and/or resources necessary to plan and install charging stations, including the technical knowledge to effectively evaluate the business case for public and/or private charging opportunities. This challenge has historically resulted in a lack of charging infrastructure access for MUD residents and renters, and those that lease retail spaces.
- **Public ZEV infrastructure Can Have Long Payback Period:** While innovative financial models can help alleviate this challenge, private property owners can often face long payback periods when adding public use ZEV infrastructure in low adoption communities, where it is most needed. While these ZEV infrastructure installations are necessary to fill gaps in the ZE charging network, they may not be financially feasible in the short-term.
- **MUD Installation Barriers:** It can be difficult to install ZEV infrastructure at MUDs due to parking availability, infrastructure ownership, internal approval processes, electrical access and metering, and an intrusive construction process.
- **Grid Management with Increased ZEV Adoption:** As ZEV adoption increases, more vehicles will need to connect to the grid, which may cause grid challenges or outages if not managed or upgraded properly.

Table 12 summarizes the challenges that can be addressed by each of the Strategies.

Table 12: Strategies Addressing Regional Challenges

No.	Strategy	CHALLENGES														
		ZEV Affordability	ZEV Charging Infrastructure Availability	Customer Perception	Rural Community Challenges	CoCs Challenges	Tribal Community Challenges	Funding Competition	ZEV O&M Learning Curve	Disaggregated ZEV Information	Information Access Barriers	Limited Training Programs	Property Owner Lack of Awareness in ZEV Infrastructure	Public ZEV Infrastructure Can Have Long Payback Period	MUD Installation Barriers	Grid Management with Increased ZEV Adoption
1	Increase the percentage of zero emission VMT	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Achieve equitable and accessible siting of ZEV chargers in all San Diego communities		•	•	•	•	•	•	•	•	•				•	
3	Increase ZEV awareness and adoption			•	•	•	•	•	•	•	•	•	•			
4	Support workforce development				•	•	•	•	•			•	•			
5	Accelerate deployment of publicly accessible ZEV infrastructure	•	•											•		
6	Lower policy and financial barriers to ZEV adoption	•	•					•	•					•		
7	Deploy ZEV infrastructure for multi-unit dwellings (MUDs) and higher density residential and/or commercial areas		•					•			•	•	•	•		
8	Ensure sufficient local grid capacity for projected ZEV demand							•							•	•
9	Encourage and support fleet transition to zero emissions			•	•	•	•		•	•	•	•	•			
10	Support innovative ZEV pilot projects			•												•

3.1 Strategy #1: Increase Percentage of Zero Emission VMT

Implement ZEV programs and encourage fleet electrification

Table 13 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 13: Strategy 1 Implementation Tactics

Strategy #1: Increase the percentage of zero emission vehicle miles traveled					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Provide and Promote Rebates and Incentives	•	•	•	•	Ongoing
2. Promote ZEVs and Infrastructure through Educational Materials	•	•	•	•	Near-term
3. Transition Medium- and Heavy-Duty Vehicles	•	•			Medium/Long-term
4. Encourage Programs that Retire Older, More Polluting Vehicles	•	•			Ongoing

3.1.1 Description

In 2022, ZEVs comprised about 95,000 light-duty vehicles and 52 medium- and heavy-duty vehicles (MDHD) in San Diego County, making up almost 3% of light-duty vehicles²⁸ registered and 0.1% of MDHD vehicles in the region. A coordinated regional effort to increase access to ZEVs and electrify fleets (both public and private) can help increase the replacement of fossil-fuel dependent vehicles, and result in environmental benefits. Core to this Strategy is transitioning vehicle trips away from ICE vehicles to electric cars, trucks, and buses. This is represented by tracking the percentage of VMT that are attributed to ZEVs.

3.1.2 Impact

Increasing the percentage of zero emission VMT was modeled in this Report. Findings showed a projected increase in ZEV adoption by 1%, or approximately 11,000 vehicles over the baseline scenario, which reaches 938,000 vehicles by 2035. Specific actions contributing to the ZEV increase include offering financial ZEV rebates (an example of a \$2,500 rebate is used to model potential impacts) and incentivizing ICE retirement (an example of a \$4,000 incentive is used to model potential impacts). Additional details on the modeling conducted can be found in Appendix F. Promoting ZEV transition programs for residents and fleet owners will lead to increased ZEV adoption across the region.

3.1.3 Key Implementation Tactics and Solutions

The tactics to support the percentage increase of ZE VMT include:

- 1. Provide and Promote ZEV and EV Charging Infrastructure Rebates and Incentives:** The easier and less costly it is for consumers to own a ZEV, the more likely they are to purchase and drive them, contributing to increased ZEV adoption rates. Promoting local, regional, state, and federal rebates and incentives can help lower barriers to ZEV adoption by improving consumer awareness about the options they have to reduce purchasing costs. These include rebates for replacing older, polluting ICE vehicles for fleets, incentives for installing public charging infrastructure, and charger installation cost coverage.
- 2. Promote ZEVs and Infrastructure through Educational Materials, Outreach, and Public Information Campaigns:** Materials should be developed and distributed to communities to educate people on ZEV benefits, rebate programs, incentives available, available tools, existing and planned charging station locations, etc. As more regional stakeholders become aware of ZEV benefits and resources, the more likely they are to adopt ZEVs.

3. Transition Fleets, including Medium- and Heavy-Duty Vehicles: While MDHD vehicles only make up less than 2% of vehicles registered in San Diego County, they are responsible for about 14% of transportation emissions in the region. Transitioning an organization’s fleet to ZEVs provides direct benefits to local air quality and driver health.



Industry Implementation

Industry groups, such as automobile dealerships, could actively promote rebates and incentives to customers that are interested in ZEVs.

4. Encourage Programs that Retire Older, More Polluting Vehicles: Encouraging the implementation of programs that retire older, fossil-fuel powered vehicles in favor of ZEVs is key to increasing ZE VMTs and reducing emissions.

2. Promote ZEVs and Infrastructure through Educational Materials



Table 13 summarizes the relevant implementation tactics and solutions in terms of how they can address challenges to ZEV adoption.

Regional and Local Implementation

1. Provide and Promote Rebates and Incentives



These groups can collaborate to develop tailored tools to educate residents in the region about ZEVs. Previous educational tools include CALeVIP and Plug-in SD EV Expert²⁹ and SDG&E’s Enhanced Integration Capacity Analysis³⁰ tool.

Regional Implementation

Regional groups can provide incentives for zero emission vehicles, vehicle replacement programs, public charging infrastructure, and charger installation cost coverage. A table of current funding opportunities at the local, state, and federal level and how they can be applied is provided in Appendix H.

ZEV educational tools can also be created by local groups such as the County of San Diego with its EV Consumer Guide³¹.



Community Implementation



Local Implementation

Local jurisdictions can provide incentives to make it easier for residents to access ZEVs. Local jurisdictions can post information on rebates and incentives on their websites with a description of how this applies to their community members. These local initiatives can also be combined with rebates and incentives available at regional, state, and federal levels.

Community groups will be vital in supporting educational outreach efforts in conjunction with regional and local groups. Specifically, CBOs, non-profits, and educational institutions have a better read of the pulse of a community and their specific challenges.

These groups can tailor educational materials to specific audiences effectively, highlighting community concerns and resources.



Industry Implementation



Community Implementation

Community groups like CBOs and non-profits can promote rebates and incentives that are provided by regional and local groups.

Industry groups will be critical in bringing ZEV technology to different target groups, teaching potential drivers how to operate and maintain the vehicle, answering questions, and providing opportunities to test drive.

An effective example of industry partnering with regional groups is SDG&E's EV Days and Ride and Drive Events in partnership with Toyota. These events enable users to experience the benefits of driving ZEVs. Additionally, Adaptive Ride and Drive are also offered as an inclusive learning environment for drivers with disabilities.

At these events ZEVs are adapted with hand controls for members of the public with differing access and functional needs.

3. Transition Medium- and Heavy-Duty Vehicles



Regional and Local Implementation

Regional groups support local plans for the transition to MDHD through funding and their own initiatives. SANDAG's MDHD ZEV Charging and Infrastructure Blueprint Planning Grant and SDG&E's MDHD plan to develop 300 MDHD charging sites in San Diego through 2025 are under development, and these organizations work with the Port of San Diego to achieve its Maritime Clean Air Strategy.

Local groups tend to be the originators for CAPs in their cities, creating an opportunity to introduce goals around MDHD fleet transition. As an example, the Port of San Diego's Maritime Clean Air Strategy (2021) identified electrification initiatives including shore power for cruise ships, replacing diesel cranes with electric versions, and electrifying the Port fleet to target MDHD transitions.



Community Implementation

Community groups like fleet operators will be instrumental in transitioning MDHD fleets. Regionally, as a major hub for e-commerce and logistics companies, target fleets could include delivery trucks, service trucks, and dump trucks for construction. Local businesses could work with their suppliers and vendors to identify funding sources and develop a transition plan for the fleet. In addition to businesses, educational institutions and employers also have an opportunity to electrify their fleets, and employers can provide ZEVs for employees.

Their impact can be compounded if collaborating with regional and local entities who can provide resources and incentive/rebate opportunities.

Encourage Programs that Retire Older, More Polluting Vehicles



Regional Implementation

Regional groups can drive this Strategy forward by promoting and providing rebates for replacing older, polluting ICE vehicles for fleets. An example is SDAPCD's [*Scrap Car Reimbursement Assistance Program \(SCRAP\)*](#)³² that provides a \$1,000 incentive to residents of San Diego County to retire their vehicles (1997 or older).



Local Implementation

Local jurisdictions can help promote existing programs with regional institutions. They can educate their jurisdictions on program availability and generate goals that support regional and state efforts.

3.2 Strategy #2: Achieve Equitable/Accessible Siting of ZEV infrastructure in all San Diego communities

Accelerate ZEV charging and fueling infrastructure implementation in rural areas and CoCs

Table 14 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 14: Strategy 2 Implementation Tactics

Strategy #2: Achieve equitable and accessible siting of ZEV infrastructure in all San Diego communities					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Implement ZEV Ambassador Program	•	•	•	•	Near-term
2. Provide and Promote Rebates and Programs that Foster Equitable ZEV infrastructure Siting	•	•	•		Near-term/Medium
3. Hosting ZEV Open Houses in CoCs, Tribal, and Rural Communities		•	•		Near-term
4. Utilize Equity Metrics to Guide ZEV Planning	•	•	•		Near-term
5. Conduct Needs-Based Siting Assessment in Low Adoption Communities	•	•	•		Ongoing

3.2.1 Description

With sufficient access to convenient fueling options, as a result of the tactics presented in these Strategies, the San Diego region is expected to achieve its share of state ZEV adoption targets based on modeling findings presented in Appendix F. Of particular importance is ensuring that fueling station deployment is accessible and equitable, particularly for rural areas, tribal communities, and CoCs where deployment has historically been limited. This observed lag in ZEV infrastructure is typically attributed to limited access to capital funds and/or investment and vehicle adoption latency. Improving access to ZEV infrastructure in these areas would help address disparities in ZEV ownership and equitable access to fueling stations compared to wealthier areas.

This Strategy focuses on tactics to expand ZEV infrastructure in low adoption communities and reduce disparities in access.

3.2.2 Impact

Accelerating public charging infrastructure in hard-to-reach communities was modeled throughout this work. Findings showed a projected 3% increase

in ZEVs adopted, or approximately 29,000 vehicles over the baseline scenario, to enable transition to 938,300 ZEVs by 2035. Specific actions that were included in the modeling to achieve this outcome include providing an example local rebate of \$2,500 for ZEVs and accelerating the timeline of 100% public charging infrastructure by 3 years. Additional details on the modeling conducted can be found in Appendix F. Equitably siting ZEV chargers around San Diego will lead to increased access of ZEV infrastructure for residents in rural areas and CoCs, reducing distributional inequities by providing resources in communities currently without.

3.2.3 Key Implementation Tactics/Solutions

The tactics to support equitable and accessible siting of ZEV infrastructure include:

1. Implement ZEV Ambassador Program: Appointing leaders in low-adoption communities to serve as ZEV ambassadors is one way to involve these groups in the planning and siting of chargers. Ambassadors can take feedback from their community groups who may not be able to attend meetings and serve as a conduit to communicate important discussion points.

Ambassadors can also communicate benefits of ZEVs to communities in a way that is culturally and linguistically appropriate and effective, which can build trust between communities and government agencies.

2. **Provide and Promote Rebates and Programs that Foster Equitable ZEV Infrastructure Siting:** Infrastructure investments are not inherently equitable. It is critical to have programs in place to ensure investments are reaching target communities. The easier and less costly it is for target communities to install ZEV infrastructure, the more likely they are to install it and adopt ZEVs. Educating target communities on federal, regional, local, and commercial incentives for ZEV infrastructure is important for equitable siting.
3. **Hosting ZEV Open Houses in CoCs, Tribal, and Rural Communities:** A primary purpose of hosting ZEV Open Houses is to facilitate an inclusive and collaborative communication process to provide education and awareness, including informing the public of ZEV benefits to help increase ZEV adoption. These efforts can include disseminating information on policies, codes, and rebates/incentives that drivers and/or property owners can utilize and encourage them to purchase ZEVs. Open houses can include opportunities to test drive vehicles, interface with interactive displays for ZEV infrastructure, and provide opportunities for communities to meet with local charging station operators and ZEV dealerships to get questions answered.
4. **Utilize Equity Metrics to Guide ZEV Planning:** Equity metrics are a method of measuring and quantifying the impacts and benefits of a system or intervention on different community groups. Example equity metrics include ZEV adoption rates in different communities, charger utilization in different communities, the diversity of voices involved in the planning process, level of engagement from historically marginalized communities, the degree to which community feedback is incorporated into decision making, the makeup of communities that are awarded rebates and incentives, and the availability of incentives for low-income residents.
5. **Conduct Needs-Based Siting Assessment in Low Adoption Communities:** Siting assessments are conducted early in the planning process to analyze general areas to site the installation of ZEV infrastructure. After general areas are identified and further narrowed based on needed capacity, stakeholder engagement sessions (specifically with CoCs, tribal, and rural communities as well as utilities and developers) should be held to gather feedback on desired sites, priorities, needs, and other factors to be considered.

1. Implement ZEV Ambassador Program



Regional Implementation

Regional entities could incorporate a ZEV ambassador program into their existing programming that promote ZEV education, such as ride and drive events. ZEV ambassadors could assist in program facilitation and encouraging community members to attend these events.



Local Implementation

Local jurisdictions can help facilitate a ZEV ambassador program in their communities at-large or in specific neighborhoods/areas, integrate ZEV ambassadors into decision making processes, and provide funding for the program which would include compensating community members and ZEV ambassadors involved. This serves as an opportunity to build trust between communities and government agencies.



Community Implementation

Community members can take on a leadership role by self-nominating to be part of ZEV ambassador programs in their city. They can represent CBOs, NGOs, or other local organizations. Ambassadors can provide feedback to local planners and agencies from their community groups, who may not be able to attend meetings, and serve as a conduit to communicate important discussion points. Ambassadors can also communicate benefits of ZEVs to communities in a way that is culturally and linguistically appropriate and effective.



Industry Implementation

Industry partners can sponsor ZEV ambassador programs. These programs could provide additional business for ZEV dealers and ZEV infrastructure businesses, so these organizations would benefit from contributing to the success of these programs.

2. Provide and Promote Rebates and Programs that Foster Equitable ZEV Infrastructure Siting



Regional and Local Implementation

Providing and promoting rebates for equitable ZEV infrastructure deployment is a collaborative effort at the regional and local level. Regional entities can develop program guidelines and eligibility criteria, allocate funds from regional budget, review and approve applications, and evaluate program effectiveness.

Local entities can adapt the program guidelines to local needs and circumstances, manage program funds and contribute where possible, implement outreach in collaboration with community groups, and support the distribution of funds within the jurisdiction.

Regional and local jurisdictions can ensure their programs allocate funding that will directly benefit rural communities and CoC; for example, regional efforts exist that dedicate a portion of program funds to these groups in CALeVIP and [SDG&E's Power Your Drive initiatives](#)³³. In 2020, as part of Power Your Drive, SDG&E installed more than 3,000 BEV chargers in the region, with over 30% of chargers in CoCs³⁴.



Community Implementation

Community groups, such as nonprofits, are essential to conduct outreach to rural communities, CoCs, and tribal communities.

Involving community partners early on in a planning and/or implementation process can be especially important for groups that often do not feel included in planning processes and where initial utilization may be low due to lower adoption rates and decreased education on the topic. [MAAC's EV Access Program](#) provides regional support throughout San Diego County in applying for incentives and rebates³⁵.

3. Hosting ZEV Open Houses in CoCs, Tribal, and Rural Communities



Local and Community Implementation

Local jurisdictions and communities can collaborate to facilitate ZEV open houses. Local jurisdictions can work with community partners such as CBOs or educational institutions to organize and fund open houses and information sessions about ZEVs in CoCs, tribal communities, and rural communities. Local jurisdictions can even partner with local charging station operators and ZEV dealerships in the area to serve as guest speakers and answer questions from community members.



Local Implementation

Local jurisdictions can develop tailored communication and outreach plans so that all stakeholders are guaranteed to receive the same attention and care through open houses or other community forums. Local jurisdictions can model communication and outreach plans after existing guidelines such as the [Greenlining Institute's](#) frameworks around equitable transportation electrification that provides case studies and resources that help make ZEVs accessible to underserved communities³⁶.

Communication from local jurisdictions should include a requirement for bi-directional communication to provide opportunities for sharing information as well as receiving feedback and input. An example of this would be to host Q&A sessions (virtually or in-person) to answer questions in a way that is informal and respectful of participants' time.

4. Utilize Equity Metrics to Guide ZEV Planning



Regional Implementation

Regional entities can employ metrics to be used across implementation scales to ensure the ZEV infrastructure siting process is equitable and creates a quantifiable way to stay accountable to these goals. Currently, there are many equity metrics regional entities can employ, including [Justice40](#)³⁷ to ensure 40% of benefits from federal and state investment goes towards disadvantaged communities and CalEnviroScreen³⁸ for locating vulnerable communities. In order to achieve Justice40 goals at the state and regional levels, regional entities can track the makeup of communities that are awarded rebates and incentives as well as the current availability of incentives for low-income and CoCs. These metrics can help regional groups in their financial budgeting and planning stages as well as in their program execution stage, ensuring CoCs have ample opportunity to apply to these rebates and are ultimately the recipients of these benefits.



Local and Community Implementation

Local governments can track more localized metrics like ZEV infrastructure utilization in different communities and diversity of voices in the charging siting process. Local entities can ensure metrics are posted publicly and updated frequently. Community groups can track these updates and hold local and regional groups accountable in ensuring ZEV planning is equitable and inclusive. Local jurisdictions can track metrics across varying community groups to measure success in different areas and guide further decision making on where programs need to be initiated to be most successful in achieving goals. In 2019, the City of San Diego partnered with CBOs on the [Climate Equity Index](#) to measure residents' access to opportunities within a census tract against the impact of climate change in these communities³⁹.

5. Conduct Needs-Based Siting Assessment in Low Adoption Communities



Regional, Local, and Community Implementation

Regional and local stakeholders can collaborate with CBOs in identifying low adoption communities that could benefit from needs-based siting. To conduct a needs-based assessment, these groups would work together to gather information on areas with limited access to public transport and alternative modes of transportation as well as barriers to ZEV adoption in that community. Based on the potential deployment locations, a feasibility study can be conducted to understand the feasibility of deploying ZEV infrastructure in these locations and the associated costs.

These findings can be incorporated into the existing [SANDAG PEV Infrastructure mapping tool](#) for jurisdictions to leverage and target areas for future funding opportunities⁴⁰.

3.3 Strategy #3: Increase ZEV awareness and adoption

Work with local and regional stakeholders to provide equitable and accessible education and outreach about ZEVs

Table 15 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 15: Strategy 3 Implementation Tactics

Strategy #3: Increase ZEV awareness and adoption					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Host Regular ZEV Learning Sessions paired with Ride and Drive Events	•	•		•	Near-term
2. Develop a focused ZEV/ZEV infrastructure Resources Task Force	•	•	•		Near-term
3. Expand Existing Regional Tool Capabilities	•				Medium-term
4. Ensure Educational and Outreach Materials are Accessible	•	•	•	•	Near-term

3.3.1 Description

As described in Section 3.4.2, lack of education and awareness around ZEVs and charging and fueling infrastructure are primary barriers to increasing ZEV adoption. In the questionnaire provided, online media sources and word-of-mouth were the most selected options through which people learned about EVs. A study conducted by Ford in 2019 found that despite the name, 42% of Americans believe electric cars still require gasoline to operate and 80% don't believe EVs are operational in extreme hot or cold conditions⁴¹. Educating stakeholders on the lower operating costs of ZEVs compared to gasoline vehicles, the improved air quality and associated health benefits, improved energy security, and availability of incentives/rebates to fund ZEVs and ZEV infrastructure can help communities better understand ZEV technology and mitigate challenges for ZEV adoption. Developing educational materials in conjunction with stakeholder collaboration will be critical in maximizing knowledge sharing across a wide range of target audiences.

3.3.2 Impact

While the impact of increasing ZEV awareness and adoption through equitable and accessible education and outreach was not quantified due to modeling limitations, this Strategy will provide equity benefits that are critical to achieving the region's ZEV adoption targets.

Educating all community members on ZEVs mitigates a large barrier to adoption and can lead to the transition to ZEVs in communities that would not previously have known about the opportunities for adoption available.

3.3.3 Key Implementation Tactics/ Solutions

The tactics to support increasing ZEV awareness and adoption include:

1. Host Regular ZEV Learning Sessions paired with Ride and Drive Events: Informational sessions can be an effective way to disseminate information regarding existing policies and programs, as well as rebates and incentives available for drivers or property owners to take advantage of. Each informational session should have content tailored for the target audience.
2. Develop a focused ZEV/ZEV infrastructure Resources Task Force: Develop a task force that coordinates and disseminates regional ZEV resources to target groups will be an essential piece to streamlining information for users. The A2Z Gap Analysis identified that stakeholders are interested in a regional effort that tailors education for different groups.
3. Expand Existing Regional Tool Capabilities: Identify funding to expand existing tools for consumers and site hosts developed as part of Plug-in San Diego, Electric Vehicle Access Program, CALeVIP, SDG&E Power Your Drive, and other applicable programs. Reinitiating and expanding previous tools, and/or developing new ones, especially those related to customer service, can help make ZEVs more accessible in the region. This strategy will consider the challenge of disaggregated ZEV information while generating and publishing the tools to properly educate and assist consumers.

4. Ensure Educational and Outreach Materials/ Events are Accessible: All outreach meetings and distributed materials should be accessible to everyone, including those with special needs and/or disabilities, non-English speakers, and those without access to Wi-Fi or a computer. Planned events should be coordinated such that they occur at convenient times, (e.g., after working hours), to allow for as many attendees as possible and support equitable participation.

1. Host Regular ZEV Learning Sessions paired with Ride and Drive Events



Regional Implementation

Regional groups can collaborate with local and industry groups to host learning sessions and Ride and Drives. An example is SDG&E’s EV Days and Ride and Drive events which partnered with Toyota to enable users to experience the benefits of driving BEVs and learn about the differences compared to ICE vehicles.



Local Implementation

At the local level, cities can host regular ZEV learning sessions paired with Ride and Drive events in hard to reach communities and/or communities with growing interest by collaborating with CBOs, non-profits, chambers of commerce, and educational institutions. Cities can then coordinate with industry partners to attract investments that are most applicable to the community’s interests and needs. This could include ZEV infrastructure, BEVs, PHEVs, and FCEVs.



Industry Implementation

Industry leaders can support Ride and Drive Events at the regional and local levels, providing different types of ZEVs for the public to test drive. These events can also engage community groups like fleet operators to test out MDHD ZEVs and educational institutions to get students interested in a career in the ZEV industry.

2. Develop a focused ZEV/ZEV infrastructure Resources Task Force



Regional, Local, and Community Implementation

Both regional and local groups can collaborate with community stakeholders to develop a focused ZEV Task Force to coordinate and disseminate regional ZEV resources to target groups. Resources include ZEV benefits, operations and maintenance knowledge, rebates/incentives available, support for applying to rebates/incentives, available regional and statewide tools on trip planning, locations of existing and planned charging stations, and other A2Z Collaboration resources. The Task Force would have a combination of regional and local stakeholders as well as a representative from each target community group with public participation. The Task Force would operate on a local level and engage community members in educational opportunities. The A2Z Gap Analysis identified that stakeholders are interested in a regional effort that tailors education for different groups.

Local government staff, in particular city planners, were identified as a key target for ZEV education to support ZEV program development in the San Diego region and to better incorporate ZEV needs and trends into long range planning processes.

CBOs could also benefit from ZEV information and resources which could lead to increased adoption in specific communities.

Fleet managers could benefit by better understanding ZEV operational considerations and Total Cost of Ownership (TCO) calculations.

3. Expand Existing Regional Tool Capabilities



Regional Implementation

Over the last few years, regional entities have been successful in implementing a variety of regional tools like [County of San Diego’s EV Consumer Guide](#) and [Plug-in SD’s EV Expert](#)⁴². There is opportunity to expand these tool offerings and to collaborate with local and community groups to tailor these tools for residents in local jurisdictions and communities.

Examples include reinstating the Plug-in SD EV Expert and leveraging technology to create a tool that channels jurisdiction-specific resources to drivers to troubleshoot issues, help with trip planning, and recommend local experts in the area that can support.



Industry Implementation

Industry groups can expand existing tools by collaborating with regional and local groups to create an online forum/social media platform for ZEV drivers in the region to share their experiences with each other and build confidence around ZEVs in the community. This would allow groups to collect feedback about what is and is not working for ZEV drivers in specific communities and if there are aspects of the technology could be improved. ZEV manufacturer VinFast recently set up an online forum for VinFast ZEV drivers to communicate about their experience, attend special events, and connect with experts⁴³. A tool like this can be built out into a region-wide offering for ZEV drivers in San Diego County.

4. Ensure Educational and Outreach Materials are Accessible



Regional, Local, Community, and Industry Implementation

For all implementation levels, all outreach meetings and distributed materials should be accessible to everyone, including those with special needs and/or disabilities, non-English speakers, and those without access to Wi-Fi or a computer. Information should be provided in multiple languages on different platforms online and offline with color palettes that can be read by those who are color blind and audible options for those that are visually impaired.

Outreach meetings and closed captioning can be provided for online videos, and ASL interpreters could be engaged for in-person informational sessions. In-person sessions should be scheduled at convenient times after working hours in easily accessible locations with an online option to cater to vulnerable populations that may not be comfortable with in person events. These meetings should be focused in hard to reach communities and have a component that allows for feedback from attendees.

For Ride and Drive Events, adaptive versions of ZEVs should be provided, where ZEVs are adapted with hand controls for members of the public with differing access and functional needs.

Section 508 of the federal Rehabilitation Act of 1973 mandates that federal agencies create and use information and communication technology that is accessible, and non-compliance can result in loss of funding. Communication technology includes software, websites, electronic documents, multimedia content, and call centers.

3.4 Strategy #4: Support workforce development

Support skills training and workforce development programs specialized for the ZEV industry

Table 16 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 16: Strategy 4 Implementation Tactics

Strategy #4: Support workforce development					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Leverage Skills Training Initiatives and Identify Workforce Training Needs	•		•	•	Medium-term
2. Coordinate with Educational Institutions to Develop or Expand ZEV Offerings	•		•		Near-term
3. Identify Funding Opportunities for ZEV Workforce Training	•	•	•	•	Near-term

3.4.1 Description

Investing in workforce training to support the ZEV industry represents an exciting opportunity to grow the local economy and develop a next generation workforce well versed in decarbonization career pathways. In order to achieve net zero emissions in the region by 2045, the San Diego Regional Decarbonization Framework estimated an annual expenditure of \$7.7 billion in clean energy vehicles would be needed between 2021-2030, and as a result the region would be projected to generate over 3,000 direct jobs in ZEVs on average annually through 2030⁴⁴. Taking intentional action to advance skills training and workforce development, particularly in CoCs, will be needed to ensure equitable economic growth and job access.

3.4.2 Impact

While the impact of supporting workforce development was not quantified due to modeling limitations, this Strategy will provide economic benefits, increase awareness and educational offerings, and provide job opportunities contributing to a robust industry that can support the growing demand for ZEVs in the San Diego region. GRID alternatives, a nonprofit supporting renewable energy adoption, provides lessons learned to the ZEV industry, saying that incorporating workforce development into ZEV programs should be a priority to create real economic benefits⁴⁵. Supporting workforce development in the ZEV industry will lead to equitable job growth in necessary fields and support the growth of the ZEV industry as a whole.

3.4.3 Key Implementation Tactics/ Solutions

The tactics to support workforce development include:

- Leverage Skills Training Initiatives and Identify Workforce Training Needs:** Facilitating discussions to work with the existing ZEV workforce to understand current and future needs of the industry will help to understand the emerging ZEV industry and will be critical in developing appropriate future training programs and shape curriculums. Training initiatives should consider different ZEV use cases, including residential, commercial, public, and fleet needs. Training curricula should provide opportunities for skills development in areas such as vehicle mechanics, charging infrastructure design and construction, operations and maintenance of chargers, and conducting site assessments. For example, the [*Electric Vehicle Infrastructure Training Program \(EVITP\)*](#) includes courses on EV battery types, specifications, and charging characteristics; installing, commissioning, and maintaining electric storage devices; first responder safety and fire hazard measures; and electric vehicle supply equipment (EVSE) troubleshooting, repair, and commissioning⁴⁶.
- Coordinate with Educational Institutions to Develop or Expand ZEV Offerings:** As the ZEV industry continues to grow, educational institutions are developing workforce programs aimed at training students in emerging areas related to installing, operating, and maintaining ZEV infrastructure as well as mechanical technicians on servicing ZEVs.

3. **Identify Funding Opportunities for ZEV Workforce Training:** Developing and implementing ZEV workforce training programs will require funding and should be identified early in the planning process. Funding can also be used to offer scholarships and stipends to support student education and workforce training to further equity goals and local economic growth.

1. Leverage Skills Training Initiatives and Identify Workforce Training Needs



Regional Implementation

Regional jurisdictions, such as the County of San Diego through the [San Diego Regional Decarbonization Framework](#) (2022), could promote skills training for the region. Regional organizations can also identify workforce training needs by facilitating discussions with local ZEV workers. The San Diego Regional Decarbonization Framework recommends utilizing EVITP-certified electricians for charging infrastructure work. California AB 841 and the San Diego Metropolitan Transit System require chargers be installed by EVITP-certified electricians.



Community and Industry Implementation

CBOs and workforce organizations can partner to promote specific trainings and workforce development programs for individuals interested in service technician, ZE installation, and ZEV manufacturing career paths. For example, the [EVITA](#) is a national collaboration of industry stakeholders that provides certified electricians with training and certifications for installing BEV infrastructure.

Another example of industry and community collaboration is [Tesla's START program](#)⁴⁷, an intensive training program providing individuals with technical expertise within automotive, collision, and manufacturing sectors. Tesla partners with a number of educational institutions to provide these trainings, with the closest program in Rio Hondo Community College in Los Angeles. Tesla encourages individuals from underrepresented communities and groups to apply to their [Pathway to START program](#). Local EV industry groups can partner with existing programs to promote local program development or implementation or provide satellite opportunities for programming.

2. Coordinate with Educational Institutions to Develop or Expand ZEV Offerings



Regional Implementation

Regional stakeholders, such as utilities, can encourage and support workforce development through partnerships with CBOs and industry organizations to educate their own employees. SDG&E has teamed up with the [San Diego Workforce Partnership](#) to support education opportunities and careers in the construction field and specific future curriculum could be focused on installing and/or maintaining ZEV infrastructure for various land uses and fleet types⁴⁸.



Regional and Community Implementation

Regional organizations can partner with local educational institutions to enable individuals in the region to participate in ZEV courses or training programs for free or at a reduced cost.

Regional groups have the opportunity to make programs available to a wide range of participants at a low cost. SANDAG, among other organizations, is a partner with San Diego College of Continuing Education on the [High Roads Construction Apprenticeship Readiness Program](#), which creates equal access for disadvantaged populations to enter the building and construction trades⁴⁹. Providing pre-apprenticeship programs can help disadvantaged workers access EVITP certifications and succeed in apprenticeship programs.



Local and Community Implementation

Non-profit organizations can partner with educational institutions to create workforce training programs. Similar programs exist within California, such as the EV Workforce Training curriculum. The nonprofit San Joaquin Valley Clean Air Now partnered with community colleges and high schools throughout the San Joaquin Valley to develop the program.



Community and Industry Implementation

CBOs, educational institutions, and workforce organizations can provide educational opportunities to companies or regional entities that desire trainings for their employees.

3. Identify Funding Opportunities for ZEV Workforce Training



Regional, Local, Community, and Industry Implementation

There are a number of funding opportunities available at all implementation levels. All implementation groups are tasked with staying up to date with funding opportunities from federal and state governments as well as industry and community organizations. An example is the NEVI program, which provides federal funding to states for ZEV infrastructure. The State of California, who is awarded the funds and can distribute at their discretion, has engaged with a variety of groups including public and local agencies, industry representatives, advocacy organizations, and more. NEVI funds can go to workforce education and many other federal funding opportunities have placed emphasis on incorporating workforce training opportunities into statewide electrification initiatives as well.

3.5 Strategy #5: Accelerate deployment of publicly accessible ZEV infrastructure

Work with local jurisdictions and public/private property owners to better support local ZEV drivers

Table 17 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 17: Strategy 5 Implementation Tactics

Strategy #5: Accelerate publicly accessible ZEV infrastructure					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Coordinate with Facility Site Hosts to Build More ZEV Infrastructure	•	•	•	•	Near-term
2. Consider Public Access of Private Charging Stations During Non-Operational/Off-Peak Hours	•		•		Near-term
3. Identify, Implement, and Publicize Incentives for Workplace Charging	•	•	•		Near-term
4. Develop Public-Use ZEV infrastructure Pricing Best Practices	•			•	Near-term

3.5.1 Description

Although infrastructure is often installed on a site-by-site basis, this process can introduce inefficiencies. Collaboration among a variety of public and private stakeholders can help achieve more efficient deployment of ZEV infrastructure by allowing more strategic planning and prioritization of deployed infrastructure. Coordination between stakeholders can support mutually beneficial scenarios that support equal access to ZEV infrastructure funding opportunities for all businesses/organizations interested in hosting infrastructure that is publicly accessible.

3.5.2 Impact

Accelerating publicly accessible ZEV infrastructure was modeled to show a projected increase in ZEV adoption by 6%, or approximately 55,000 ZEVs, over the baseline scenario, which reaches 938,000 vehicles by 2035. This assumes publicly accessible ZEV infrastructure will be 100% available to meet demand by 2027.

Additional details on the modeling conducted can be found in Appendix F. Increasing public charging opportunities makes it easier for residents to charge their ZEVs and therefore reduces barriers to ZEV adoption.

3.5.3 Key Implementation Tactics/ Solutions

The tactics to support accelerating publicly accessible ZEV infrastructure include:

1. **Coordinate with Facility Site Hosts to Build More ZEV Infrastructure:** Both public agency and private facility owners each serve their own unique purpose in the regional ZEV infrastructure network. Coordinating with site hosts can provide an opportunity to develop an effective phased implementation plan and identify funding sources to support priority locations. Additionally, coordinating with site hosts could help facility owners identify gaps in the number of chargers available and lead to building more ZEV infrastructure.
2. **Consider Public Access of Private Charging Stations During Non-Operational/Off-Peak Hours:** Many existing private charging stations are installed for that property owner’s tenants and/or customer use. Private chargers located at businesses are often only utilized for a portion of the day (e.g., during operating hours of the business). Making private charging stations available to the public during non-operational hours presents an opportunity to improve the overall utilization of the infrastructure and could introduce innovative financing mechanisms.

3. **Identify, Implement, and Publicize Incentives for Workplace Charging:** Workplace charging plays an important role in the overall regional charging network. Whereas drivers expect rapid charge times along highways, drivers are often parked for longer times at their workplaces and can use Level 2 chargers – which can be less strenuous on the grid. It also enables drivers to make their commutes zero emissions and can also be aligned with workplace corporate sustainability initiatives.

4. **Develop Public-Use ZEV Infrastructure Pricing Best Practices:** When a site host is considering pricing policies to develop their business case for installing ZEV infrastructure, they should consider pricing based on energy consumed, time parked, and/or a combination of both.

Table 17 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

1. Coordinate with Facility ZEV Infrastructure Site Hosts



Regional and Local Implementation

Regional and local groups can coordinate with site hosts to develop an effective phased implementation plan and identify funding sources to support priority locations. One method of coordination includes providing educational outreach to potential future site hosts to inform them of benefits and funding/incentive opportunities as well as provide resources for developing functional business models and pricing schemes. An example of successful collaboration in the region includes SANDAG and the County of San Diego’s effort in designating Alternative Fuel Corridors (AFCs) within the San Diego region, which will lead to BIL/IIJA funded public DC fast chargers through the [State NEVI Plan](#)⁵⁰. The Program will allocate \$384 million to California over five years, with a portion going towards the San Diego region.

Regional and local groups can coordinate with property owners on opening access to existing stations, resulting in more chargers becoming accessible to the public without having to build new stations.

An example would be a workplace with charging for employees during the day and fleet charging or public charging in the evenings.



Industry Implementation

EVSPs can support regional and local groups in installing ZEV infrastructure at priority sites in their jurisdictions.

An example is EVgo partnering with site hosts in the City of San Diego to build out a DC fast charging network for public use. There are currently [25 locations in San Diego](#) located in public spaces like malls, airport parking, and plazas⁵¹.

2. Consider Public Access of Private Charging Stations During Non-Operational/Off-Peak Hours



Regional Implementation

Regional and local groups can provide financial and/or zoning incentives for private property owners to encourage them to add public-use ZEV infrastructure on their property if surrounding land uses support charging. An example is the [California Electric Vehicle Infrastructure Project \(CALeVIP\) 2.0](#) which provides funding for ZEV infrastructure for publicly accessible sites⁵². Specifically, the [San Diego County Incentive Project](#) provides \$21.7 million in funds for purchase and installation of eligible ZEV infrastructure in the county⁵³.



Local Implementation

Local stakeholders can identify and publicize incentives for workplace charging after hours by coordinating with regional groups and being in tune to new funding opportunities that are applicable for their residents.



Community and Industry Implementation

In addition to collaborating with regional and local stakeholders, local businesses with charging stations can model expected utilization of their ZEV infrastructure in order to develop a business case that will support public use of their ZEV infrastructure. Station owners can collaborate with ZEV experts in applying charging station management software to provide real-time data on charger utilization and electricity consumption. The software could produce demand pricing based on user, time of day, and/or length of stay. This gives primary tenants/customers a better rate but allows others to use as well.

Station owners can also set up energy modeling and financial modeling software that would be used to estimate electricity costs and support the estimation of payback period based on utilization levels of the ZEV infrastructure.

3. Identify, Implement, and Publicize Incentives for Workplace Charging



Regional Implementation

Regional groups should consider how they can implement incentives for workplace charging. Existing regional programs that can help incentivize workplace charging include [CALeVIP 2.0](#) for publicly accessible charging and [SDG&E's Power Your Drive for Workplaces](#), where SDG&E plans to install charging infrastructure at about 100 workplaces over two years.



Community Implementation

Workplace property owners can implement incentives for workplace charging publicized by the regional and local levels to support decarbonized commutes. A DOE study from 2015 states that employees with access to BEV infrastructure at work are 6 times more likely to purchase a BEV⁵⁴. Employers can find resources on planning and installing workplace charging through the [DOE's Alternative Fuels Data Center](#)⁵⁵, including sample surveys, planning tools, and policy development considerations.

With partially or fully subsidized parking and opportunity to charge during the day, workplace chargers could be a strategic opportunity to bring hybrid/remote workers back into the office.

4. Develop Public-Use ZEV Infrastructure Pricing Best Practices



Regional Implementation

Regional groups can help support public-use ZEV infrastructure pricing by standardizing costs across jurisdictions to provide consistency and predictability for drivers. These groups can collaborate and create a best practice document that can guide site hosts on how they should be setting prices for drivers.

This should include transparent pricing (including any fees or surcharges that will added in the end), reflect the true cost of providing the infrastructure with a reasonable return on investment, and potential incentives for low-income customers.



Industry Implementation

Industry groups, such as charger operators, can support the development of pricing standardization. They can also work to conform to pricing standardizations and regulations where applicable.

3.6 Strategy #6: Lower policy and financial barriers to ZEV adoption

Encourage and facilitate policies and programs on ZEV adoption at all governmental levels

Table 18 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 18: Strategy 6 Implementation Tactics

Strategy #6: Lower policy and financial adoption barriers to ZEV adoption					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Implement Existing Policy Requirements	•	•			Near-term
2. Alternative Policies or Actions to Incentivize ZEV Adoption	•	•	•	•	Mid-Term
3. Support Continuation of Regional and Utility Rebate Programs	•				Near-term

3.6.1 Description

ZEV adoption and ZEV infrastructure deployment has been growing rapidly over the past few years as more policies, programs, and funding are introduced to facilitate ZE adoption and lower adoption barriers. This is occurring at all levels of government: at the federal level through BIL/IIJA and IRA providing direction and incentives for ZEVs and infrastructure deployment; at the state level through executive directives of eliminating gas-powered vehicle sales and establishing ZEV and charging infrastructure goals; and at the local San Diego level in expanding localized programs to subsidize vehicle and infrastructure costs. The San Diego region has been a leader in planning for ZEVs with numerous planning documents and goals established across various sectors. This Strategy includes policy recommendations to deploy the fueling infrastructure needed to meet A2Z Gap Analysis targets.

3.6.2 Impact

Implementing policies targeted to meet forecasted ZEV fueling needs projected a 3% increase in ZEV adoption, or approximately 29,000 ZEVs, over the baseline scenario, which reaches 938,000 vehicles by 2035. Specific actions contributing to the ZEV increase include offering financial ZEV rebates (an example of a \$2,500 rebate is used to model potential impacts) and incentivizing ICE retirement (an example of a \$4,000 incentive is used to model potential impacts). Additional details on the modeling conducted can be found in Appendix F. Incentivizing ZEV adoption through policy or rebates can reduce barriers to ZEV adoption for residents by increasing governmental support of ZEV adoption.

3.6.3 Key Implementation Tactics/ Solutions

The tactics to support lowering policy and financial barriers to ZEV adoption include:

1. **Implement Existing Policy Requirements:** [AB1236](#) requires all jurisdictions implement streamlined permitting processes⁵⁶. There remain a few local governments that have yet to implement this process at the time of writing this Report.
2. **Alternative Policies or Actions to Incentivize ZEV Adoption:** Local governments can consider implementation of policies or actions that will accelerate ZEV fueling infrastructure beyond AB 1236 requirements.
3. **Support Continuation of Regional and Utility Rebate Programs:** Rebate programs are a helpful way to provide support for initiatives by alleviating financial burden. Rebates can vary annually based on availability of funding, regulations, and demand. Jurisdictions, regional agencies, and utility companies can support applications for funding to restart previous programs and create new ones.

1. Implement Existing Policy Requirements



Regional and Local Implementation

Regional organizations can partner with local jurisdictions to provide staffing and additional resources to ensure remaining jurisdictions implement AB 1236 requirements⁵⁷. For example, the County of San Diego is compliant with this and can be utilized as an example statewide. Local entities should reach out to regional entities for support to fulfill these requirements.

Regional and local agencies could establish a coordinated permitting effort, which would support a streamlined process without long waits or barriers when multiple agencies are involved.

2. Alternative Policies or Actions to Incentivize ZEV Adoption



Regional and Local Implementation

Regional and local entities can set ZEV infrastructure targets for their jurisdictions in alignment with the ZEV targets that are defined at the state and federal levels. These entities can also collaborate to expand funding opportunities for ZEV adoption at community and industry levels. Lastly, education is a major barrier to ZEV adoption. Alternative actions to incentivize ZEV adoption can include educational outreach tactics described in Strategy #3.



Community Implementation

Community groups like educational institutions and CBOs can write letters of support to state and federal agencies to expand and/or create ZEV programs.



Local and Industry Implementation

Government, utilities, and ZEV service providers can create partnerships across different levels to leverage local efforts into shovel-ready projects available for funding.

Private companies that offer rental cars or car purchasing services to employees can offer financial incentives to support employees in purchasing ZEVs.

3. Support Continuation of Regional and Utility Rebate Programs



Regional Implementation

Jurisdictions, regional agencies, and utilities can support applications for funding to restart previous programs and create new ones. For example, SDG&E received approval on a [Pre-Owned EV Rebate program](#), which will provide low-income qualified customers with a \$4,000 rebate and non-low income qualified customers with a \$1,000 rebate on the purchase or lease of a pre-owned EV⁵⁸. Additionally, Residential EV drivers who enroll in [SDG&E's EV-TOU 5](#) plan can charge EVs overnight for as little as \$0.09/kWh, with a \$16 monthly service fee⁵⁹. SDG&E could consider additional financing mechanisms such as low interest loans or leasing options for EVs and charging stations.

3.7 Strategy #7: Deploy ZEV Infrastructure for Multi-Unit Dwellings and Higher Density Residential and/or Commercial Areas

Update building codes and streamline ZEV infrastructure permitting process

Table 19 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 19: Strategy 7 Implementation Tactics

Strategy #7: Deploy ZEV infrastructure for multi-unit dwellings (MUDs) and higher density residential and/or commercial areas					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Incorporate ZEV infrastructure siting principles in public works guidelines		•			Near-term
2. Identify permitting processes that may inhibit efficiencies of ZEV infrastructure deployment		•			Near-term
3. Support coordination among jurisdictions and stakeholders	•	•	•	•	Near-term
4. Support adopting reach codes that encourage ZEV infrastructure in new private MUDs	•	•			Medium-term
5. Support adopting reach codes that encourage retrofitting ZEV infrastructure in existing private MUDs	•	•			Medium-term

3.7.1 Description

Installation of chargers in high density residential/MUDs has proven to be more complex than other forms of residential charging. For example, while a renter in a MUD may want to charge their vehicle, they will need permission from the owner of the unit and/or other entities, such as a homeowner’s association before doing so. Other challenges include assessing how charging within a MUD impacts a single user versus dividing costs among the entire building. These challenges can reduce the amount of charging installed in such homes and subsequently can have negative impacts on equitable access to fueling, particularly because CoCs comprise a disproportionately larger segment of the renting population and often reside in multi-family housing. Reaching emissions reductions goals will require engaging high-density buildings (e.g., MUDs, hotels, motels), particularly in urban areas, where a significant number of residents reside and/or stay. Including fueling opportunities at hotels/motels will continue to alleviate consumer range anxiety around ZEVs, particularly around long-distance travel.

Updating building codes and streamlining permitting processes to minimize barriers to installation can help encourage developers in higher density land uses to install ZEV infrastructure and ensure that accessible charging reaches a larger number of community members.

3.7.2 Impact

While the impact of updating building codes and the permitting process was not quantified due to modeling limitations, this Strategy will provide equity benefits to ensure more residents have access to ZEV infrastructure. Increasing ZEV infrastructure at multi-family housing through influencing ZEV infrastructure regulations, streamlining permitting processes, and supporting coordination among stakeholders will lead to increased ZEV accessibility for CoCs.

3.7.3 Key Implementation Tactics/ Solutions

The tactics to support deploying ZEV infrastructure in high density areas include:

1. **Incorporate ZEV infrastructure Siting Principles in Public Works Guidelines:** To simplify and streamline ZEV infrastructure siting and installation, local public works guidelines can be updated to include siting principles, which can guide agencies and building owners/ developers in designing, locating, constructing, maintaining, and operating buildings in a sustainable manner with the inclusion of ZEV infrastructure.

2. **Identify Permitting Processes that may Inhibit Efficiencies of ZEV infrastructure Deployment:** Existing permitting processes related to installing ZEV infrastructure should be reviewed to identify inefficiencies for improvement, such as long lead times for approval and/or overburdensome requirements. Streamlining the permitting process can help save time, money, and frustration for all stakeholders.
3. **Support Coordination Among Jurisdictions and Stakeholders:** To support coordination across agencies and regional jurisdictions in efforts to encourage and streamline the permitting process, the A2Z Collaboration can host regular workshops with jurisdictional public works departments, planning departments, and/or building developers to identify issues with installing ZEV infrastructure and identify ways to mitigate against them.
4. **Support Adopting Reach Codes that Encourage ZEV infrastructure in New Private MUDs:** CalGreen Code now requires new construction of MUDs to include ZEV infrastructure. Local reach codes can be adopted to require ZEV infrastructure or pre-wiring for ZEV infrastructure to be included in new MUD construction, making future installation of fueling infrastructure easier and less costly. Local governments across the state have shown support of the CALGreen EV infrastructure building code requirements, with 20 jurisdictions exceeding the minimum code requirements in their local code adoptions⁶⁰.

5. **Support Adopting Reach Codes that Encourage Retrofitting ZEV infrastructure in Existing Private MUDs:** MUD developments have the opportunity to serve multiple ZEV drivers, but many existing buildings do not have ZEV infrastructure. Local reach codes can be adopted to go beyond CALGreen requirements and require any MUD requesting approval for a retrofit project to include ZEV infrastructure.

New CALGreen Codes for MUDs

Reach codes are build codes adopted by a local jurisdiction that go above and beyond the established state codes. They come in two forms: prescriptive and performance. Prescriptive codes require new or retrofitted buildings to include specific features (i.e., requiring solar panels on new residential construction projects), while performance codes require the building to perform as a certain level (i.e., exceed a minimum energy performance by an established percentage). California Green Building Standards Code (CALGreen) are the California building codes that set minimum requirements for sustainable practices at residential and commercial construction projects; they were originally adopted in 2009 and updated every three years. Beginning in 2023, CALGreen building code will require EV charging infrastructure for new multifamily residential developments as well as hotels and motels. The Code breaks down the requirements for multifamily dwelling into 2 categories based on EV Capable requirements (fully wired and ready for use 208/240 volt, 40 amp circuit) and EV Ready requirements (electrical panel space, conduit, and termination box available for a future 120 volt, 40 amp circuit). The Code states that 10% of total parking spaces should be capable of supporting Level 2 EVSE and 25% of total parking spaces should be ready and equipped with charging stations to support Level 2 EVSE. Non-residential EV charging requirements includes a category for EV Capable Spaces with Table 20 defining number of spaces required based on size of parking lot⁸⁹.

Table 20: Number of Spaces Required Based on Parking Lot Size (CalGreen)

Total Number of Actual Parking Spaces	Number of Required EV Capable Spaces	Number of EVCS (EV capable spaces provided with EVSE)
0-9	0	0
10-25	4	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201+	20% of total	25% of EV capable spaces

Note: Electric Vehicle (EV), Electric Vehicle Charging Station (EVCS) Electric Vehicle Supply Equipment (EVSE). The number of required EVCS in column 3 count toward the total number of required EV capable spaces in column 2.

1. Incorporate ZEV infrastructure siting principles in public works guidelines



Local Implementation

To simplify and streamline ZEV infrastructure siting and installation, local jurisdictions can update their public works guidelines to include siting principles that can guide agencies and building owners/developers to include ZEV infrastructure in the design and construction of buildings.

This is especially important in high density areas with MUDs and commercial areas so the infrastructure can efficiently serve as many ZEV drivers as possible.

2. Identify permitting processes that may inhibit efficiencies of ZEV infrastructure deployment



Local Implementation

Local jurisdictions and planning agencies can review permitting processes against the timelines of relevant funding sources and other jurisdiction processes to capture inefficiencies such as long lead times for approval and/or overburdensome requirements. These inefficiencies can be presented as a case for developing a more streamlined process.

3. Support coordination among jurisdictions and stakeholders



Regional Implementation

In partnership with SANDAG and the Center for Sustainable Energy (CSE) Plug-in San Diego was launched in 2015 to address permitting, installation, and PEV awareness barriers identified in the PEV Readiness Plan and promote best practices.

These best practices include standardization of EV charging station building codes and installation requirements, training for electrical contractors, EV charging stations installation guides and checklists, and EV charging station encouragement programs⁶¹.



Local Implementation

Local jurisdictions and developers can collaborate to expand on this effort and release an updated checklist and best practice guidance for installers.



Regional, Local, Community, and Industry Implementation

The A2Z Collaboration can host regular workshops with jurisdictional public works departments, planning departments, and/or building developers to identify issues with installing ZEV infrastructure and identify ways to mitigate against them. This collaborative effort will help address issues across the region in providing ZEV infrastructure while developing information to help jurisdictions be successful with the changes they want to make. The A2Z Collaboration can host workshops with jurisdictional departments to encourage coordination and collaboration. Educational materials can also be developed to be used in outreach to MUD property owners.

4. Support adopting reach codes that encourage ZEV infrastructure in new private MUDs



Regional Implementation

Regional entities can provide technical assistance to local jurisdictions to adopt CALGreen Code updates from CA Building Standards Commission every 3 years to advance ZEV infrastructure installation in new residential and commercial construction.



Local Implementation

Local jurisdictions can adopt local reach codes that go beyond CALGreen requirements for ZEV infrastructure (or the pre-wiring required for future installations) in new MUD construction. Reach codes can come from local jurisdictions adopting CALGreen Tier 1 or Tier 2 requirements of ZEV infrastructure capability at new multifamily developments or townhomes.

5. Support adopting reach codes that encourage retrofitting ZEV infrastructure in existing private MUDs



Regional Implementation

Regional agencies can advise on specific updates that the CA Building Standards Commission can integrate in their updates to the CALGreen Code every three years. An example is advancing ZEV infrastructure installations for retrofits.



Local Implementation

Local jurisdictions can adopt local reach codes that go beyond CALGreen requirements for ZEV infrastructure to be included as a condition of approval of any MUD retrofit project, where the building requires a change in systems or structure from its initial construction. Local jurisdictions will need to roll out these reach codes in a way that ensures residents in CoCs or tribal communities will not have to pay additional costs for ZEV infrastructure installations. There are incentive programs and resources available for MUD property owners or managers that local jurisdictions can inform managers of to help them conform to local reach codes.

3.8 Strategy #8. Ensure sufficient local grid capacity for projected ZEV demand

Deploy grid enhancements and utility program design

Table 21 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 21: Strategy 8 Implementation Tactics

Strategy #8: Ensure sufficient local grid capacity for projected ZEV demand					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Continue Supporting and Encouraging Participation in TOU Programs	•				Ongoing
2. Deploy Renewable Energy to Address Grid Constraints	•	•	•	•	Ongoing
3. Deploy Energy Storage Devices to Address Grid Constraints	•	•	•	•	Ongoing
4. Encourage Implementation of EV Submeters to Enhance Energy Management	•	•	•		Near-term
5. Implement a ZEV Charging Demand Response Program	•		•		Medium-term

3.8.1 Description

With the increase in ZEV adoption, particularly BEVs, more vehicles will rely on the grid as a source of fuel, subsequently increasing grid loads. If not properly planned for, this additional load can strain the grid and result in grid challenges and decreased reliability and resilience.

Grid upgrades to increase capacity can be costly for physical infrastructure with long timelines.

Therefore, incentives to shift charging behavior and patterns from high-demand times to off-peak times through utility programs can be a simpler and cost-effective way to serve the growing number of ZEVs and supplement ongoing grid enhancements.

Examples of such programs include rate design, demand charges, and incentivized energy storage installation to redistribute demand.

One form of grid management is the use of innovative rate design, such as time-of-use (TOU) rates, to encourage spreading out charging. TOU rates are used to financially incentivize users to charge during off-peak times when demand is lower and/or cleaner, renewable energy sources are more available. The simplest example is encouraging charging with cheaper energy rates overnight when demand is lowest compared to peak energy hours when demand is highest (e.g., between 4:00 p.m. and 9:00 p.m.).

TOU rates can also account for the availability of renewable energy (e.g., during the day, renewable energy can be used to meet some of the observed demand).

Demand charges are additional fees charged to customers (typically on electric bills of commercial and industrial customers) based on the highest amount of power drawn during a billing period to account for the additional costs required by the utility company to provide that energy.

Demand charges can be minimized or eliminated by enrolling in an eligible subscription-based pricing plan or utilizing smart charging that actively monitors charging sessions and total maximum power being drawn to not exceed thresholds that would result in a demand charge.

3.8.2 Impact

Ensuring sufficient grid capacity for electrification was projected to result in a 5% increase, or approximately 46,000 ZEVs adopted over the baseline scenario, which reaches 938,000 vehicles by 2035. Specific actions contributing to the ZEV increase include providing a new Level 2 and DCFC rate design and a new ZEV demand response program. Additional details on the modeling conducted in this work can be found in Appendix F.

Shifting ZEV charging behavior to off-peak times through TOU programs and demand response programs will ensure sufficient grid capacity for existing electricity demand and increased demand from additional ZEV adoption.

3.8.3 Key Implementation Tactics/ Solutions

The tactics to support ensuring sufficient grid capacity for ZEV demand include:

1. **Continue Supporting and Encouraging Participation in TOU Programs:** Supporting and encouraging enrollment in EV TOU pricing plans can support balancing grid loads by financially incentivizing users to shift ZEV charging patterns to when demand is lowest.
2. **Promote the Installation of Renewable Energy to Address Grid Constraints:** Adding renewable energy sources to the grid, such as solar PV and wind power, can increase the security and resilience of the grid in times of supply disruptions and peak usage.
3. **Promote the Installation of Energy Storage Devices to Address Grid Constraints:** Installing energy storage can alleviate constraint issues by redistributing energy and creating grid flexibility. If, for example, excess solar is produced during the middle of the day but is not needed at that moment, energy storage devices can store this energy and add it back to the grid at the time of peak demand.
4. **Encourage Implementation of EV Submeters to Enhance Energy Management:** An EV submeter is attached to a vehicle's charging cable to report only the energy that goes towards charging EVs. Encouraging users of residential, commercial, and industrial land uses to utilize submeters will help to better understand charging demand by knowing the exact amount of energy per land use that is dedicated to EVs, reducing one of the significant barriers to installing chargers in MUDs.
5. **Implement a ZEV Charging Demand Response Program:** Demand Response programs provide financial incentives to customers to shift or reduce energy use during high demand times. Implementing a Demand Response program allows users to save money while supporting a reliable grid and avoiding potential outages.

1. Continue Supporting and Encouraging Participation in TOU Programs



Regional Implementation

Supporting and encouraging enrollment in EV TOU pricing plans can help balance the loads on the grid by financially incentivizing users to shift ZEV charging patterns to times when demand is low. Local utilities play a large role in this tactic: SDG&E and local [Community Choice Aggregators \(CCAs\)](#) already offer EV TOU pricing plans for consumers to save on electric bills by making small changes to how and when they use energy, and making use of cleaner, renewable energy sources when they are more available⁶². SDG&E offers [three residential TOU plans](#) for EV drivers (EV-TOU, EV-TOU-2, and EV-TOU-5) and an Electric Vehicle High-Power (EV-HP) rate for separately metered commercial EV charging.

2. Promote the Installation of Renewable Energy to Address Grid Constraints



Regional Implementation

Utilities can increase their renewable energy portfolio and add additional renewable energy to the grid. At present, about 40% of the electricity that SDG&E provides to the grid is from a renewable source. SDG&E will continue to move towards generating electricity by 100% renewable resources, with [SB100](#) requiring all retail electricity to be from 100% zero-carbon energy by 2045.



Local Implementation

Local jurisdictions can provide financial incentives to residents who want to add renewable energy to the grid. Cities can provide rebates for the equipment or tax breaks for equipment purchase, installation, and grid hook-up.



Community Implementation

CBOs and other community groups can create a community solar project for residents, building owners, nonprofits, and other investors. Community groups can be responsible for facilitating communication between these various stakeholders and ensuring the success of the community solar project with the investment from community members.



Community Implementation

CBO's and other community groups can create a community energy storage project for residents, building owners, nonprofits, and other investors. Community groups can be responsible for facilitating communication between these various stakeholders and ensuring the success of the community energy storage project with the investment from community members.



Industry Implementation

Industry partners can ensure all technicians are continuously educated on renewable energy installation and grid connection.

Workforce organizations and advocacy groups can promote certifications in solar PV installation and additional courses that would benefit renewable energy grid connection.



Industry Implementation

Industry partners should ensure all technicians are continuously educated on energy storage installation and grid connection. Workforce organizations and advocacy groups can promote certifications in various energy storage device installation and maintenance as well as additional courses that would benefit renewable energy grid connection.

3. Promote the Installation of Energy Storage Devices to Address Grid Constraints



Regional Implementation

Utilities can add energy storage devices to the grid and encourage customers to add storage devices of their own. SDG&E employs various energy storage devices, including vanadium redox flow batteries, and will allow customers to earn generation credits by adding energy exported to the grid from storage devices⁶³.



4. Encourage Implementation of EV Submeters to Enhance Energy Management

Regional Implementation

Utilities can offer demand response options such as SDG&E's Demand Response programs for both home and businesses⁶⁴. One program is the Smart Thermostat Program that rewards residents with up to \$70 and businesses up to \$50 for purchasing an approved thermostat and signing up for the program. Other programs include the AC Saver Program to save on energy bills during the summer and a Power Saver Rewards program where residents can earn credits if they reduce energy on days where there is high demand.



Local Implementation

Local jurisdictions can provide financial incentives to residents who want to add energy storage to the grid. Cities can provide rebates for the equipment or tax breaks for equipment purchase, installation, and grid hook-up.



Local Implementation

Local entities can support this effort by requiring permits for submeters in their jurisdiction.



Community Implementation

Community members can implement EV submeters to enhance energy management on any occasion. Building owners can encourage their tenants to utilize submeters to better understand charging demand by knowing the exact amount of energy per land use that is dedicated to EVs. Submetering upfront costs are covered by the homeowner but are significantly cheaper than requiring a separate utility meter.

Some consideration may be needed to provide financial opportunities and support to cover submetering costs for CoCs as they enroll in such programs.

5. Implement a ZEV Charging Demand Response Program



Regional Implementation

Regional entities can encourage utilities to implement EV submeters as part of CPUC's proceeding in 2022. SDG&E is in the process of implementing the plug-in EV submetering protocol which will allow EV drivers to enroll in EV-specific rates (that can be much lower during off-peak times than typical home and business rates) and avoid costs associated with the installation of an additional meter⁶⁵.

3.9 Strategy #9: Encourage and support fleet transition to zero emissions

This includes transit, goods movement, municipal fleets, private fleets, and micro-mobility

Table 22 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 22: Strategy 9 Implementation Tactics

Strategy #9: Encourage and support fleet transition to zero emissions					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Develop Comprehensive Fleet Transition Plan	•	•	•	•	Near-term
2. Evaluate ZEV infrastructure for Specific Vehicle Classes	•	•	•	•	Near-term
3. Support Fleet Providers through Educational Materials and/or Workshops	•	•		•	Near-term
4. Identify and Pursue Fleet Transition Funding	•	•			Ongoing
5. Promote ZE Flexible Fleets	•	•	•	•	Long-term
6. Implement Last-mile ZE Delivery Zones		•			Medium-term



Community Implementation

CBOs and building owners can promote demand response programs to their community members. These can apply as an individual consumer or as a business. Businesses can join the Base Interruptible Program that could save up to \$7,500 annually if energy use is reduced on designated high demand days⁶⁶. Residents and business owners have the option to participate in Demand Response programs offered by third party providers as well.

3.9.1 Description

To facilitate fleet transitions, fleet operators must understand the requirements and benefits of transitioning their fleet. Supporting fleet managers as they design and implement their transition plans is important to ensure benefits are captured within the San Diego region. Fleet transitions also present an opportunity to greatly expand the number of ZEVs on the road without relying on individual consumers to purchase a personal ZEV.

At the federal level, many expanded and new funding programs have been established as part of the BIL/IIJA as described in Appendix G. Similarly, President Biden’s EO 14057 established a plan to have all federal fleet acquisitions be 100% ZEV by 2035 and 100% of light-duty acquisitions by 2027.

At the state level, California has a target of five million ZEVs by 2030 and by 2035, 100% of new cars and light trucks sold in California are required to be ZEVs.

3.9.2 Impact

Encouraging fleets to transition to zero emission was modeled and found to have a 2% increase, or approximately 18,000 ZEVs adopted, over the baseline scenario, which reaches 938,000 vehicles by 2035. Specific actions contributing to the ZEV increase include providing 100% public infrastructure availability in 2027 rather than 2030. Additional details on the modeling conducted can be found in Appendix F. Utilizing ZEV fleets, whether it be for municipal fleets, emergency vehicles, or delivery vehicles, can account for large scale vehicle transitions at a time, resulting in an efficient transition to ZEVs for the region.

3.9.3 Key Implementation Tactics/ Solutions

The tactics to support full fleet transition to ZEVs include:

- 1. Develop Comprehensive Fleet Transition Plan:** As a first step in developing a comprehensive fleet transition plan, local planning agencies and fleet operators should identify key fleets for electrification. Target fleets should be identified based on size, feasibility, and characteristics of existing fleets that can be transitioned in the near term. This will help realize benefits from transitioning more immediately as well as aid in long-term transition plans.
- 2. Evaluate ZEV Infrastructure for Specific Vehicle Classes:** Although BEVs are currently the most common ZEVs, FCEVs are an emerging technology with each vehicle type featuring advantages and disadvantages. FCEVs should be considered in fleet transition plans to determine if specific vehicles or classes of vehicles would be best as FCEVs. Evaluating ZEV infrastructure involves weighing operational benefits of specific vehicles with available and accessible infrastructure.
- 3. Support Fleet Providers through Educational Materials and/or Workshops:** Educational materials should be developed and distributed to fleet providers to educate them on the benefits of transitioning to ZEVs. Workshops can be held to share information and gather input on barriers and how they can be alleviated.
- 4. Identify and Pursue Fleet Transition Funding:** Fleet funding opportunities across all levels of government should be continuously monitored and pursued to capitalize on funding opportunities as soon as they are available.
- 5. Promote ZE Flexible Fleets:** Promote ZE forms of flexible fleets (micromobility and/or microtransit) to address gaps in mobility access to further advance regional equity. Chargers can be installed strategically at transit hubs and other locations that can fulfill the charging needs of these flexible fleets.
- 6. Implement Last-mile ZE Delivery Zones:** Creating a last-mile ZE delivery zone requires any delivery within a designated area to be on a ZEV – including BEVs and FCEVs, as well as bikes, e-scooters, and electric autonomous delivery robots. In practice in the U.S., the designated area has been about one square mile.

1. Develop Comprehensive Fleet Transition Plan



Local and Community Implementation

Local planning agencies and fleet operators should identify key fleets for electrification as a first step in developing a comprehensive fleet transition plan. Target fleets should be identified based on size, feasibility, and characteristics of existing fleets that can be transitioned in the near term.

These should be identified in collaboration with community groups and their priority needs. Transition plans should consider fleet vehicles' operating cycles to determine infrastructure needs and/or if another ZEV technology (e.g., hydrogen) would better serve operating needs.



Industry Implementation

Industry groups such as EVSPs and advocacy groups can also weigh in on fleet transition plans to determine if FCEVs could make sense. Fuel cell electric vehicles should be considered in fleet transition plans to determine if specific vehicles or classes of vehicles would be best as FCEV vehicles.



Regional, Local, Community, and Industry Implementation

Comprehensive fleet transition plans should account for availability of required vehicles, charging capacity on-site, skills training, right-sizing the fleet, and even considerations like whether there is a nearby dealership for specific vehicles that could handle operations and maintenance needs as they arise. Key fleets for electrification can include Transportation Network Companies (TNCs), emergency service providers, last mile delivery providers, school buses, public buses, and trucks as they travel along predetermined, consistent routes, usually in short distances, and can offer a number of health benefits to communities in which they operate as well as vulnerable populations (children, elderly, people with Asthma, etc.).

2. Evaluate ZEV Infrastructure for Specific Vehicle Classes



Regional Implementation

Regional entities can perform analyses on available ZEV infrastructure in the area.

This includes evaluating possibilities for both electric and hydrogen fueled fleets based on local hydrogen availability, existing infrastructure, and available land space to create new infrastructure.



Local and Community Implementation

Local planning agencies and fleet operators should evaluate available ZEV infrastructure for all vehicle classes transitioning. In addition to identifying key fleets for electrification, local planning agencies and fleet operators should identify fleets that could feasibly transition based on available infrastructure and capacity to install any additional infrastructure. They should also look at fleets that could transition to FCEV based on available hydrogen infrastructure in the area.



Industry Implementation

Industry groups such as EVSPs and advocacy groups can weigh in on fleet transition plans that would make sense for specific vehicle classes. Fuel cell electric vehicles should be considered in fleet transition plans to determine if specific vehicles or classes of vehicles would be best as FCEV vehicles.

3. Support Fleet Providers through Educational Materials and/or Workshops



Regional Implementation

Regional entities can support fleet electrification by providing resources, training materials, and workshops to help fleet providers assess their options. [SDG&E's Power Your Drive for Fleets](#) is a comprehensive program to support fleet

electrification by connecting fleets with resources, providing fleet-friendly charging rates, and financial incentives to design and install necessary charging infrastructure to power MDHD electric fleets⁶⁷.



Industry Implementation

Industry groups can educate local agencies on their experience in transitioning fleets and provide more technical details on challenges faced.

Industry groups can partner with regional jurisdictions to provide training material or educational sessions on how to transition fleets.

4. Identify and Pursue Fleet Transition Funding



Regional Implementation

Fleet funding opportunities across all levels of government should be continuously monitored and pursued to capitalize on opportunities as soon as they are available.

[The County of San Diego's EV Roadmap](#) identifies development of County fleet plan and outlines potential funding needs including recommendations for individual departments to request and fund EVs for departmental use.

5. Promote ZE Flexible Fleets



Regional, Local, Community, and Industry Implementation

All levels can promote ZE forms of flexible fleets (micromobility and/or microtransit) to address gaps in mobility access to further advance regional equity. Chargers can be installed strategically at transit hubs and other locations that can fulfill the charging needs of these flexible fleets. Using microtransit as a first-last mile approach in CoCs can promote public transportation while still enabling ZE connections to transit stops.

This will involve collaboration with communities and local jurisdictions to ensure high priority locations are selected for flexible fleet deployment. Industry groups should collaborate with communities

to understand the types of micromobility and microtransit are most successful to meet needs. Regional groups can provide planning frameworks, funding opportunities, and best practices for local jurisdictions to adopt.

A regional example is the San Diego Regional Decarbonization Framework (2022) which recommends investing in TNC partnerships like Uber or Lyft in rural and underserved transit areas to ensure sufficient access to opportunities. A local example is the San Diego Metropolitan Transit System (MTS) which has started using ZE buses on routes that service CoCs as part of the [ZEB Pilot Program](#)⁶⁸.

6. Implement Last-mile ZE Delivery Zones



Local Implementation

While much of goods movement is focused on longer haul movement on trucks, local jurisdictions can help curb emissions through local policies that limit deliveries to a specific area.

Creating a last-mile ZE delivery zone requires any delivery within a designated area to be on a ZEV – including Evs and FCEVs, as well as bikes, e-scooters, and electric autonomous delivery robots.

An example is the City of Santa Monica operating a [ZE Delivery Zone](#) of one square mile pilot project that has shown initial success in reducing emissions by removing delivery vehicles out of the selected area as well as reducing traffic from these types of vehicles⁶⁹.

3.10 Strategy #10: Support innovative ZEV pilot projects

Transition cars, trucks, and buses to ZEV through regional collaboration

Table 23 summarizes the relevant implementation tactics and solutions in terms of how they can address the aforementioned challenges.

Table 23: Strategy 10 Implementation Tactics

Strategy #10: Support innovative ZEV pilot projects					
Tactic	Implementation Scale				Implementation Timeline
	Regional	Local	Community	Industry	
1. Conduct Annual Evaluation of ZEV Industry Trends to Identify Best Practices	•	•			Ongoing
2. Identify Key Partnerships to Support Innovative Pilots	•	•		•	Near-term
3. Identify and Leverage Emerging Funding Sources to Support Innovative Implementation Efforts	•	•	•		Near-term
4. Collaborate on Development of Clean Hydrogen Hubs to Secure Fuel Supply	•	•	•	•	Long-term

3.10.1 Description

ZEV technology is rapidly evolving and the ZEV industry should be continuously monitored to understand current and future trends related to vehicles, fueling technology, smart demand management, and utility operations to meet changes in demand. This can help futureproof planning efforts and ensure that initiatives account for trends and anticipated changes. Pilots have long represented an effective way to introduce innovation at a smaller scale for further evaluation. Doing so can help inform decisions on how to effectively scale up pilots, including where to target infrastructure upgrades and add demand as pilots become scaled to larger efforts.

3.10.2 Impact

Supporting innovative pilots was modeled and projected to have a 1% increase, or approximately 11,000 ZEVs, over the baseline scenario which reaches 938,000 vehicles by 2035. Specific actions contributing to the ZEV increase include offering financial ZEV rebates (an example of a \$2,500 rebate is used to model potential impacts) and incentivizing ICE retirement (an example of a \$4,000 incentive is used to model potential impacts). Additional details on the modeling conducted can be found in Appendix F.

Identifying pilot opportunities and leveraging funding and partnerships to generate more pilot programs can lead to more thorough planning efforts yielding successful ZEV transition programs.

3.10.3 Key Implementation Tactics/ Solutions

The tactics to support innovative ZEV pilot projects include:

1. **Conduct Annual Evaluation of ZEV Industry Trends to Identify Technologies, Best Practices, and Potential Pilots:** ZEV technology advancements often provide further incentives for electrification through enhanced resilience, improved user experience, lower upfront costs, or revenue generation. Therefore, it is vital to stay on top of changes and innovations in the industry.
2. **Identify Key Partnerships to Support Innovative Pilots:** Identifying partners is fundamental to advancing collaborative approaches for the region as well as testing out new technologies and providing direct benefits to communities.
3. **Identify and Leverage Emerging Funding Sources to Support Innovative Implementation Efforts:** Identifying funding sources for innovative pilots early on is integral to determining interested partners, coordinate roles, and secure monies. Such sources often have a limited number of awards.

4. **Collaborate on Development of Clean Hydrogen Hubs to Secure Fuel Supply:** To facilitate adoption of MDHD ZEVs throughout the region, deploying hydrogen fueling stations along freight routes will be key. Additionally, the region will need to identify a source of hydrogen for these stations.

1. Conduct Annual Evaluation of ZEV Industry Trends to Identify Best Practices



Regional and Local Implementation

Regional and local planning agencies can conduct annual evaluations and summary reports of ZEV trends, with particular attention to regional relevance and feasibility. The evaluation can include case studies from other initiatives throughout the state.

The resulting evaluation can be integrated into regional planning efforts for ZEV infrastructure implementation. Efforts like this can be led by a committee or task force developed within the A2Z Collaboration.

2. Identify Key Partnerships to Support Innovative Pilots



Regional, Local, and Industry Implementation

Regional and local entities can engage in partnerships to support pilots; partners can include public or private organizations including regional or city agencies, startups, utilities, industry, community organizations, and/or research institutions. Examples of innovative pilots that stakeholders can collaborate on include renewable energy (i.e., solar and wind) to increase regional energy generation, vehicle-to-grid (V2G) technology to help with load management, microgrid implementation to improve resiliency, and mitigating the increased grid demand of more ZEVs to reduce the need for costly infrastructure upgrades. Other innovative technologies that can be considered (but may not be able to be directly invested in by local agencies) are inductive and conductive charging and regenerative braking on vehicles.

An example of an impactful partnership across implementation scales is Nuvve, SDG&E, and Cajon Valley Union School District, who in July 2022 successfully deployed the [first full V2G project](#) in the nation, qualifying eight electric school buses with Nuvve technology to participate in SDG&E'S Emergency Load Reduction Program⁷⁰.

The EV industry could promote partnerships with local and regional agencies to electrify entire fleets at a time. For example, the San Diego International Airport (SAN) and Endera partnership resulted in piloting the [San Diego Flyer](#), an all-electric shuttle. The service is provided on six Endera E-450 EV Cutaway shuttles that provide free rides to users between the airport and the Old Town Transit Center.

The vehicles add to the number of Airport Authority fleet vehicles that are powered by alternative fuel, which, among other initiatives, led to SAN achieving the highest rating by the Airport Carbon Accreditation Program⁷¹.

3. Identify and Leverage Emerging Funding Sources to Support Innovative Implementation Efforts



Regional, Local, and Community Implementation

Regional transit agencies, educational institutions, and industry members should take advantage of federal funding opportunities. A comprehensive table of federal, state, and regional/local funding opportunities is provided in Appendix G. For example, [FTA's Integrated Mobility Innovation \(IMI\) grant program](#) funds innovative transit improvements and can be utilized to fund pilot projects and other innovative programs⁷². In 2019, the San Joaquin Regional Transit District (SJRTD), in partnership with Trillium Solutions and UC Davis, was awarded the IMI grant funds to create standard payment integration and trip planning apps across regional transit providers including micromobility and rideshare services. Another example of funding is the CPUC approving [\\$11.7 million for three V2G pilot projects](#) to determine cost-effective business models. It is intended that program incentives and rate designs will be implemented to scale and expand the technology⁷³.

Another example is the BIL's [Vehicle Battery Recycling and Second Life Application](#), which is anticipated to support ten total projects⁷⁴.

4. Collaborate on Development of Clean Hydrogen Hubs to Secure Fuel Supply



Regional Implementation

Regional entities can apply for and/or administer funding for innovations in technology, including hydrogen hub technology. Regional entities like the SDAPCD provide grants for clean air technology.

SDG&E could consider implementing a pilot program to support the deployment of small electrolyzers that could be used as an energy storage system to power EVs and as a hydrogen generation source for fuel cell vehicles.



Industry Implementation

Industry partners like workforce organizations can assist in training the local workforce in the installation, operation, and maintenance of hydrogen hubs. Industry partners may utilize grants or funding from regional organizations to conduct research and innovation on hydrogen technologies to better provide clean hydrogen to the region.



Regional, Local, Community, and Industry Implementation

Public-Private Partnerships can support hydrogen fueling projects to help achieve equity in all San Diego communities. For example, the [*Alliance for Renewable Clean Hydrogen Energy Systems \(ARCHES\)*](#) is a public-private partnership aimed at establishing a regional hydrogen hub in California by leveraging federal funds which aim to build up to ten hubs across the nation⁷⁵. The ARCHES program is funded by the US Department of Energy (DOE) and involves educational institutions, utilities, local jurisdictions, and industry partners.

These groups can collaborate to identify potential sites for hydrogen production, storage, and distribution as well as conduct feasibility studies on proposed sites. Once a site is decided, collaboration with the utility will be needed to interconnect the hub to the grid. Hubs will need to be monitored and evaluated by stakeholders in these groups for impact.

4 Funding Opportunities

A primary goal of the A2Z Collaboration is to encourage investment in the transportation electrification and decarbonization goals of the San Diego region. As such, identifying funding sources is a critical cornerstone to the success of the Strategies presented in this work. This section presents funding opportunities available at the federal, state, local and regional levels for the adoption of ZEVs and ZEV infrastructure in the San Diego region. Many of these funding sources prioritize deployment of ZEVs to advance equity, promote sustainability, and encourage adoption of ZEV technology. This section highlights a range of funding opportunities available to applicants, tips for applying for funding, and links to specific funding resources.

- **Federal Opportunities:** The BIL/IIJA includes around \$550 billion in new federal investment in the nation's infrastructure. Funding is available through discretionary grant applications and prioritizes ZEV projects that take steps toward tackling the climate crisis through electrification, advance equity through the Justice40 Initiative, and support jobs and workforce training.
- **State Opportunities:** The State of California has established many goals to accelerate the adoption of ZEVs and promote access to ZEV infrastructure across the state. California provides rebates, vouchers, and other incentives to promote ZEV adoption.
- **Regional and Local Opportunities:** Funding programs for the deployment of ZEVs and charging infrastructure may exist locally. Local opportunities may also be available to bridge the gap for program understanding by offering webinars and other guidance for the application of funding opportunities for community stakeholders and the general public who may be less familiar with the technology.

Funding tables in Appendix G summarize opportunities at federal, state, and local levels to aid in the deployment of ZEVs and charging infrastructure. The identified funding opportunities do not represent the exhaustive funding opportunities available; however, they represent the most relevant funding opportunities for organizations at all implementation levels described in [Section 3](#).

Funding opportunities presented are subject to change and are current as of the date of this Report. To maintain current awareness of available funding opportunities, it is recommended to review ongoing opportunities, available by federal and state agencies on an annual basis. Typically, Federal and State funding opportunities are released in tandem with annual budget appropriations. Local funding opportunities may be updated more frequently than once a year, and for those funding sources

it is recommended to subscribe to information regarding the funding program to receive ongoing updates. A few actions stakeholders can take include registering for alerts from U.S. DOT, FTA, and the Federal Register's [Key Notices of Funding Opportunities](#)⁷⁶, [Grants.gov](#)⁷⁷, and subscribing to the [CEC's solicitations mailing list](#)⁷⁸ to receive email notices when updates are available. American Public Transportation Association (APTA) Legislative Committee and Local American Planning Association Chapters also publish relevant and often local legislation.

5 Future Considerations

First and foremost, this work acknowledges the deep local commitments to transportation decarbonization made by entities throughout the region and the activities they have undertaken to doing so. This work builds upon this foundation and introduces Strategies to support these entities in expanding their impact. The San Diego region is uniquely positioned to combat the impacts of climate change with the A2Z Collaboration bringing together local and regional entities to achieve and surpass State ZEV goals. The A2Z Collaboration along with local jurisdictions and community groups are already making great progress in the acceleration of ZEV adoption rates and ZEV infrastructure deployment across the region through a number of programs, partnerships, and funding opportunities. While San Diego presents higher than average ZEV adoption levels, it still maintains barriers to widespread ZEV adoption that include considerations of rural communities, funding availability, educational resources for stakeholders, and broad regional collaboration. The A2Z Collaboration represents a regional commitment to convening entities and agencies to collaboratively present transportation decarbonization solutions and attract investment to support those solutions in the region. The Strategies presented in this Report present a framework for organizations and stakeholders in the San Diego region to implement changes to achieve these goals and were developed to align with broader regional and statewide priorities. They were developed through best practices research, regional benchmarking, subject matter expert input, impact and optimization modeling, and stakeholder input.

Key takeaways from the Report include the following:

Key Takeaway #1 Rapidly evolving ZEV policies and market conditions continue to influence and shape projections of ZEV adoption

- A. Based on the Strategy Impact Assessment, it was found that the combined Strategies had lower impact than targeted by the A2Z Gap Analysis. This is in part due to the significant change in policy and market conditions since the A2Z Gap Analysis was completed, including important state-wide developments in EO N-79-

20, AB 2127, and AB 8, and the Infrastructure Reduction Act (IRA), which has significantly increased the level of incentives available.

B. While the Strategies fell short of the A2Z Gap Analysis 2030 target by approximately 107,000 ZEVs, there is opportunity for regional and local leadership to provide larger rebates/ incentives and greater support for hard to reach communities to accelerate progress in the region. Specifically, this includes the following actions:

- Increasing incentive amounts for ZEV purchase beyond \$2,500 and increasing retirement amounts beyond \$4,000
- Tailoring rate design for level 2 chargers to further Incentivize ZEV infrastructure installation
- Prioritizing CoCs, rural communities, and tribal communities in rebates, incentives, policies, and initiatives

Key Takeaway #2 Stakeholder Input Centered on Equity and Education

- A. The most commonly cited reasons why stakeholders in the San Diego region were not ready to purchase an EV included high costs of purchasing an EV, a lack of access to charging infrastructure, and lack of desire to switch from their current vehicle.
- B. Online media sources and word-of-mouth were the most selected options through which people learned about EVs based on our Phase 1 stakeholder engagement. It will be critical to focus efforts on ensuring the general public, car dealers, building owners, and fleet operators are aware of the benefits of ZEVs and available funding opportunities.
- C. Equity considerations were a priority amongst stakeholders involved in this effort, particularly for CoCs, rural communities, and tribal communities. Strategies included in this report aimed to ensure that infrastructure siting and ZEV adoption also addressed equitable and accessible spatial allocation to address these needs. Future regional and local programming should be aligned with stakeholder priorities in the region.

Key Takeaway #3 Funding availability will be key to successful implementation

- A. Implementation of Strategies will require financial investment and will be critical to enabling ZEV infrastructure siting for public use, fleet transitions, and innovative pilot programs.

There are a number of funding sources available to support ZEV initiatives within the San Diego region. A table of current funding opportunities at the local, state, and federal level and how they can be applied is provided in Appendix G.

Key Takeaway #4 Data-driven modeling is important to developing impactful solutions

- A. Modeling conducted for this work forecasted 229,000 vehicles below the 2030 target in the A2Z Gap Analysis for the Baseline Forecast. ZEV Uptake Modeling should be utilized in future work to quantitatively identify gaps in existing programs to achieve ZEV adoption and other decarbonization goals.
- B. As a result of the A2Z ZEV Strategy Impact Assessment, the following Preliminary Actions were identified as the top 3 for achieving increased ZEV adoption and were incorporated into the ten Strategies presented in this Report. Impact modeling should be utilized for future work to determine projected increases in ZEVs to determine effectiveness of actions and proposed Strategies.
- Accelerating coverage of public ZEV infrastructure three years ahead of business-as-usual targets by diminishing availability, accessibility, and range anxiety barriers. This Preliminary Action resulted in a modeled increase of about 11% above the baseline ZEV adoption.
 - Implementing ZEV optimized rates and a demand response program for Level 2 chargers and DCFC increased expected ZEVs by about 5%.
 - Providing incentives to accelerate replacement of non-ZEVs was the third most impactful Preliminary Action, by encouraging ZEV sales and increasing overall ZEV adoption by about 3% above the baseline.

Key Takeaway #5 ZE charging infrastructure siting preferences by stakeholders were driven by convenience

- A. College, business, or workplace Level 2 charging locations as well as higher capacity DCFC sites are estimated to be the most cost-effective charging sites when considering utilization rates given ZEV uptake, allocation, and charging cost assumptions.

- B. Charging stations were desired by stakeholders across all community location options with the most interest in residential charging solutions (e.g., single-unit homes and MUDs), shopping centers, and work.
- C. For example, these three Strategies garnered the most support from stakeholders based on their priorities of convenience and ease of accessibility:
 - **Strategy 1:** Increase percentage of zero emission VMT
 - **Strategy 2:** Achieve equitable/accessible siting of ZEV chargers in all San Diego communities
 - **Strategy 3:** Increase ZEV awareness and adoption

To continue to drive impact of this work, the following next steps have been identified to build off this Report and further expand the ongoing work of entities within the Region:

1. Accelerate availability of public ZEV infrastructure as soon as possible.
2. Make public charging infrastructure funding go further using scenario planning to identify the optimal infrastructure mix and locations for infrastructure deployment.
3. Improve the effectiveness of accelerated replacement incentives by making sure replacement programs (e.g., cash for clunkers) are accessible and funding is available.
4. Develop incentives that target lower cost vehicles and drivers with lower income to amplify their impacts on equity and accessibility.
5. Conduct detailed analysis on grid constraints and implement planned demand response and accelerated replacement programs.
6. Conduct detailed analysis on ZEV customer adoption behavior by income, vehicle price, and other factors to inform incentive targeting.

This Report and associated resources and tools provided are encouraged to be shared on other organization websites/platforms to provide more access to information on ZEVs and ZEV infrastructure as well as funding opportunities that can be utilized to action these Strategies and implementation tactics.

The information presented in this document is subject to change based on industry changes, new technology, new policies, updated funding, and changing behavior. Websites are linked so that readers can verify latest information.

6 Acronyms and Abbreviations

A2Z	Accelerate to Zero Emissions
AB	Assembly Bill
ADA	Americans with Disabilities Act
ACC II	Advanced Clean Cars II
AFC	Alternative Fuel Corridor
APTA	American Public Transportation Association
ARCHES	Alliance for Renewable Clean Hydrogen Energy Systems
BEV/EV	Battery Electric Vehicle/Electric Vehicle
BIL/IIJA	Bipartisan Infrastructure Law/Infrastructure Investment and Jobs Act
CAPS	Climate Action Plans
CARB	California Air Resources Board
CBOs	Community-based Organizations
CCAs	Community Choice Aggregators
CEC	California Energy Commission
CoCs	Communities of Concern
CPUC	California Public Utilities Commission
CSE	Center for Sustainable Energy
DCFC	Direct Current Fast Charging
DOE	Department of Energy
EO	Executive Order
EVCS	Electric Vehicle Charging Station
EVITP	Electric Vehicle Infrastructure Training Program
EVSP	Electric Vehicle Service Providers
EVSE	Electric Vehicle Supply Equipment
FCEV	Fuel Cell Electric Vehicle
GHG	Greenhouse Gas
ICE	Internal Combustion Engine
IMI	Integrated Mobility Innovation

6 Acronyms and Abbreviations *continued*

IOU	Investor-Owned Utility
IRA	Infrastructure Reduction Act
MDHD	Medium- and Heavy-Duty Vehicles
MSS	Mobile Source Strategy
MTS	Metropolitan Transit System
MUD	Multi-Unit Dwelling
NEVI	National Electric Vehicle Infrastructure
PEV	Plug-In Electric Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
RDF	Regional Decarbonization Framework
SAN	San Diego International Airport
SANDAG	San Diego Association of Governments
SCE	Southern California Edison
SCTCA	Southern California Tribal Chairmen's Association
SDG&E	San Diego Gas & Electric
SDAPCD	San Diego Air Pollution Control District
SJRTD	San Joaquin Regional Transit District
TCO	Total Cost of Ownership
TNC	Transportation Network Company
TOU	Time-of-Use
VMT	Vehicle Miles Traveled
ZE	Zero Emission
ZEV	Zero Emission Vehicle

7 Glossary

Battery Electric Vehicles (BEVs)	<p>These vehicles run solely on electricity that is stored in a battery. They produce zero tailpipe emissions and come in a variety of makes and models.</p>
Communities of Concern (CoCs)	<p>These vehicles run solely on electricity that is stored in a battery. They produce zero tailpipe emissions and come in a variety of makes and models.</p> <p>The Report and Strategies were developed with equity as a core tenant and lens. The team acknowledges the importance of language and terminology in discussing these important topics. The Report utilizes the terminology of “Communities of Concern” to represent communities in San Diego County with identified structural inequities, such as access to transportation or disproportionate pollution burden, that require intentional procedural and distributional equity actions to address them.</p> <p>This definition is based on existing local definitions of “Communities of Concern”,^{79,80,81} and was selected through deliberate equity discussions with community-based organizations, local agencies, and businesses who are part of the A2Z Steering and Advisory Committees.</p> <p>The A2Z Collaboration recognizes that there exist other important regional, state, and federal terms, such as “Underserved and Historically Unrepresented” and “Disadvantaged,” that often intersect but do not entirely overlap with this definition of “Community of Concern.” Though the phrase “Communities of Concern” will primarily be used in this document, other specific terms related to these areas will be incorporated into the Strategies where required to better position these communities for potential funding sources:</p> <ul style="list-style-type: none"> - Underserved Communities (US Executive Order 13985, 2021) <ul style="list-style-type: none"> o Populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life - Underserved Community (California Public Utilities Code § 1601, 2019) <ul style="list-style-type: none"> o In a “disadvantaged community” as defined by subdivision (g) of Section 75005 of the Public Resources Code o Included within the definition of “low-income communities” as defined by paragraph (2) of subdivision (d) of Section 39713 of Health and Safety Code o Within an area identified as among the most disadvantaged 25 percent in the state according to the California Environmental Protection Agency and based on the most recent CalEnviroScreen o Community in which at least 75 percent of public-school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program o Is a community located on lands belonging to a federally recognized California Indian tribe - Disadvantaged Communities per California Senate Bill 535 (California Environmental Protection Agency, 2022) <ul style="list-style-type: none"> o Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 o Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores o Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 o Lands under the control of federally recognized Tribes. For purposes of this designation, a Tribe may establish that a particular area of land is under its control even if not represented as such on CalEPA’s DAC map and therefore should be considered a DAC by requesting a consultation with the CalEPA Deputy Secretary for Environmental Justice, Tribal Affairs and Border Relations at TribalAffairs@calepa.ca.gov.

7 Glossary *continued*

Communities of Concern (CoCs) (cont.)	<ul style="list-style-type: none"> - Justice40 Initiative Transportation Disadvantaged Community (US Department of Transportation, 2022) <ul style="list-style-type: none"> o Transportation access disadvantage identifies communities and places that spend more, and take longer, to get where they need to go. o Health disadvantage identifies communities based on variables associated with adverse health outcomes, disability, as well as environmental exposures. o Environmental disadvantage identifies communities with disproportionately high levels of certain air pollutants and high potential presence of lead-based paint in housing units. o Economic disadvantage identifies areas and populations with high poverty, low wealth, lack of local jobs, low homeownership, low educational attainment, and high inequality. o Resilience disadvantage identifies communities vulnerable to hazards caused by climate change. o Equity disadvantage identifies communities with a high percentile of persons (age 5+) who speak English “less than well.” - Low-income communities (California State AB 1550, 2016) <ul style="list-style-type: none"> o Census tracts that are either at or below 80 percent of the statewide median income, or below the threshold designated as low-income by the California Department of Housing and Community Development’s (HCD) State Income Limits.
Equity	Fair treatment, access, opportunity, and advancement for all, while striving to identify and eliminate barriers that have prevented the full participation of some groups ⁸² .
Demand Response	Programs that can be used in the electric power industry to balance supply and demand of the electric grid. These programs use financial incentives to influence consumers to reduce their electricity usage during peak periods. Demand response programs can lower the cost of electricity and ease demand during peak times.
Distributional Equity	Programs and policies result in distribution of benefits and burdens across all segments of a community, prioritizing those with highest need. An example of distributional equity is the acceleration of ZEV charging infrastructure implementation in rural areas and Communities of Concern.
Flexible Fleet	Shared, on-demand transportation services that provide convenient and personalized travel options. While they build on the popularity of services such as rideshare, bikeshare, and scootershare, fleets can also include neighborhood shuttles and delivery services ⁸³ .
Gallons of Gas Equivalent (GGE)	Conversion metric between a fuel source and its equivalent energy in gallons of gas.
Greenhouse Gas Emissions (GHGs)	Gases in the earth’s atmosphere that trap heat (known as the Greenhouse Effect). Common gases include Carbon Dioxide (CO ₂), Methane (CH ₄), and Nitrous Oxide (N ₂ O).
Hydrogen Fuel Cell Vehicles (FCEV)	Hydrogen fuel cell vehicles are fueled with pure hydrogen gas that is then converted to electricity by the fuel cell. The only tailpipe emissions are water vapor and warm air.
Plug-in Hybrid Electric Vehicle (PHEV)	Plug-in hybrid electric vehicles use electricity stored in batteries to power an electric motor as well as gasoline or diesel to power an internal combustion engine ⁸⁴ .
Medium- and Heavy-Duty Vehicles (MDHD)	Medium- and heavy-duty vehicles are typically more polluting than light-duty vehicles due to their additional weight, power needs, and fuel type. These vehicles weigh over 10,000 pounds and include commercial pickup trucks, delivery trucks, and municipal service vehicles (e.g., street sweepers, garbage trucks, and other special utility vehicles).

7 Glossary *continued*

Micromobility	Micromobility includes ways of getting around that are fully or partially human-powered — such as bikes, e-bikes and e-scooters and mobility-assistance devices/wheelchairs. Most commonly, micromobility vehicles do not exceed 15mph ⁸⁵ .
Procedural Equity	Intentional planning of inclusive, accessible, authentic engagement and representation in processes and procedures to develop or implement programs or policies. An example of procedural equity is hosting engagement events at varying times of the day to accommodate different participants' schedules.
Range Anxiety	The fear that a vehicle has insufficient energy storage to reach its destination and would thus strand the vehicle's occupants.
Rural Communities	The Census Bureau defines rural as any population, housing, or territory not in an urban area. This means areas with fewer than 2,500 people ⁸⁶ .
Total Cost of Ownership (TCO)	The total cost of ownership is the cost of a product over its lifetime; it considers the purchase price as well as the cost to operate the product. In the context of ZEVs, the TCO consider the following factors among others: price paid for vehicle, applied rebates and incentives, depreciation over time, operational costs for charging, and ZEV infrastructure installation costs.
Transportation Network Companies (TNCs)	TNCs provide prearranged transportation services for compensation using an online-enabled application or platform (such as smart phone apps) to connect drivers using their personal vehicles with passengers ⁸⁷ .
Zero Emission Vehicle (ZEV)	Vehicles that run on fuels other than gasoline and include a variety ⁸⁸ of low- to no-emission technologies including BEVs, PHEVs, and FCEVs.
Zero Emission Infrastructure (ZEV infrastructure)	Zero emission infrastructure includes any equipment part of a charging or refueling station for ZEVs.

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Low Income: any community in which 33 percent or more of households are low income, and/or 10 percent or more of the households are severely overcrowded, and/or 25 percent or more of the population is in poverty
Minority: any community in which 65 percent or more of the population is non-White
Low Mobility: any community in which 25 percent or more of households have no auto available, and/or 25 percent or more of the population is disabled, and/or 20 percent or more of the population is aged 75 or older
Low Community Engagement: any community in which 20 percent or more of households do not speak English as a primary language and do not speak English well, and/or 20 percent or more of the population aged 25 and older have less than a high school education
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