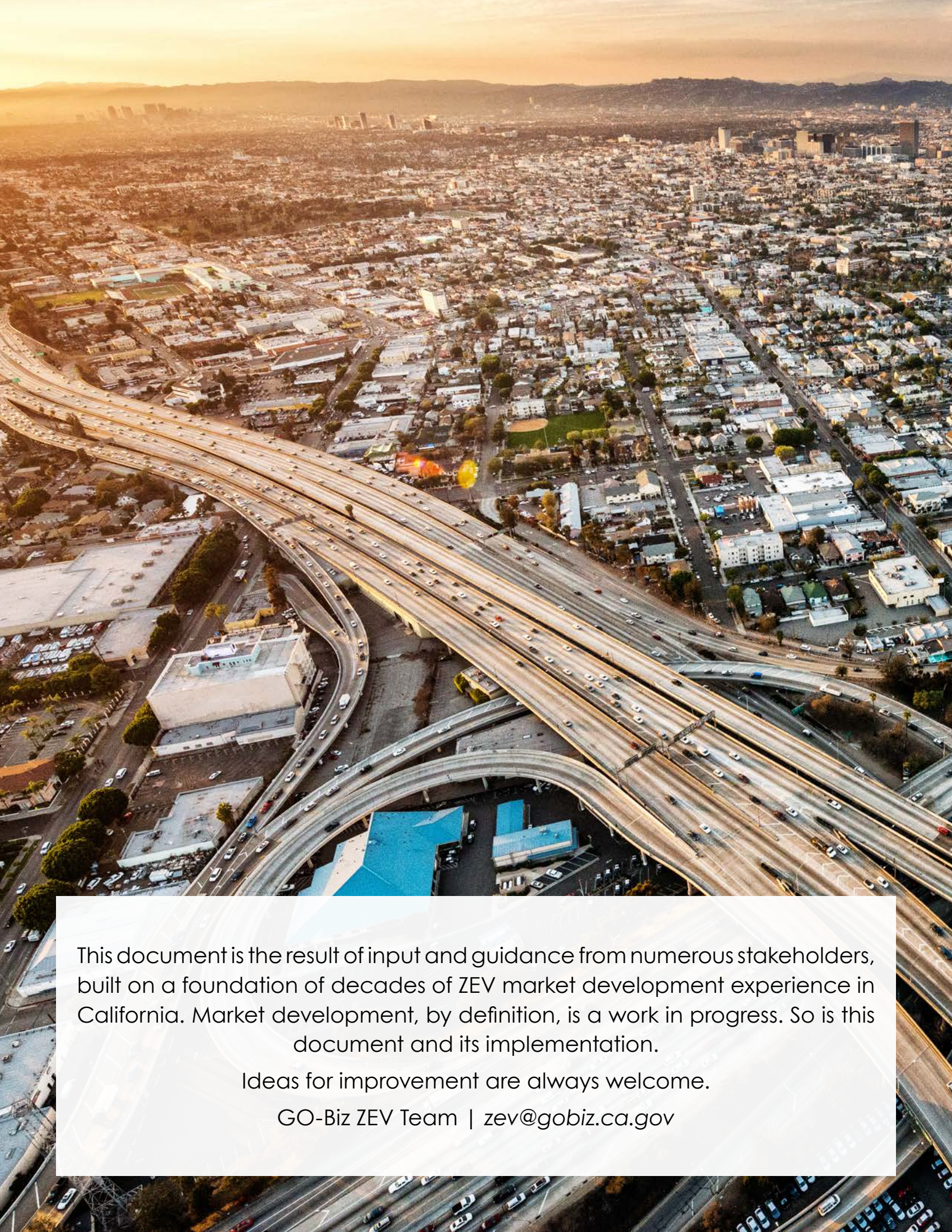




California Zero-Emission Vehicle Market Development Strategy



February 2021



This document is the result of input and guidance from numerous stakeholders, built on a foundation of decades of ZEV market development experience in California. Market development, by definition, is a work in progress. So is this document and its implementation.

Ideas for improvement are always welcome.

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Executive Summary

Following a record-setting wildfire season exacerbated by the effects of climate change, Governor Newsom signed Executive Order N-79-20 on September 23, 2020. Executive Order N-79-20 sets ambitious statewide targets to transition California's transportation sector to zero emissions to reduce carbon, smog-forming, and toxic diesel pollution, while retaining and creating jobs and growing the economy.

Increasing and accelerating the shift to a zero-emission transportation system requires an organized, collaborative, and cross-cutting approach. Through this document, the Zero-Emission Vehicle (ZEV) Market Development Strategy, the Governor's Office of Business and Economic Development (GO-Biz) and our partners seek to accelerate large scale, affordable, and equitable ZEV market development.

The following pages purposely afford flexibility for government and stakeholders to innovate, while seeking to ensure transparency and accountability. To accomplish this, the Strategy is centered around the four market pillars: vehicles, infrastructure, end users, and workforce. The pillars must all be fully supported and are built upon a foundation of five core principles: equity in every decision, embracing all zero-emission pathways, collective problem-solving, public actions drive greater private investment, and designing for system resilience and adaptability.

The market pillars and underlying core principles inform the Strategy's roadmap for *who* is focused on *what* — the roles and responsibilities of each public and private market player. The Strategy will be updated at least every three years and each state agency will submit a brief action plan annually, starting March 1, 2021, setting the agency's priorities according to their objectives included herein. All objectives advance the market for one or more of the pillars. Additionally, working with our partners, GO-Biz will develop annual priority summaries for each pillar, along with an equity engagement and implementation strategy and cross-cutting, multi-pillar priority view. These pillar priority documents will focus on harmonizing policy and implementation to get to scale with a target of being posted by March 15th each year.

The Strategy sets the state's high-level course of action. A corresponding public ZEV Strategy website will house the above-mentioned components and track the state's progress towards meeting the Executive Order's targets, agency objectives, and pillar priorities. Progress tracking of diverse market metrics, or market-health indicators, will also facilitate ongoing collaboration and information sharing to refine our understanding of market advancement and inform our course.

A rapid transition to 100 percent zero emissions requires leadership and contributions from many — from industry and political leaders to community members and neighbors. At its core, the ZEV Strategy is a bet on collaboration and constructive competition among these leaders, and those who will come in the future. This document is an initial step on a journey to a complete market transformation; a step only made possible because of the tremendous contributions of a host of visionaries and leaders in all sectors. California continues to lead the way — together.



ZEV Market Development Strategy Overview

On September 23, 2020, Governor Newsom signed Executive Order N-79-20, setting the following zero-emission vehicle targets for California:

- 100% of in-state sales of new passenger cars and light-duty trucks will be zero-emission by 2035,
- 100% zero-emission medium and heavy-duty vehicles in the state by 2045 where feasible and by 2035 for drayage trucks, and
- 100% zero-emission off-road vehicles and equipment operations by 2035, where feasible.

To help meet these targets, Governor Newsom tasked the Governor's Office of Business and Economic Development (GO-Biz) to collaborate with multiple agencies and partners to shepherd the administration's ZEV Market Development Strategy (ZEV Strategy). This document is the first part of the ongoing, purposefully evolving effort to turn California's 100 percent ZEV vision into reality. The ZEV Strategy is structured to break down silos and ensure cross-cutting work throughout the California state government to achieve our ZEV goals.

If we fast forward to 2035 and 2045 and look back at what worked, we can predict one thing with certainty: success will have had many parents. We will have met the challenge with a diverse team of stakeholders from multiple sectors and priority communities¹ who came together to solve problems, create opportunities, and increase equity. And we will meet the challenge through prioritizing the following decision-making principles: equity in every decision, embracing all zero-emission pathways, collective problem solving, public actions drive greater private investment, and designing for system resilience and adaptation.

As such, the purpose behind this ZEV Strategy is to empower stakeholders to work toward generating maximum positive impact on the market. The idea is to set a strong course with the understanding and expectation that conditions are likely to change, often for the better. We firmly know where we need to go, yet we are flexible in how we get there. In a word, the California ZEV Strategy hinges on one of California's most important assets: people.

CURRENT CIRCUMSTANCES

COVID-19 changed the world in 2020. As of this writing, it continues to impact lives, livelihoods, and budgets, and will continue to do so for the foreseeable future. This reality temporarily alters the tools available to build the ZEV market and may affect the pace of change, but it does not change the goal. The crisis has shown Californians how clean the air could be with less combustion and that poor local air quality can worsen the impacts of many diseases, including COVID-19.

Why do we need a ZEV Market Development Strategy?

A robust, competitive, and equitable zero-emission vehicle market is a critical and necessary answer to a series of stubborn problems, including but not limited to: greenhouse gas emissions, toxic air contaminants, and criteria pollutants from California's

¹ Priority communities include neighborhoods of California that disproportionately suffer from historic environmental, health, and other social burdens. See glossary for full definition and references to relevant statutes.

more than 30 million vehicles and corresponding fossil-fuel consumption. California has made great strides in cleaning up our air, but the Los Angeles region and the San Joaquin Valley still suffer from the worst air quality in the nation. Greenhouse gas emissions are falling in California as a whole, led by our clean electricity sector, but transportation still accounts for nearly 50 percent of the total. Medium- and heavy-duty trucks are the largest source of vehicle pollution even though they comprise only 2 million of the 30 million registered vehicles in California.² Additionally, our past land use development patterns make passenger cars and trucks a necessity in most areas of the state. Safe, affordable, clean transportation and mobility options that reduce reliance on individual cars are not accessible for many communities.

The ZEV Market Development Strategy is meant to help California collectively move from what we know — that California's ZEV market is growing — to what we need — a ZEV market that rapidly scales to deliver the benefits of zero-emission vehicles to all Californians. Moving at the scale and speed we need requires active collaboration and contributions from all market players, both existing and new. It depends on all Californians with a focus on communities most in need, creative problem solving, business model innovation, continued and new investment, regulatory and policy coordination, and consumer support.

California's vehicle regulations, incentives, investments, and sales helped create the zero-emission vehicle market as it stands today. The next step — increasing equitable statewide deployment — requires continuing and expanding creative public-private partnerships³ to accelerate investment and streamline implementation to expedite a fully self-sustaining, scalable ZEV market.

The ZEV Market Development Strategy focuses on the opportunities and priorities to build the infrastructure network, bring more vehicle types to market in all vehicle classes and applications, increase economic development and high-road jobs,⁴ build a skilled workforce, and enable consumers and fleets to adopt ZEVs. We must additionally ensure strategies and programs are developed with consideration of unique local and regional needs and attributes. The Strategy does not create a new layer of government, but instead organizes efforts to work more effectively and efficiently to transition to a self-sustaining ZEV market.

Thankfully, success does *not* depend on technological breakthroughs (although those certainly help). We are working on a human challenge; one only limited by our collective will. This document is written to point all stakeholders in a shared direction, and from there, to unleash the creative and innovative spirit that continues to define California.

Building on California's ZEV Action Plans

The ZEV Market Development Strategy builds on the success and lessons of California's three *ZEV Action Plans* in 2013, 2016, and 2018. Relevant unfinished actions from the latter plans will be carried forward by the responsible agencies. Furthermore, agency actions will continue to build on completed tasks.

2 [CARB Press Release: California takes bold step to reduce truck pollution](#)

3 Public-private partnerships include public-private funding and cost share opportunities, such as utility infrastructure programs that leverage ratepayer funding to help pay for some of the fueling infrastructure while fleet entities, such as private companies, transit agencies, school districts, and others pay for part of the infrastructure need and are required to procure eligible ZEVs in order to participate. Likewise, state, regional and local funding, financing, and other programs leverage both public and private capital to move the market forward.

4 High-road jobs are jobs created within a high-road economy, which not only centers on job quality, but also sustainability and equity. A broader term than "high-quality jobs." See glossary for expanded definitions.



The Four Pillars of ZEV Market Development

The primary goal of the ZEV Market Development Strategy is to accelerate large scale, affordable and equitable ZEV market development. **Scale** to bring down the transition cost, accelerate private capital investment, and reduce the need for direct public investment. **Equity** to ensure that communities suffering most from a combination of economic, health, and environmental burdens are actively prioritized and directly benefit from public investment through increased zero-emission mobility options, job opportunities, and cleaner air.

The Strategy should enable outcomes beneficial to California's core health, science, equity, and economic development motivations: improved air quality, reduced greenhouse gas emissions, robust access to and investment in clean transportation, reduced dependence on fossil fuels, preparation for high-road jobs and expanding workforce opportunities for priority communities, and ensuring a clean, reliable, resilient, and affordable energy system.

For purposes of this document, we organize the ZEV market into four pillars: Vehicles, Infrastructure, End Users, and Workforce. All are fundamental to building the market; the system suffers if one pillar falls behind and thrives when the pillars are balanced. These pillars are built on a foundation of core principles, which are described in the following section. The metrics, which will pull from resources presented in Appendix C, will measure our collective success in advancing each of these pillars and toward achieving California's environmental, economic, and equity goals.



Four Pillar Definitions

- Vehicles:** New and used plug-in electric and hydrogen fuel-cell electric vehicles, including light-, medium-, and heavy-duty vehicles and equipment used for transporting people and freight, as well as for construction, mining, materials handling, industrial operations, agriculture, recreation, and other industries. This also includes zero-emission solutions like ZEV carsharing and micro-mobility options (e.g., e-bicycles, e-scooters). This pillar includes zero-emission high-speed rail, locomotives, marine vessels, and aircraft that transport passengers and freight, as well as the supply chain needed to support all vehicle types.

- **Infrastructure:** Fueling infrastructure needed to support all ZEVs, including electric vehicle charging stations, hydrogen fueling stations, catenary systems and the energy systems that supply them. Vehicle-grid integration (e.g., through battery-electric vehicles), and grid integration of fueling systems (e.g., hydrogen produced through electrolysis) are important components to cost-effectively expand renewable energy penetration, improve resilience, and drive charging and fueling value for end users and the grid. Includes the supply chain to enable infrastructure build out that offers the opportunity to fuel a ZEV at a lower cost than conventional fossil fuels.
- **End Users:** Consumers, riders, fleet operators, transportation network companies, car dealers, drivers, transportation planning agencies, program administrators, ports, regional and local governments and communities, trucking companies, fuel providers, and more.
- **Workforce:** The human workforce, including supply chains, needed to design, manufacture, sell, construct and install, service and maintain ZEVs, ZEV infrastructure, ZEV distribution systems, dealerships, energy systems, networks of charging and fueling stations, and other ZEV-related build. Workforce also includes those at third-party support companies and agencies whose work with ZEV focused institutions is critical to operating and expanding the ZEV market, such as marketing and advertising firms, roadside assistance companies, financial institutions, insurance agencies, and recyclers.

This ZEV Strategy focuses on the who, what, and how of building, maintaining, and balancing these four pillars and uses the construct to identify key market and implementation gaps. Each metric, objective, and collective problem-solving action in the ZEV Strategy maps directly back to at least one of these four pillars, the investments required to build them, and/or outcomes. Each action and decision is rooted in one or more of our core principles.



Core Principles

The following principles serve as the foundation for decision-making throughout the Strategy development and implementation effort:

- 1. Equity in every decision.** The people suffering the impacts of social, economic, and environmental burdens are also those closest to the solutions. Continual, meaningful engagement and capacity building within priority communities is key to ensuring that the ZEV market provides direct and assured benefits to those most impacted by poor air quality and lack of access to clean mobility and high-road jobs. We actively look for opportunities to implement community-led ideas and share decision-making power; each decision or action should incorporate priority communities' ideas and direct feedback.
- 2. California embraces all zero-emission pathways.** We are technology neutral and actively embrace and support all viable pathways to zero emissions through policymaking, funding, and other state decisions/actions. This includes but is not limited to new and used battery-electric, hydrogen fuel-cell electric, and directly connected electric systems, such as catenary bus lines, and electrified rail including high-speed rail, across all vehicle sizes and classes, and connections to zero-emission transit or other mobility options.
- 3. Collective problem-solving.** Success depends on active engagement and collaboration between all levels of government, industry, non-governmental organizations (NGOs), communities, and other engaged stakeholders (e.g., end users).
- 4. Public actions drive greater private investment to scale investable markets.** Public and private sector actors have unique, complementary roles to play in scaling the ZEV market. Public policies and actions should help limit market risk and ensure fair and equal access and activate market-based mechanisms; private actions drive scale and provide innovative solutions.
- 5. Design for resilience and adaptation.** We are developing the ZEV system holistically, with resilience and adaptation front of mind. ZEVs enable opportunities to stabilize and support our energy system for the benefit of all, including increasing reliability, resilience, and renewable energy penetration.





DRIVE ON SUNSHINE

ZEV Strategy Framework

At the base level, the ZEV Strategy serves as a roadmap for *who* is focused on *what*, within the context of the Four Pillars of ZEV market development. The intended result is for any stakeholder, existing or new, to be able to identify their niche and plug in to the system to contribute to and benefit from ZEV market success and expansion.

To aid and simplify bi-directional communication, the ZEV Strategy is organized around two components: a) this document to set the course based on existing state policies, and b) a website to track progress and facilitate ongoing collaboration and information sharing⁵.

ZEV Market Development Strategy Document

Focused on *who* and *what* (updated at least every three years, during which time we will monitor progress and change course if necessary):

1. Establish agreed-upon core principles that guide our ZEV market development quest.
2. Organize collaborative agency and stakeholder efforts around and across building the four pillars of the market: Vehicles, Infrastructure, End Users, and Workforce, with objectives rooted in our core principles (see 'Core Principles' above).
3. Set the direction for metrics targets to measure progress in each of the four pillar areas and in reaching specific goals/objectives.
4. Communicate the roles and top-level objectives of each agency and major stakeholder group in meeting the targets.

ZEV Market Development Website

How and *when* (actively managed):

5. **Outcome Metrics (quarterly updates):** Set up an accessible metrics tracking portal to measure progress relative to California's policy goals.
6. **State Agency Action Plans (annual):** Identify and align regulatory and programmatic (e.g., incentive programs) objectives and processes across agencies.
7. **Pillar Priorities (annual):** Identify topics that need focused, collective action, and set forth plans to address these core issue areas.⁶
8. **Lessons Learned (ongoing):** Ensure lessons learned are easily accessible so that successes can be repeated, and barriers can be overcome in California and throughout the nation.

The ZEV Strategy itself is written from the state government policy and implementation point of view, with a heavy focus on the fundamental roles non-state government actors play. State actions are more detailed, but the ZEV Strategy also establishes guideposts for what our broad community believes is needed from each class of active stakeholder to enable success.⁷

⁵ [GO-Biz: Zero-Emission Vehicle Market Development Strategy](#)

⁶ GO-Biz will introduce an annual stakeholder process to set priorities for the collective action, and ensure each task has a clearly identified lead. Year 1 will rely heavily on feedback collected during the development of this Strategy document.

⁷ Non-state agency objectives were established with direct and indirect input and will be updated



GO-Biz's Role

GO-Biz serves as the head coach and steward of the ZEV Strategy. The GO-Biz team's role is to actively build constructive connections between stakeholders, work with stakeholders to chart and correct the course of action for collective focus, coordinate state agency actions, and facilitate transparency to keep stakeholders and agencies accountable, including to one another. In short, GO-Biz's job is to put market players in position to win, for the good of the market, for the climate, and for California's air quality. It is important to note that GO-Biz is an amplifier of information, not a funnel. We expect and hope for connections and progress to happen both with and without our active involvement.



ZERO-EMISSION VEHICLES IN THE BROADER CONTEXT

One of California's priorities is to reduce vehicle miles traveled (VMT) by locating more homes, jobs, services, and education in close proximity to each other so that people can rely less on personal cars and trucks and rely more on transit, biking, walking, and micro-mobility options like e-bikes, e-scooters and ZEV carpools.^{8,9} Similarly, California's Sustainable Freight vision is to develop a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, livable communities. This includes deploying zero-emission equipment everywhere feasible.¹⁰ The ZEV Market Development Strategy effort focuses on delivering safe, reliable zero-emission answers within the broader VMT reduction and Sustainable Freight framework.

From a macro-level climate and health perspective, California's mobility policies strive to enable the following loading order for residents:

Personal/Shared Mobility*	Freight Movement & Delivery*	Off-Road Applications*
Walk/bike	Bike, walk, drones (last mile delivery)	Zero-emission vehicles and equipment
Zero-emission e-bikes, e-scooters, and motorcycles	Zero-emission vehicles and equipment	Low emissions where ZEVs infeasible
Public transit	Low emissions where ZEVs infeasible	–
Shared ZEVs (carpooling, carsharing, and ridesharing)	–	–
Single occupant ZEVs	–	–

* The ZEV Strategy focuses on zero-emission solutions for the **bold** entries

COMPLEMENTARY EFFORTS

Vehicle Miles Traveled Reduction: The California State Transportation Agency (CalSTA) in coordination with Caltrans, the California Transportation Commission, and other partner state agencies, is leading the development of the Climate Action Plan for Transportation Infrastructure (CAPTI) to identify near term actions and investment strategies that help leverage transportation infrastructure investments to reduce our dependence on driving and improve clean and active transportation, sustainable freight, and transit options. This effort will have the practical impact of reducing vehicle miles traveled, as outlined in EO N-79-20 and N-19-19. The ZEV Strategy will not address transportation planning or programming, but rather work to ensure clean transportation and ZEV options are available and deployed within these systems.

ECONOMICS & WORKFORCE — JUST TRANSITION

Per EO N-79-20, the Labor and Workforce Development Agency and Office of Planning and Research are working with a group of state agencies to design a Just Transition Roadmap, which is an economy-wide strategy to ensure that all Californians benefit from the transition to carbon neutrality, including communities and workers most impacted by climate change and the realignment of fossil fuel industries. The ZEV Strategy will leverage this work, and other related efforts, to ensure California is prepared to meet the needs of the ZEV market.

8 Additionally, broader work-from-home opportunities help reduce VMT and its associated emissions and other consequences, which has become more apparent in 2020.

9 [CARB: California's 2017 Climate Change Scoping Plan](#)

10 [CARB: Sustainable Freight Action Plan](#)

Current Status — Market Snapshot

In addition to the targets in Executive Order N-79-20, California has intermediate goals including 5 million ZEVs on California roads by 2030 and 250,000 public and shared charging stations and 200 hydrogen fueling stations by 2025.¹¹ As of September 30, 2020, 763,816 passenger ZEVs and more than 3,000 medium- and heavy-duty ZEVs have been sold in California.¹² We have more than 67,343 shared charging stations, including 4,818 direct current (DC) Fast Chargers (as of October 30, 2020), and 44 retail hydrogen stations open to drivers (as of January 15, 2020).¹³ Heavy-duty chargers and fueling stations are beginning to proliferate to enable zero-emission medium- and heavy-duty market penetration.

Battery-electric vehicle (BEV) costs continue to decline for vehicles such that market analysts predict battery vehicle cost parity with internal combustion vehicles as soon as 2023 for some sectors of the market, when electric vehicle battery packs are expected to cost \$101/kWh.¹⁴ Furthermore, fast charging speed is accelerating, helping to increase vehicle marketability and functionality.

With respect to hydrogen, many of today's stations have multiple dispensers, can dispense four to eight times more hydrogen than those initially deployed just five years ago while being built at half the cost. With supportive policies, experts project that green electrolytic hydrogen and renewable hydrogen produced with organic material feedstock can be cost competitive with gasoline by the mid-2020s.¹⁵ With volume, fuel-cell electric vehicle (FCEV) costs are estimated to rapidly decrease, with high expectations for delivering additional value especially in larger size classes and for drivers with longer daily driving needs.^{16,17} This underscores the complementary nature of BEVs and FCEVs, both of which are needed to achieve a 100 percent ZEV future.

CARB's June 2020 adoption of the Advanced Clean Trucks regulation, following the Innovative Clean Transit and Airport Shuttle regulations, will help grow the medium-, heavy-duty, and off-road markets, following years of public and private investment.

11 [Executive Order B-48-18](#)

12 [Passenger ZEVs: Zero-Emission Vehicle and Infrastructure Statistics](#). Medium-, heavy-duty and off-road ZEV count includes vehicles and equipment funded by the [Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project \(HVIP\)](#), [Clean Off-Road Equipment Voucher Incentive Project \(CORE\)](#), school buses and other vehicles funded by the [Clean Transportation Program](#), vehicles and equipment funded by the [Zero-and-Near-Zero Emission Freight Facilities Project](#), and estimates of additional vehicles and equipment deployed via [advanced technology demonstration programs](#) and through other funding sources (zero-emission forklift counts would likely increase this number substantially).

13 [CEC: Zero-Emission Vehicle and Infrastructure Statistics](#)

14 [BloombergNEF: Battery Pack Prices Cited Below \\$100/kWh for the First Time in 2020, While Market Average Sits at \\$137/kWh](#)

15 [Reed et. al. Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California](#). CEC. Publication Number: CEC-600-2020-002.

16 [Hydrogen Council. Hydrogen Scaling Up: A sustainable pathway for the global energy transition](#). November 2017.

17 [The International Council on Clean Transportation. Transitioning to Zero-Emission Heavy-Duty Freight Vehicles](#). September 2017.



The light-duty ZEV regulation is set to be updated as well. Through California's suite of public and private complementary regulatory, incentive, and market-enabling actions,¹⁸ manufacturers have clear policy signals to produce ZEVs in all on- and off-road applications.¹⁹

All this progress has been made through the implementation of multiple critical policies and market signals, including regulations, funding and financing, and education and outreach, coupled with important market development actions and investments by public and private entities. This implementation, and ongoing policy innovation, must continue to reach our intermediate goals and the transformational targets in EO N-79-20, and to guarantee equitable participation and benefits for all Californians.²⁰

18 In addition to the regulations noted, incentives funded through the California Climate Investments, Clean Transportation Program, and other sources have played a critical role in California's ZEV market transition to date. Continued public and private funding, financing, investment and other incentives will be essential to accelerating market growth and ensuring access to ZEVs and clean air for all Californians.

19 *CARB Press Release: California takes bold step to reduce truck pollution*

20 People with an income over \$150,000/year account for about a third of new vehicle purchases and slightly higher amounts of new electric vehicle and plug-in hybrid purchases. (See, e.g., Clean Vehicle Rebate Project Presentation: "*Growing the Electric Vehicle Market: EV Adopters, 'Rebate Essentials,' and 'EV Converts'*") Programs making these vehicles more affordable, whether new or used, and marketing them to more Californians are critical to continue to broaden market participation.

Measuring Success (Metrics)

The ZEV Strategy website will house a ZEV metrics portal to clearly display the various tools California has (or will develop) to track progress and diagnose issues. The goal is to provide easily understandable trends and opportunities for stakeholders to go deep into the data. It will also allow for analysis of where there are needs for further investment and focus to meet the State of California's air quality, climate, and equity goals.

The metrics will be organized around the key outcomes (Air Quality, GHGs, Access/Equity, Investment/Jobs) and four pillars (Vehicles, Infrastructure, Workforce, End Users). Each outcome and pillar have a series of targets and/or policy drivers against which progress can be measured. These details and related reports are available in Appendix C.

Table 1 offers a summary of the top-level questions that stakeholders will be able to answer using the ZEV metrics page on the ZEV Market Development Strategy website.²¹ Please note that the metrics on the ZEV Strategy website will prioritize simplicity, with direction to help motivated stakeholders dig into more detail.

²¹ The ZEV Metrics will link to maintained state agency or partners wherever possible.



TABLE 1: ZEV METRICS SUMMARY - KEY OUTCOME METRICS — QUESTIONS TO ANSWER

Air Quality	Greenhouse Gases	Mobility Access*	Jobs/Economic Development*
<ul style="list-style-type: none"> Quantity of criteria pollution reduced from transportation sector, with a focus on priority communities 	<ul style="list-style-type: none"> Quantity of GHG emissions reductions and fossil fuel consumption from transportation sector 	<ul style="list-style-type: none"> Percent of population and commerce with access to high-quality, clean transportation and mobility options with capabilities comparable to existing equipment. Emphasize priority communities 	<ul style="list-style-type: none"> Quantification of in-state ZEV-related employers and jobs, with a focus on high-road job access, emphasizing priority communities In-state ZEV related manufacturing and supply chain footprint

* Note: data collection and analysis processes will be established and refined through ZEV Strategy implementation.

TABLE 2: FOUR PILLARS METRICS

Vehicles	Infrastructure	End Users	Workforce
<ul style="list-style-type: none"> Progress toward CA's LD, MHD, off-road vehicle and equipment targets New and used vehicle market penetration Priority community access to ZEVs Micro-mobility deployment numbers and usage 	<ul style="list-style-type: none"> Progress toward CA's fueling infrastructure targets for LD, MHD, off-road vehicle and equipment. Access to charging/fueling with a focus on priority communities. ZEV fuel cost competitiveness Hydrogen production capacity relative to demand Charging system resilience 	<ul style="list-style-type: none"> Fleet deployments in or near priority communities General consumer and fleet awareness and understanding of ZEVs (annual surveys) Consumer exposure to ZEVs: ZEV carsharing and ridesharing; ride and drive Consumer and fleet outreach, education awareness campaigns across vehicle classes and vocations (consolidation of annual reports) 	<ul style="list-style-type: none"> Trained workforce availability Estimate of ZEV-related high-road jobs in California Priority community access to high-road jobs Training programs for electricity and hydrogen
Investment and Financing			

Public and private investment tracking — target increased and accelerated private investment.

All of the metrics will be designed to help stakeholders quickly answer two fundamental questions: 1) is the market scaling relative to our targets? 2) are priority communities directly and equitably benefiting as the market scales? This will require speaking directly to communities and implementing a bottom-up approach to understanding if we are achieving our goals.



Roles and Responsibilities

One of California's strongest assets is a diverse group of motivated stakeholders that are already playing active roles in developing the ZEV market. Tables 3–12 — “A Tale of Four Pillars” lists stakeholders who play an active role in ZEV market development. Lead and supporting roles are distributed within each stakeholder class, usually with one or more leads per pillar to help establish which group is best positioned to impact the overall success within the pillar.²²

Readers can view detailed objectives for each agency or stakeholder in [Appendix A](#) and [Appendix B](#). The expectation is for staff and leadership to consider the broader context as they look for gaps in implementation, policy, or participation; ways to innovate; and to streamline and improve processes.

Our hope is that a reader can use these tables to quickly understand the role of any given stakeholder group, and how each entity fits within the context of the greater effort.

Unique Responsibilities of Each Actor

Each agency and stakeholder group has unique contributions to bring to ZEV market development. Appendices A and B establish guiding objectives developed with direct and indirect feedback from each group — with a focus on contribution to the larger ZEV market system.²³ Each objective maps back to at least one of the four pillars of market development, and/or outcomes.

California state agencies have the most detailed objectives. The objectives of non-state government actors hinge on what our leading partners are striving to deliver in the context of state goals. Many objectives necessarily overlap, given the reality that multiple parties are needed to usher in success.

Role of Government in the ZEV Transition

Within the context of developing the ZEV market, the government's role is to develop, implement, and improve policies that enable and encourage investment and market expansion, while increasing access and ensuring that direct benefits reach all communities. Policies must be developed in close collaboration with all of the stakeholder groups included in this document.

Incentives, including direct investments, revenue neutral market-based policies, tax benefits, access to low-interest loans, and a maturing used ZEV marketplace, will continue to play a pivotal role in filling market gaps and creating opportunities to increase access and accelerate the transition to ZEVs. The ZEV Strategy process aims to create a responsive system to focus incentives and related policies around equity and scale, with a goal of leveraging incentives to accelerate private investment.

22 Note: none of the lead or support designations are meant to diminish any group's contributions. Leaders are generally in a prime position to impact outcomes; supporters play crucial roles but generally have slightly less influence on the subject ZEV market development pillar. It is important to acknowledge that success hinges on the system, not any single actor.

23 The ZEV Strategy is designed to be an iterative process; feedback from stakeholder groups will be integrated in ZEV Strategy updates, as appropriate, and throughout implementation.

California Government — State Agencies

The agencies listed in this Strategy have leading and/or supporting roles in building and incentivizing the ZEV market, and we continue to benefit from strong agency leaders and innovative staff throughout state government. [Appendix A](#) of the Strategy presents each agency's objectives relative to scaling the ZEV market and prioritizing efforts, as well as the key related documents each agency produces, contributes to, or supports.²⁴ The goal is to empower agency leaders and staff to focus, streamline, and accelerate the administration's market development efforts.

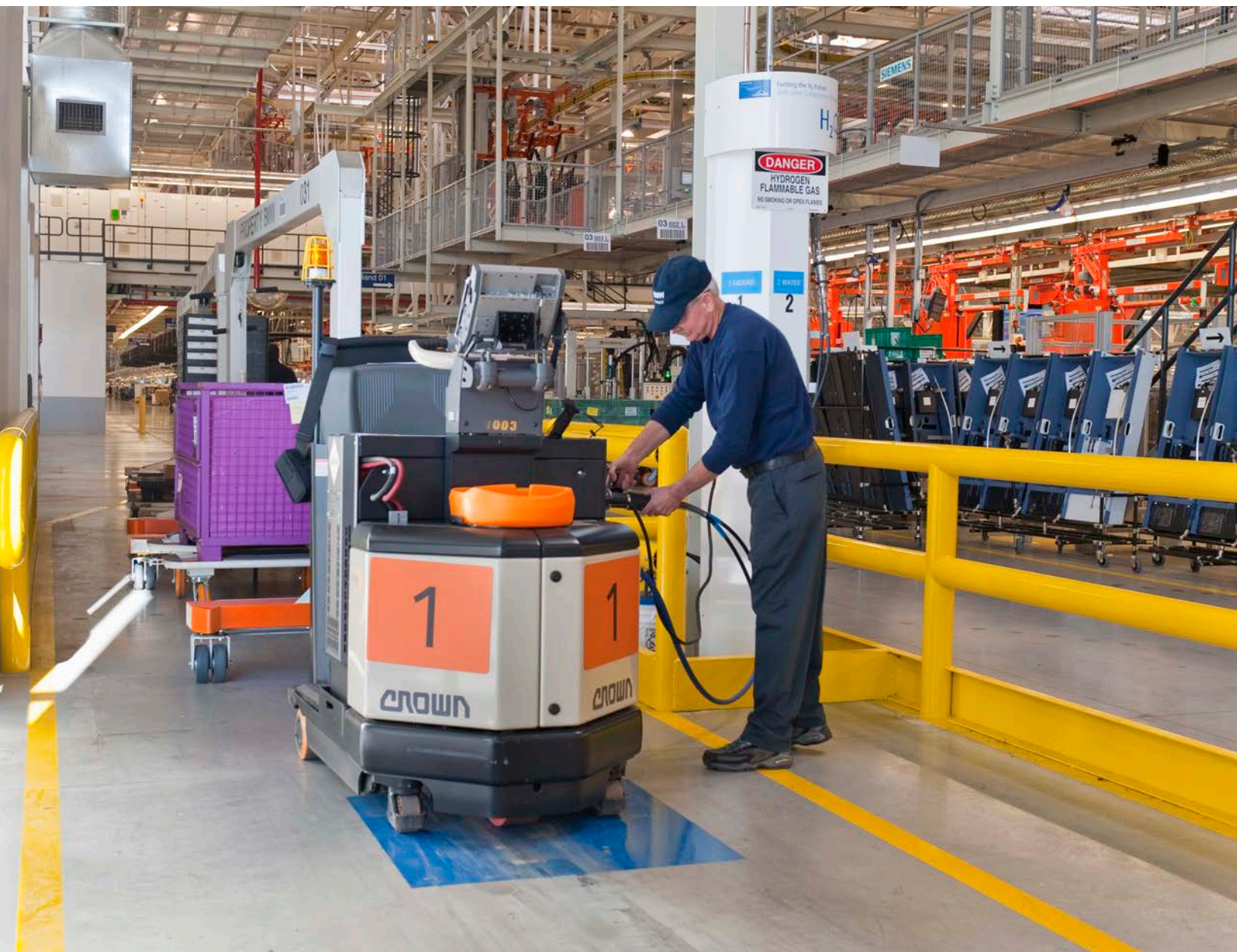


²⁴ State agency objectives are intended to be developed on three-year cycles that coincide with the ZEV Market Development Strategy updates, as outlined in Executive Order N-79-20. However, agencies may review and revise objectives in the interim, as needed, to better support the evolving ZEV market.

Key Stakeholder Groups

Numerous stakeholder groups beyond California state government agencies play key roles in advancing the ZEV market — the state cannot achieve scale alone. [Appendix B](#) offers an overview of these key groups and their high-level objectives. While comprehensive, it is not all inclusive; as the ZEV market continues to evolve, roles and objectives may change, and new entrants will emerge to respond to the needs of a mature market.

The level of detail provided for these groups is intentionally less than what is outlined for state agencies. The purpose of including key stakeholders in this Strategy is to illuminate the broader ZEV stakeholder landscape, highlight key areas of focus for each group, provide an entry point for those aiming to join the ZEV market development movement, and help identify gaps and areas of overlap so that we can more effectively organize our collective effort.



California ZEV Market Development Stakeholders/Partners

- **California State Agencies (listed on [page 20](#))**
- **Local and Regional Government**
 - Air Districts
 - City/County Government
 - Metropolitan Planning Organizations
 - Regional Transportation Planning Agencies
- **Federal and Tribal Governments**
 - Federal Government Agencies and National Labs
 - Tribal Governments
- **Vehicle Manufacturers and Supply Chain**
 - Dealerships (and dealership groups; direct sales)
 - Light-Duty Manufacturers
 - Medium- and Heavy-Duty Manufacturers
 - New Market Entrants
 - Off-Road Vehicles and Equipment Manufacturers
 - Suppliers
- **Grid Operators, Electricity, and Hydrogen Providers**
 - Balancing Authorities
 - Community Choice Aggregators
 - Electric Utilities, Load-Serving Entities
 - Electric Vehicle Charging Station Providers and Installers
 - Gas Utilities
 - Hydrogen Producers
 - Hydrogen Station Developers and Operators
 - Registered Service Agencies
- **Fleets (public and private)**
- **Non-Governmental Organizations**
 - Codes and Standards Bodies
 - Collaboratives
 - Community-Based NGOs
 - Environmental NGOs
 - Equity NGOs
 - Trade Associations
- **Investors/Financing Institutions**
- **Organized Labor**
- **Academia**
 - Community Colleges
 - Universities
- **International Relationships**



The Process

As established in EO N-79-20, the ZEV Market Development Strategy Document will be updated at least every three years. The objectives in the ZEV Strategy (e.g., GO-Biz will lead the development and implementation of the ZEV Strategy) are likely to remain relevant for at least three years. However, the actions and tactics under each objective (e.g., GO-Biz will work with stakeholders to establish clear, agreed upon ZEV metrics that multiple stakeholders can use to diagnose market health) will change more frequently and be adjusted in response to market conditions.

State Agency Action Plans

Every year, each state agency will submit a brief action plan to GO-Biz, setting the priorities under their ZEV Strategy objectives and communicating key equity strategies the agency is seeking to implement, advance, and/or improve. These plans are designed to be a prioritization exercise that increases transparency and accountability to the objectives detailed in [Appendix A](#). GO-Biz will work closely with each agency to help foster alignment and ensure agency actions are coordinated and understood. Stakeholders and partners play a critical role in helping identify areas for improvement and potential policy conflicts.

The first draft action plans are due to GO-Biz by March 1, 2021. The actions are intended to be concise in form, and ambitious in substance. All are aimed at advancing the market in one or more of the four pillars. Agencies will report progress on their actions by January 31, 2022, marking the end of the 2021 cycle, and beginning of the new 2022 cycle.

The action plans and progress/accomplishments will be available on the publicly accessible ZEV Strategy website.²⁵

Pillar Priorities

In addition to the agency specific action plans, GO-Biz will publicly post annual priority summaries for each market pillar, along with an equity engagement and implementation strategy and a cross-cutting priority view to connect the pillars together. In all cases, these Pillar Priority documents will focus on policy and implementation harmony across agencies and stakeholders. These six, concise Pillar Priority documents will communicate market development areas and outline the top-level strategies, with a focus on state policy leadership and regional and local opportunities to accelerate implementation.²⁶ These documents will be posted by March 15 of each year and build off a) issues identified through tracking market metrics, b) stakeholder feedback, and c) agency action plans.²⁷

Lessons learned through each year's ZEV Market Development Strategy will inform subsequent policy development.

²⁵ [Zero-Emission Vehicle Market Development Strategy](#)

²⁶ Six documents: 1: Vehicle Pillar, 2: Infrastructure Pillar, 3: End Users Pillar, 4: Workforce Pillar, 5: Equity Strategy, 6: Cross Cutting Priorities

²⁷ Note: The timing may change as we refine the process based on stakeholder feedback.



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Capturing Lessons Learned

California leaders and stakeholders have learned a tremendous amount since the advent of the ZEV program in the early 1990s. We will continue learning through active collaboration and partnerships that go beyond state and local agencies to include priority communities, project by project, study by study, policy by policy. The ZEV Strategy website aims to consolidate lessons learned in formats that are accessible to multiple stakeholders, inside and outside of California. This includes organizing and directing stakeholders to relevant project summaries, an annual summary of accomplishments and lessons learned for each market pillar with stakeholder input (including equity and cross-cutting issues), and suggestions for improvement to help other jurisdictions learn from California's experience.



Conclusion

There is nothing easy about shifting the entire transportation system from fossil to renewable energy in the timeframe required to meet or exceed California's health and science-based goals. But, with the shared targets outlined in EO N-79-20 and collaboration and contributions from multiple parties, it is possible, especially given the gaining momentum in the marketplace. This ZEV Market Development Strategy effort aims to move the transition from *possible* to *inevitable* by creating a framework and process for collaboration and decision-making across multiple stakeholders and partners.

Readers should consider this document and its appendices to be a foundational step in an ongoing effort to accelerate the ZEV market — an effort we all need to continually build upon and improve. There will certainly be challenges on the road to 100 percent ZEVs, but nothing that cannot be overcome by working together.



A Tale of Four Pillars: ZEV Market Development Strategy, Who's Who

LEGEND

Lead: The group is positioned to take primary responsibility for the given ZEV market pillar (there may be more than one lead per stakeholder class).

Support: The group makes active contributions within the ZEV market pillar in a supporting role.

ZEV Connection: High-level summary that includes statutory and/or administrative direction. Not comprehensive.

Equity Connection: Top-level equity objective for each agency or partner. Designed to be both aspirational and pragmatic.

Goal: Large Scale, Equitable Market Development

Outcomes: Air Quality, GHG Emission Reductions, Equitable Access, Investment/Jobs

TABLE 3: STATE AGENCIES

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Building Standards Commission (BSC)	Building standards that enable ZEV infrastructure	Continue to increase access to infrastructure for all communities through building code updates	–	Support	–	–
California Air Resources Board (CARB)	Health, climate, ZEV regulations and policies; investments and incentives that grow the market equitably; consumer awareness	Improve air quality; vehicle & mobility access for all, metrics development for equity projects	Lead	Support	Lead	Support
California Department of Consumer Affairs (CDCA), Bureau of Automotive Repair (BAR)	Auto repair training, consumer assurance	Protect consumers in used market	–	–	Support	Support
California Department of Consumer Affairs (CDCA), Contractors State License Board (CSLB)	Support and metrics that support implementation of AB 841 and other trades	Data collection and analysis for ZEV infrastructure licensing in CA regions	–	–	–	Support

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
California Department of Food and Agriculture (CDFA), Division of Measurement Standards (DMS)	Device specifications and standards for public stations (consumer and vendor protection)	Ensure fair and accurate transactions	–	Support	–	–
California Department of Forestry and Fire Protection (CAL FIRE)	Fire code adoption and support, & national standard adoption and support. Enforcement of regulations on state property	Broad ZEV infrastructure safety	Support	Support	Support	Support
California Department of Resources Recycling and Recovery (CalRecycle)	Battery & fuel cell recycling, waste to energy	Projects supporting diverse workforce	Support	Support	Support	Support
California Department of Transportation (Caltrans)	ZEV fleet and infrastructure; highway signage for ZEV fueling	Contracting to enable equitable job growth	Support	Support	Support	Support
California Energy Commission (CEC)	ZEV infrastructure investment and analysis, fuel consumption tracking, energy system resilience and forecasting, ZEV technology research and demonstration, ZEV-related manufacturing, workforce training and development	Increase access for and investments in priority communities; support ZEV adoption and access in multi-family housing; pathways to high-road jobs in priority communities; conduct ZEV-related pilot projects in equity communities	Support	Lead	Support	Support
California Environmental Protection Agency (CalEPA)	Battery recycling, waste to hydrogen, electricity	Equity component to all projects	Support	Support	–	–

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
California High-Speed Rail Authority	California's biggest passenger ZEV along with ZEV maintenance equipment and ZEV bus fleet	Progressive contracting, economic development, job training	Lead	Support	Support	Support
California Infrastructure and Economic Development Bank (IBank)	Finance support for ZEV expansion	Lending to enable women and minority owned businesses; lending parameters to ensure equitable access to high-road jobs	Support	Support	–	–
California Labor and Workforce Development Agency	Just transition to carbon-neutral economy	Support development of Just Transition Roadmap	–	–	–	Support
California Public Utilities Commission (CPUC)	Regulate IOU infrastructure investments and ZEV-related programs, rate design to encourage long-term growth, affordable electricity, grid reliability	Equitable investment in and incentives for priority communities, encourage broad employment opportunities, affordable rates for fueling	Support	Lead	Support	Support
California State Transportation Agency (CalSTA)	ZEV based transportation systems	Focus program investments on robust access	Support	Support	Support	–
California Transportation Commission (CTC)	Transportation planning, investment, funding	Plans and project applications describe benefits to priority communities; investment in priority communities	Support	Support	–	–

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
California Workforce Development Board (CWDB)	Workforce development (programs and policy)	Development of high-road training partnerships targeting mission-critical industries, occupations, and communities most in need; collaboration with other agencies to ensure program alignment	–	–	–	Lead
Department of Finance (DOF)	Public investment oversight, public investor guidance	State investments to increase access	Support	Support	Support	Support
Department of General Services (DGS)	Electric vehicle charging stations installation at state properties, ZEV first purchasing, charging accessibility, hydrogen station support.	Contracting to enable equitable growth of high-road jobs	Support	Support	Support	Support
Department of Housing and Community Development (HCD)	Building standards that require ZEV infrastructure and facilitate future charging	Pursue standards that benefit low-income housing	–	Support	–	–
Department of Motor Vehicles (DMV)	ZEV adoption data and registration processes	Ensure DMV customer processes are accessible to all, track ZEV adoption via vehicle registration	Support	–	Support	–
Department of Toxic Substances Control (DTSC)	Battery recycling	Regulations protect vulnerable populations	Support	–	–	–
Division of the State Architect (DSA)	Electric vehicle charging station accessibility regulations and installation at public K-12 schools and community colleges	Ensure access to ZEV fueling for disabled Californians through regulations that are already in effect in the California Building Code	–	Support	Support	–

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Employment Training Panel (ETP)	Job training support for companies expanding their ZEV workforce or retraining	Prioritize investments to underrepresented communities	–	–	–	Support
Governor's Office of Business and Economic Development (GO-Biz)	ZEV Strategy lead, Business support, streamlining	Target economic expansion in underserved communities — focus on minority and small owned businesses/ suppliers	Support	Support	Support	Support
Governor's Office of Planning and Research (OPR)	Just transition to carbon-neutral economy, local government connection	Lead development of Just Transition Roadmap, State, local and regional resilience	–	–	Support	Lead
State Treasurer's Office (STO)	Finance support for ZEV projects including vehicles and charging/fueling infrastructure	Lending to facilitate access to capital for small businesses including supplemental support in priority communities	Support	Support	Support	Support
Strategic Growth Council (SGC)	ZEV enabling investments in communities, community awareness and capacity building	Job development and mobility improvement in priority communities	Support	Support	Support	Support

TABLE 4: LOCAL AND REGIONAL GOVERNMENTS

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Air Districts	Indirect Source Rules requiring ZEVs, incentives and creative market expansion programs; support ZEV Mobile Source Measures and Transportation Control Measures in updates to pollutant plans; evaluate success in reducing emissions in AB 617 Communities	Focus incentives and outreach in priority communities	Lead	Lead	Lead	–
City/County Government	Permitting, weights and measures, zoning, code development and adoption; municipal fleets; planning (e.g., Climate Action Plans and EV Readiness Plans); directional fueling/charging signage; vehicle and infrastructure incentives	Actively engage priority communities	Support	Lead	Support	Support
Metropolitan Planning Organizations (MPOs)	Regional Transportation Plans and Sustainable Communities Strategies focused on maximizing ZEV mobility and infrastructure	Design planning processes to incorporate environmental justice and directly benefit priority communities	Support	Support	Support	Support
Regional Transportation Planning Agencies (RTPAs)	Regional Transportation Plans include regional ZEV goals	Regional Transportation Plans include equity goals	Support	Support	Support	Support

TABLE 5: FEDERAL AND TRIBAL GOVERNMENTS

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Federal Government Agencies and National Labs	Regulations and policies, research development and deployment, project funding, and broad partnership to scale the ZEV market	Programs explicitly direct resources to priority communities	Lead	Lead	Lead	Lead
Tribal Governments	Pursue ZEV solutions to benefit residents	Collaborate with stakeholders to ensure tribal priorities and needs are addressed	Support	Lead	Lead	Lead

TABLE 6: VEHICLE MANUFACTURERS AND SUPPLY CHAIN

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Dealerships (and dealership groups; direct sales)	Key point of contact for drivers, fleets, and education/marketing	Educate customers on ZEV benefits	Lead	Support	Lead	Support
Light-Duty Manufacturers	Production, advertising, deployment, sale and maintenance of ZEVs	Scale the market for the benefit of all	Lead	Support	Lead	Support
Medium- and Heavy-Duty Manufacturers	Production, deployment, cost reduction, customer assistance, cost of ownership analysis	Scale the market for the benefit of all and concentrate deployments in priority communities	Lead	Support	Lead	Support
New Market Entrants (note: applies to all categories)	Bring new vehicles, infrastructure, software, innovation and human behavior solutions (and attendant data) - challenge the status quo	Create innovative ways to accelerate market access and benefits to priority communities	Lead	Lead	Lead	Lead
Off-Road Vehicles and Equipment Manufacturers	Zero-emission off-road vehicles, equipment, and rail technologies	Target early deployments in segments with the greatest human impact	Lead	Support	Lead	Support

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Suppliers	Produce vehicle and infrastructure components	Create jobs for priority communities	Support	Support	–	Support

TABLE 7: FLEETS

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Fleets (public and private)	Fleet deployments in all applicable use cases	Deploy ZEV fleets in and near priority communities	Lead	Lead	Lead	Support

TABLE 8: GRID OPERATORS, ELECTRICITY AND HYDROGEN PROVIDERS

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Balancing Authorities	Maintain grid reliability and ensure investor/operator confidence	Maintain grid reliability for all communities of California	Support	Lead	Support	Support
Community Choice Aggregators (CCAs)	Reliably provide electricity to customers and their vehicles; support infrastructure, resilience, technical assistance and customer education, ZEV/EVSE incentives (personal vehicles, public/private fleets, e-mobility), innovative pilots (including workforce training, VGI, etc.)	Prioritize light, medium and heavy-duty investments in priority communities through local data driven decision-making, targeted incentive programs, and progressive contracting to deliver maximum community benefit	Support	Lead	Lead	Support
Electric Utilities, Load-Serving Entities	Provide electricity to vehicles and electrolysis safely, reliably, affordably, and in a timely manner; support large-scale infrastructure deployment through investments and rate design, provide customer support and education, and ensure electric rates remain affordable	Fill in market gaps to support infrastructure development in priority communities, contracting to encourage minority and women owned business, equitable cost assignment	Support	Lead	Lead	Support

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Electric Vehicle Charging Station Providers and Installers	EV charging stations enable ZEV adoption at scale, EVCS technology enables grid-beneficial ZEV charging and positive end user charging experience	Hire from, invest in, and deliver charging solutions for priority communities	Support	Lead	Lead	Support
Gas Utilities	Research, test, develop, and if/when deemed safe, leverage pipeline infrastructure to carry H2 and/or RNG to be converted to H2; develop/support interconnection requirements and tariffs for hydrogen injection into gas system	Invest in priority communities, contracting to encourage minority and women owned business	Support	Lead	Lead	Support
Hydrogen Producers	Produce low-cost carbon-free hydrogen at scale	Hire from priority communities	Support	Lead	Lead	Support
Hydrogen Station Developers and Operators	Develop and maintain reliable hydrogen fueling networks	Hire from, and enable fuel cell travel in and around priority communities	Support	Lead	Lead	Support
Registered Service Agencies	Install, repair, and maintain commercial fueling devices	Ensure safe, reliable, and accurate transactions	Support	Support	Support	Support

TABLE 9: NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Codes and Standards Bodies	Develop and adopt codes, standards and protocols that ensure safety, consumer protection, and enable market scale	Achieve safety, consumer protection for all	Support	Support	Support	–
Collaboratives	Multi-stakeholder collaboration	Connect, synthesize, and apply a diverse set of views	Lead	Lead	Lead	Support
Community-based NGOs	Policy research, analysis, and implementation; ZEV education, awareness, and advocacy; sharing lessons learned; connect priority communities to ZEV benefits and address community-based and specific transportation and mobility needs; solicit resident input and provide expertise on historical community conditions to build workable solutions	Community partnership, engagement, and capacity building	Support	Support	Support	Support
Environmental NGOs		Showcase diverse perspectives; help increase program effectiveness	Support	Support	Support	Support
Equity NGOs		Bring voices and perspective to policy making, represent the underrepresented	Support	Support	Support	Support
Trade Associations	Represent collective business interest to streamline policymaking input; workforce development	Pursue employees from priority communities, bring in minority owned businesses	Support	Support	Support	Support

TABLE 10: INVESTORS

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Investors/ Financing Institutions	Private capital scales the market	Create broad opportunities	Lead	Lead	Lead	Lead

TABLE 11: ACADEMIA

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Community Colleges	ZEV workforce pipelines and industry partnerships	Create opportunities for priority communities	Support	Support	Support	Lead
Universities	R&D, Analysis, Human capital/workforce development	Create opportunities for priority communities	Support	Support	Support	Lead

TABLE 12: ORGANIZED LABOR

ZEV Stakeholder	ZEV Connection	Equity Connection	Vehicles	Infrastr.	End Users	Workforce
Organized Labor	Train and connect ZEV workforce	Create opportunities for priority communities to join the ZEV related workforce	Support	Support	Support	Lead

AUTHORIZED VEHICLES
NOT CONNECTED
FOR ELECTRIC CHARGING
PURPOSES WILL BE
TOWED AWAY
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CHARGING

Glossary

Battery-Electric Vehicle (BEV): A zero-emission vehicle that uses electricity stored in a battery to power one or more electric motors and can be plugged in at home, work, fleet, or public charging stations.

Core Principles: A set of five principles that provides the foundation for decision-making throughout the Strategy development process and can be adjusted over time as priorities shift and the market advances. The core principles are equity in every decision, embrace all zero-emission pathways, collective problem solving, public-private partnership, resilience and adaptation.

End Users: The pillar of ZEV Market Development that encompasses consumers, riders, fleet operators, transportation network companies, car dealers, drivers, transportation planning agencies, program administrators, ports, regional and local governments and communities, trucking companies, and fuel providers.

Equity: Actively empowering priority communities to thrive and reach their full environmental, economic, and social potential by transforming the behaviors, institutions and systems that are causing disproportionate harm. Decisions and processes that intentionally prioritize equity are inclusive across marginalized groups, increase access to a broad suite of clean transportation and mobility options and other critical resources, and maximize opportunities in priority communities.

Fuel-Cell Electric Vehicle (FCEV): A zero-emission vehicle that is powered by electricity generated by an on-board fuel cell that electrochemically combines hydrogen (from the tank) and oxygen (from the air), with only harmless water vapor created as byproduct. Hydrogen is stored on-board the vehicle as a compressed gas.

High-quality jobs: The ideal job pays a family-sustaining wage, offers comprehensive employer-provided benefits, values worker voice, and provides security, fair scheduling, a safe and healthy work environment, and pathways for career advancement. There is no single standard for a quality jobs across regions and industries. A key element of the broader term “high-road jobs.”

High-road jobs: Jobs created within a high-road economy, which not only centers job quality, but also sustainability and equity. In a “high-road” economy, firms compete by capturing the value of innovation, quality, and worker skill, rather than pursuing a “low-road” race to the bottom based on low wages and environmental externalities. The result is family-supporting jobs, with better wages and benefits, opportunities for entry and advancement, and respect for worker voice. A broader term than “high-quality jobs.”

Infrastructure: The pillar of ZEV Market Development that encompasses fueling infrastructure needed to support all ZEVs such as electric vehicle charging stations (EVCS), hydrogen fueling stations, catenary systems and the energy systems that supply them, vehicle-grid integration, and the supply chain that enables infrastructure build out that offers the opportunity to fuel a ZEV at a lower cost than conventional fossil fuels.

Light-Duty Vehicles: Have a gross vehicle weight rating of at most 10,000 pounds.

Medium- and heavy-duty vehicles: Have a gross vehicle weight rating above 10,000 pounds. Medium-duty vehicles are between 10,000 and 26,000 pounds while heavy-duty vehicles includes vehicles above 26,000 pounds.

Metrics: Includes quantitative and qualitative indicators of ZEV market growth and health that will be tracked over time on a publicly-accessible website to display progress towards meeting state ZEV targets, filling market gaps, and meeting other key success indicators. Metrics are separated into six sections: Outcomes, Vehicles, Infrastructure, Workforce, End Users, and Investment. Progress will be updated regularly, leveraging existing processes where feasible to facilitate ongoing collaboration and information sharing.

Micro-mobility: Light-weight transportation options optimized to move an individual a short distance. Electronic scooters and bikes, as well as traditional bicycles and scooters are the most prominent examples of micro-mobility technologies.

Objectives: A goal to be achieved or a target to be reached. Meeting ZEV objectives will help grow or scale the ZEV market.

Off-road vehicles and equipment: Vehicles and equipment designed to do work off-road.

Pillars of Market Development: Provide an illustrative and organized focus for the strategy document. There are four pillars: Vehicles; Infrastructure; End Users; Workforce. Each are fundamental to building the market. If one pillar falls behind, the market suffers; if the pillars are balanced, the market thrives.

Pillar Priorities: Concise documents provided annually by GO-Biz that summarize the progress made for each market pillar. The pillar priority documents will communicate market development areas and outline the top-level strategies, with a focus on state policy leadership and regional and local opportunities to accelerate implementation.

Priority Communities: Includes neighborhoods of California that disproportionately suffer from historic environmental, health, and other social burdens. These burdens include, but are not limited to, poverty, high unemployment, inadequate access to educational resources and training opportunities to secure high-road jobs, air and water pollution, presence of hazardous wastes, high incidence of asthma, heart disease, and other chronic illnesses. Due to historic discrimination, these communities often include high levels of residents and households with people of color, low-income status, seniors, people with disabilities, non-English speakers, and those who have limited awareness of or access to clean transportation and mobility options. This definition recognizes the need to be inclusive and deliberate in acknowledging past and current policies resulting in the accrual of these burdens and minimizing further harms as paramount in meeting the State's equity goals and fostering actions that distribute community benefits intentionally and equitably. Priority communities include disadvantaged communities (DACs), low-income communities, and underserved communities, which are specific terms used in many of the statutes and regulations in the Strategy (e.g., Senate Bill 535 (De León, 2012), Senate Bill 350 (De León, 2015), Assembly Bill 1550 (Gomez, 2016), Assembly Bill 841 (Ting, 2020)).

Stakeholder: An individual or group that has a stake or interest in any decision, activity, or enterprise of the ZEV market.

State Agency Action Plans: Brief documents that identify and align regulatory and programmatic objectives, processes, and priorities across agencies. Each plan is connected to at least one of the four pillars of market development helping provide both transparency and accountability.

Vehicles: The pillar of ZEV Market Development that encompasses light-, medium-, and heavy-duty battery-electric vehicles and hydrogen fuel-cell electric vehicles, equipment used for transporting people and freight. This also includes zero-emission solutions like ZEV carsharing, e-bicycles, e-scooters, high-speed rail, locomotives, marine vessels, and aircraft that transport passengers and freight.

Vehicle-grid integration (VGI): Any method of altering the time, charging level, or location at which grid-connected electric vehicles charge or discharge, in a manner that optimizes plug-in electric vehicle interaction with the electrical grid and provides net benefits to ratepayers by doing any of the following: increasing electrical grid asset utilization; avoiding otherwise necessary distribution infrastructure upgrades; integrating renewable energy resources; reducing the cost of electricity supply; offering reliability services consistent with Section 380 or the Independent System Operator tariff. For purposes of the Strategy, we also consider the broader grid integration of fueling systems (e.g., hydrogen produced through electrolysis).

Vehicle Miles Traveled (VMT): The miles traveled by motor vehicles over a specified length of time (e.g., daily, monthly or yearly) or over a specified road or transportation corridor.

Workforce: The pillar of ZEV Market Development that encompasses the human workforce, including supply chains, that is needed to design, manufacture, sell, construct and install, service and maintain ZEVs, ZEV infrastructure, ZEV distribution systems, dealerships, energy systems, networks of charging and fueling stations, and other ZEV-related build. Workforce also includes those at third-party support companies and agencies whose work with ZEV focused institutions.

Zero-Emission Vehicle Action Plans: Reports published in 2013, 2016, and 2018 that offered a roadmap in support of the Governor's goal of getting 1.5 million ZEVs on the road by 2025 (Executive Order B-16-2012). It laid out the state's progress to-date, challenges, high-level goals, and actions for state agencies to take that could accelerate ZEV adoption.





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Appendix A: State Agency Objectives and ZEV-Related Reports

As part of the ZEV Strategy, each agency (or groups of agencies, as indicated below) will work to deliver results under the one or more objectives established in the pages of Appendix A. To focus actions under these objectives, each agency or agency group will submit concise annual agency action plans designed to concentrate efforts on key deliverables or results. These action plans are meant to be prescriptive enough to ensure accountability, yet open enough to encourage innovation.²⁸ If new data or insights justify a shift in priority, agencies will adjust and share the changes.²⁹ Agencies are listed alphabetically. Each agency's objectives directly or indirectly relate to one or more market development pillars, as shown in the following tables.

LEGEND

Direct = Main target of the objective

Indirect = Ancillary benefit of the objective

Building Standards Commission (BSC)

The BSC oversees California's comprehensive building codes. For ZEVs, this means approving forward leaning building codes that significantly reduce the cost of infrastructure, opening opportunities for consumer and fleet adoption.

Equity: Continue to increase access to infrastructure for all communities through building code updates.

Building Standards

Collaborate with regulation-proposing and expert agencies (CARB, HCD, CEC, CPUC, GO-Biz) to advance building standards that prepare California for a 100% ZEV fleet.

BSC ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Building Standards: Collaborate with regulation-proposing and expert agencies (CARB, HCD, CEC, CPUC, GO-Biz) to advance building standards that prepare California for a 100% ZEV fleet.	-	Direct	Direct	-

²⁸ Annual updates are envisioned, starting with March 1, 2021. Action plans will be housed on the ZEV market development website (GOBiz will create the website). GO-Biz envisions these plans to be 1-5 pages and will work with each agency to minimize the administrative burden, maximize the impact and transparency.

²⁹ A note on data: State agencies will strive to align data requests to minimize administrative costs for companies working to build the ZEV market.

California Air Resources Board (CARB)

CARB serves as the foundational agency for ZEV market development. Their regulations and incentive programs, both developed with active agency and stakeholder engagement, set the market development floor. CARB is responsible for promoting and protecting public health, air quality, and reducing the impacts from climate change by reducing criteria pollutants, toxic air contaminants, and greenhouse gas emissions.

Equity: Improve air quality, particularly in communities disproportionately impacted by pollution; increase clean vehicle and mobility awareness, affordability, and access for priority communities; collect quantitative and qualitative data and develop metrics to measure progress and impact over time.

CARB ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Analysis: Maintain shared analytical understanding of the role of transportation in air quality/toxic and climate emissions.	Direct	Direct	Indirect	–
Regulation: Develop and implement regulations to require investment into production, sale and use of zero-emission vehicles/transportation and mobility, freight, and off-road equipment considering needs identified by communities most impacted by poor air quality. Propose building standards that prepare California for a 100% ZEV fleet (coordinate with BSC, HCD, CEC, CPUC, GO-Biz).	Direct	Direct	Indirect	Indirect
Incentives: Create and implement incentive systems that build awareness and market demand, facilitate market expansion — with a focus on meeting unique community transportation and mobility needs, and share lessons learned to replicate or expand creative projects and approaches where feasible. Ensure that all incentives support state's high-road workforce goals as well and encourage high-road market expansion and improved job quality for CA workers.	Direct	Indirect	Direct	Direct
ZEV Market Development: Expand new and used markets and programs, consumer education and awareness, and increase access to clean mobility. Lead H2 infrastructure analysis, support EVSE analysis (in collaboration with CEC, CPUC and GO-Biz).	Direct	Direct	Direct	Direct
Mobility and Technology Advancement: Invest in research, development, and demonstration to advance clean mobility and ZEV technology, including opening/enabling new markets.	Direct	Direct	Direct	Indirect
Information Sharing: Feed aggregated OEM and market data into agency policymaking processes.	Direct	Direct	Indirect	Direct
External Market Development: Leadership/collaboration with other states, nations, federal government, local government and community-based organizations, etc.	Direct	Direct	Direct	–
Consumer and Worker Awareness: Strengthen and expand ZEV related education and outreach, and tailor to unique needs of impacted communities, to ensure all Californians understand how to transition to cleaner mobility options.	–	–	Direct	Direct

KEY CARB DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Climate Change Scoping Plan: 1) Transportation's contribution to GHG emissions, 2) ZEV penetration required to reach GHG targets.	Lead Agency, Ongoing
Mobile Source Strategy: 1) Overall strategy to decrease emissions from mobile sources, 2) major milestones that inform regulatory and incentive strategy.	Lead Agency, Ongoing
State Strategy for the State Implementation Plan: Determine the role ZEVs play in achieving the existing National Ambient Air Quality Standards (NAAQS) and how the state can speed up the timeline for NAAQS attainment.	Lead Agency, Ongoing
Funding Plan for Clean Transportation: Funding strategy - which sectors and communities need pilot project funding, rebate style funding, or subsidized financing. Equitable ZEV deployment, ZEV manufacturing, ZEV replacement, aligning vehicle purchase incentives, reduced risk of purchasing ZEV, outreach plans and strategies, community transportation needs assessments, light-duty ZEV market findings, and long-term heavy-duty investment strategy (see below).	Lead Agency, Ongoing
Heavy-Duty Investment Strategy: (appendix to Funding Plan for Clean Transportation Incentives). Strategy to move technologies through the commercialization process. Seek to provide funding assistance that supports the technology advancement partnerships needed to achieve MHD ZEV deployment targets. Collaborate with CTC.	Lead Agency, Ongoing
Carl Moyer Program Guidelines: Incentive funding opportunities for on-road and off-road equipment.	Lead Agency, Ongoing
Cap-and-Trade Auction Proceeds Investments Plan: 1) Funding priorities relative to all climate sectors, connection to relevant implementing agencies.	Lead Agency, Ongoing
Evaluation of Fuel-Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development — AB 8: 1) CARB's analysis of current status and near-term projections of FCEV deployment and station network development, 2) actions necessary to maintain progress and continued future expansion, 3) recommendations to CEC on future station development co-funding through AB 8, 4) technical recommendations.	Lead Agency, Ongoing
Community Air Protection Incentive Guidelines: ZEV role in addressing disproportionate air quality burdens on the most impacted communities.	Lead Agency, Ongoing
California's Sustainable Communities and Climate Protection Act Progress Reports — SB 150: Updated every four years; ZEV component measures progress on transportation improvements.	Lead Agency, Ongoing
Low Carbon Fuel Standard Guidance Documents: How to leverage the LCFS to generate revenue for ZEV infrastructure.	Lead Agency, Ongoing
SB 498 ZEV Report Policy recommendations for increasing ZEV use.	Lead Agency, One-Time
SB 350 Low-Income Barriers Study, Part B) Overcoming Barriers to Clean Transportation Access for Low-Income Residents (CARB, CEC, CPUC, Caltrans, others): Identify barriers for priority communities to access clean transportation options, mobility, and new and used ZEVs. Implement strategies to address these barriers.	Coauthor, Supporting Agency
Hydrogen Station Network Self-Sufficiency Analysis per Assembly Bill 8: 1) Potential scenarios by which to eliminate state support and estimated self-sufficiency date, 2) Impact of factors that drive hydrogen station economics, 3) Most effective cost reduction opportunities, 4) Benefits to the consumer through reduced price at the pump.	Coauthor, Supporting Agency

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
SB 100 (CEC, CPUC and CARB): ZEV role in meeting 100% zero carbon by 2045 requirement.	Coauthor, Supporting Agency
SB 1000 (CEC, CPUC and CARB): Ensure chargers are equitably deployed and vehicles are integrated into the grid.	Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency
Vehicle-Grid Integration Roadmap (CEC, CAISO, CPUC, CARB): Actions state can take to advance VGI, accelerate development and deployment.	Coauthor, Supporting Agency
Electric Vehicle Charging Infrastructure Assessment — AB 2127 (CEC, CARB, CPUC): Amount/locations of chargers needed to end the need for combustion.	Coauthor, Supporting Agency
AB 74 Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.	Coauthor, Supporting Agency
AB 8 Time and Cost to 100 Hydrogen Stations (CEC, CARB, with support from GO-Biz): Status and impact of public and private investment; station development timelines.	Coauthor, Supporting Agency
Electrify America Investment Plans: How Electrify America invests VW settlement money into California's ZEV market.	Approving Agency

California Department of Consumer Affairs, Bureau of Automotive Repair (BAR)

The BAR offers various programs and resources for consumers that can be applied to ZEVs to help consumers navigate and grow confidence in the technology.

Equity: Protect consumers in the secondhand market.

BAR ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Consumer Confidence: Establish systems that give consumers confidence that used PHEVs, BEVs, and FCEVs will serve their needs for multiple years.	Direct	–	Direct	–
Maintenance and Repairs: Automotive technicians are trained to service ZEV platforms.	–	–	–	Direct
Data: Build on existing data sharing practices to help inform collective understanding of market health and consumer response.	Indirect	–	–	Direct

California Department of Consumer Affairs, Contractors State License Board (CSLB)

The CSLB supports implementation of AB 841 and protects California consumers by licensing and regulating the state's construction industry.

Equity: Collect data and perform analysis to ensure sufficient ZEV infrastructure licensing in priority communities across the state.

CSLB ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Consumer Protection: Establish/enforce licensing procedures that ensure a well trained workforce and meet market needs.	–	–	–	Indirect
Data: Build on existing data sharing practices to help inform collective understanding of market health.	–	–	–	Indirect

California Department of Food and Agriculture, Division of Measurement Standards (DMS)

The DMS promotes accuracy in metering technology and other related fields in weights and measures for both electricity and hydrogen. They work within the national system, and often blaze the trail for other states and the nation to follow.

Equity: Ensure fair and accurate transactions.

DMS ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Consumer/Vendor Protection: Establish/enforce fuel quality and weights and measures laws and regulations that meet market needs and ensure accurate pricing and marketplace transparency.	–	Direct	–	–
Workforce Training: Put systems in place to help ensure weights and measures testing does not become a bottleneck in the system.	–	Direct	–	Indirect

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE streamlines and adopts fire codes relevant to ZEVs, implements training, and educates communities on fire safety.

Equity: Promote ZEV infrastructure safety across California, making sure priority communities are proactively addressed.

CAL FIRE ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Fire Codes: Adopt fire codes & standards, interpret, and streamline codes for ZEV infrastructure that reflect the latest science and technology. Assist local fire marshals on code interpretation. Enforce the regulations in state buildings.	Indirect	Indirect	–	–
Enforcement Regulations on State Property: Plan review, construction inspections and approval of projects including the High-Speed Rail.	Indirect	Indirect	–	–
Training: Identify and integrate opportunities for ZEV related fire training in existing and new courses.	Indirect	Indirect	–	–

California Department of Transportation (Caltrans)

Caltrans operates a large fleet of vehicles, manages land, and implements projects, including rail and transit, that can all push the market toward zero emissions.

Equity: Prioritize ZEV deployment and investments in priority communities while facilitating Federal and State funding sources to assist our partners in zero-emission vehicle, bus, and rail replacement, procurement, and deployment.

CALTRANS ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Green Fleet: Create and promote the greenest fleet in the US.	Direct	Direct	–	–
Rights of Way: Leverage Caltrans' assets and corridor plans to open access to the ZEV market.	–	–	–	–
A: Fill gaps in DCFC and hydrogen fueling networks where feasible.	Indirect	Direct	Direct	Direct
B: Strategically open state land to public and private ZEV infrastructure development.	Indirect	Direct	Direct	Direct
C: Zero-emission lanes or other strategies to incent zero-emission freight. Make ZEVs integral to freight approaches.	Direct	Direct	Direct	Direct
D: Create opportunities for zero-emission rail.	Direct	Direct	Direct	Direct
Dig Once: Make future infrastructure installations easy.	–	–	–	–
A: Develop plan for future line pulls and pipelines.	–	Direct	–	Indirect
B: Develop plan for broadband access.	–	Direct	–	Indirect
C: Develop plan for data hubs for connected and autonomous vehicles.	–	Direct	–	Indirect
Bike/Walk Integration: Integrate biking/walking thoroughfares in road projects.	–	Direct	Direct	Indirect
Research and Development: Focus R&D on ZEV market deployment where feasible.	Direct	Direct	Direct	Indirect
ZEV Infrastructure Signage: Lead efforts to raise awareness with robust signage.	Indirect	Direct	Direct	Indirect

KEY CALTRANS DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Low Carbon Transit Operations Program (LCTOP) Guidelines: Assist transit providers with funding for the purchase of zero-emission buses and rail, along with the accompanying infrastructure.	Lead Agency, Ongoing
California State Rail Plan: Provide framework for California's rail network, set the stage for cleaner and better rail and community connections.	Lead Agency, Ongoing
The California Fleet Management Plan	Lead Agency, Ongoing
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency
California Transportation Plan (CTP) (Office of State Planning, Caltrans): Common framework to guide transportation decisions and investments by all levels of government and private sector. Analysis and recommendations regarding current transportation issues and future trends.	Coauthor, Supporting Agency

California Energy Commission (CEC)

The CEC sets the pace for California's multi-agency ZEV infrastructure deployment and ZEV-related manufacturing efforts. This includes efforts to expand charging and hydrogen fueling, vehicle-grid integration, and planning for resilient transportation systems powered by renewable energy. This also includes funding research, development, and deployment of next generation ZEV technologies and investments in ZEV related manufacturing.

Equity: In priority communities: increase access and investments, support ZEV adoption and access in multi-family housing, support ZEV focused pathways to high-road jobs, and conduct ZEV-related, community supported pilot projects.

CEC ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Analysis: Develop and maintain analysis on ZEV infrastructure needs and progress as well as data and shared analytical understanding of the integration of transportation into the energy system, in collaboration with CARB, CPUC, GO-Biz, and other agencies. Forecast transportation energy demand for all vehicles, including ZEVs. Maintain database of California's ZEV-related manufacturing companies.	Direct	Direct	Direct	Indirect

Objectives	Vehicles	Infrastr.	End User	Workforce
Infrastructure Development: Catalyze the development and deployment of economically and environmentally sustainable ZEV infrastructure, with focus on gaps in access for California's most impacted communities. Enable public and private sector investment in ZEV infrastructure, with focus on freight transport given disproportionate and growing pollution burden. Oversee publicly-owned utilities' electricity resource planning, including plans for transportation electrification through investments and rates.	Indirect	Direct	Indirect	Direct
Research, Development & Demonstration: Support wide range of innovative technologies to accelerate deployment of ZEV infrastructure, vehicle-grid integration, and increase benefits for all residents and markets.	Direct	Direct	Direct	Indirect
Infrastructure Resilience: Support energy storage as feasible, vehicle-grid integration, hydrogen supply, grid and fueling infrastructure reliability, workforce adequacy, on-site generation, etc.	Direct	Direct	Indirect	Indirect
Special Projects, Lithium Valley: Work with multiple stakeholders to develop and implement recommendations for lithium extraction in California, per AB 1657 (2020), as well as through other CEC efforts to facilitate a California-based lithium industry.	Direct	Indirect	Indirect	Direct

KEY CEC DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Integrated Energy Policy Report (CEC, CAISO, CARB, CPUC): Analyze ZEV infrastructure needs, grid impacts, vehicle-grid integration (VGI) opportunities to reach 100% ZEVs. Forecast ZEVs and associated energy demand to inform utility planning, based on current policies.	Lead Agency, Ongoing
Clean Transportation Program Investment Plan: Determine ZEV sectors, community priorities, and market segments in need of funding for pilot projects, rebates, and subsidized financing.	Lead Agency, Ongoing
EPIC Investment Plan: Fund needed ZEV technology innovations such as smart charging, VGI, bi-directional charging, EV battery reuse and recycling, and distributed energy resources for resiliency.	Lead Agency, Ongoing
Electric Vehicle Charging Infrastructure Assessment — AB 2127 (CEC, CARB, CPUC): Amount and regional need of chargers to serve light-duty, medium-duty, and heavy-duty battery-electric and plug-in hybrid electric vehicles envisioned in California's policy goals.	Lead Agency, Ongoing
AB 8 Time and Cost to 100 Hydrogen Stations (CEC, CARB, with support from GO-Biz): Status and impact of public and private investment; station development timelines.	Lead Agency, Ongoing
Vehicle-Grid Integration Roadmap (CEC, CAISO, CPUC, CARB): Actions state can take to advance VGI, accelerate development and deployment.	Lead Agency, Ongoing
SB 1000 (CEC, CPUC and CARB): Ensure chargers are equitably deployed.	Lead Agency, Ongoing
Lithium Valley Commission Report: Recommendations for developing and expanding in-state lithium production, per AB 1657 (2020). Due on or before October 22, 2022.	Lead Agency, One-Time

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
SB 100 (CEC, CPUC and CARB): ZEV role in meeting 100% zero carbon by 2045 requirement.	Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency
SB 350 Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents (CARB, CEC, CPUC, CalTrans, others): Identify barriers for low-income and priority communities and low-income households to access clean transportation options, enhanced mobility, and new and used ZEVs. Implement strategies to address these barriers.	Coauthor, Supporting Agency
AB 74/Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.	Coauthor, Supporting Agency
VGI Working Group Report (CPUC, CEC, CARB, CAISO): Determine and enable opportunities to realize VGI benefits, responsibly accelerate ZEV market and achieve grid reliability and resiliency.	Coauthor, Supporting Agency
Integrated Resource Plan (POUs): Ensure that electricity sector contributes to California's economy-wide ZEV and GHG emissions reductions goals.	Receiving Agency
Evaluation of Fuel-Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development — AB 8: 1) CARB's analysis of current status and near-term projections of FCEV deployment and station network development, 2) actions necessary to maintain progress and continued future expansion, 3) recommendations to CEC on future station development co-funding through AB 8, 4) technical recommendations.	Receiving Agency

California Environmental Protection Agency (CalEPA)

CalEPA oversees a variety of agencies, including CARB, that work to restore, protect and enhance California's environment. This table focuses on non-CARB related work.

Equity: Leverage analysis tools and outreach to strategically focus agency actions on high-impact projects and policies.

CALEPA ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Battery Recycling Coordination: Convene the Lithium-ion Car Battery Recycling Advisory Group in collaboration with CalRecycle and the Department of Toxic Substances Control (DTSC).	Direct	–	Direct	Direct
Disadvantaged Communities Identification: Determine the state's disadvantaged communities using the California Communities Environmental Health Screening Tool (CalEnviroScreen).	Indirect	Indirect	Indirect	Indirect

Objectives	Vehicles	Infrastr.	End User	Workforce
California Department of Resources Recycling and Recovery (CalRecycle)	–	–	–	–
A: Recycling: Promote and set up systems for battery and fuel cell reuse and recycling.	–	–	Direct	Direct
B: Second Life of Batteries: Classification, transportation, disposal of used batteries.	–	Direct	–	Direct
C: Biomass and Organics to Hydrogen or Electricity: Develop systems to promote and enable the connection of waste resources to California's energy system, including in alignment with States Low Carbon Fuel Standard regulation.	–	Direct	–	–
Department of Toxic Substances Control (DTSC)	–	–	–	–
A: Second Life of Batteries: Classification, transportation, disposal of used batteries. Second Life of Batteries. Classification, transportation, disposal of used batteries.	Indirect	–	–	Indirect

KEY CAL EPA DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
AB 74/Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.	Lead Agency, Ongoing
Lithium-ion Car Battery Recycling Advisory Group Recommendations (CalEPA, DTSC, CalRecycle): Determine policies for the recovery, repurposing, and recycling of lithium-ion vehicle batteries sold with motor vehicles of in all classes.	Lead Agency, Ongoing

California High-Speed Rail Authority (HSR)

High-Speed Rail will become the state's largest zero-emission vehicle, with feeder bus service provided by ZEVs, ZEV on-rail and on-road maintenance fleets, and its stations will serve as ZEV mobility hubs.

Equity: Develop contracts, economic development plans, and job training programs in a manner that benefits priority communities and leads to more, new high-road jobs.

HSR ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
ZEV Mobility Hubs: Integrate multi-modal ZEV transitions at stations.	Direct	Direct	Direct	Direct
System Resilience: Establish world-class resilience for California's rail system.	Direct	Direct	Direct	Indirect
ZEV Fleet: Link the rail journey with ZEV bus fleets, incentivize ZEV on-rail maintenance fleets and work with partners to develop a workforce that can operate and maintain the system and fleet.	Direct	Direct	Indirect	Direct

Objectives	Vehicles	Infrastr.	End User	Workforce
ZEV Contract Requirements: Reinforce regulation and policy by requiring ZEV across multiple classes for construction and operation.	Indirect	Indirect	Indirect	Indirect

KEY HSR DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
High Speed Rail Business Plan (every other year): The plan for the project's implementation, including type of service, proposed construction timeline, alternative financial scenarios for different levels of service, forecasts of ridership and costs, and risks and mitigation measures.	Lead Agency, Ongoing
High-Speed Rail Sustainability Report (every year): The progress the Authority is making in fulfilling environmental, economic, and cultural sustainability commitments, including its work on stations as multimodal hubs, charging infrastructure work, and renewable energy planning.	Lead Agency, Ongoing

California Infrastructure and Economic Development Bank (IBank)

IBank has broad authority to enable financing of ZEV related projects.

Equity: Lend to enable growth and expansion of women and minority owned businesses and ensure equitable access to high-road jobs across the state.

IBANK ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
ZEV Project Finance: Increase financing opportunities for ZEV projects and bring more private capital into the market.	Indirect	Indirect	Indirect	Indirect

KEY IBANK DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Climate Catalyst Fund (in development): Issue loans and other financial products to the full range of potential borrowers — private, nonprofit, tribal and public actors, creating a truly full-service “green bank” functionality for the state.	Lead Agency, Ongoing
Infrastructure State Revolving Fund (ISRF): Provides low-cost public financing to state and local government entities, including Municipalities, Universities, Schools and Hospitals (MUSH borrowers) and to nonprofit organizations sponsored by public agencies for a wide variety of public infrastructure and economic expansion projects.	Lead Agency, Ongoing
California Lending for Environmental Needs (CLEEN) Program: Offers financing for a broad range of technologies and projects, including ZEVs and infrastructure.	Lead Agency, Ongoing

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
<p>Conduit Bonds</p> <p>A: Industrial Development Bonds (IDBs): Tax-exempt financing for qualified manufacturing and processing companies, including those involved in ZEVs.</p> <p>B: 501(c)3 Bonds: Tax-exempt financing to eligible nonprofit public benefit corporations for the acquisition and/or improvement of facilities and capital assets.</p> <p>C: Exempt Facility Bonds (EFBs): Tax-exempt financing for projects that are government-owned or consist of private improvements within publicly-owned facilities.</p> <p>D: Public Agency Revenue Bonds (PARBs): Bond financings for various state entities' economic or public development projects and programs.</p>	Lead Agency, Ongoing
<p>Small Business Finance Center — Loan Guarantee Programs: Features a loan guarantee program designed to assist small businesses that experience capital access barriers.</p> <p>A: Climate Tech Finance Program: Provides focused capital support for innovative projects in the climate solutions sector.</p>	Lead Agency, Ongoing

California Labor & Workforce Development Agency (LWDA)

The LWDA leads California's efforts to protect and improve our current and future workforce. They play a pivotal role in ensuring our labor pool is prepared to meet the demands of a rapidly expanding ZEV market.

Equity: Collaborate with OPR to develop and implement the “Just Transition Roadmap”.

LWDA ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Just Transition: As specified in EO N-79-20, work with the Office of Planning and Research to establish a Just Transition Roadmap for workers and communities impacted by the transition to carbon-neutrality.	–	–	–	Direct

California Public Utilities Commission (CPUC)

The CPUC oversees investor owned utility investments in ZEV infrastructure and the development and affordability of rates, rebates, and other ZEV customer-facing programs with a focus on accelerating the ZEV market and maximizing ratepayer benefits.

Equity: Investment in and incentives for priority communities, encourage broad employment opportunities, pursue affordable rates for fueling, minimize and equitably distribute costs for ZEV infrastructure.

CPUC ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Utility Investment: Enable widespread, safe ZEV adoption via utility investments on infrastructure, with a focus on investing in priority communities. Includes implementation of AB 841 (2020) to develop and implement new rules or tariffs to support charging infrastructure.	–	Direct	Direct	Indirect
Electricity Rates that are aligned with the CPUC principles of rate design, promote VGI and electrolytic hydrogen fuel production at times that are beneficial for the electric grid over the long term, while also protecting ratepayers and ensuring rates remain affordable.	Direct	Direct	Direct	Indirect
Private Investment: Enable and encourage aggressive private investment in ZEV infrastructure, such as through existing programs that require site host cost-sharing and procurement of vehicles as precursor to participation and working with utilities to accelerate the interconnection process.	Indirect	Direct	Direct	Indirect
Vehicle-Grid Integration: Promote cost-effective VGI to minimize impacts and maximize benefits of ZEV deployment on the electric grid, improve resilience and enable ZEV market opportunities.	Direct	Direct	Direct	Indirect
Hydrogen in Pipelines: Work with gas utilities to understand both the potential and constraints to integrating hydrogen into existing or new pipeline networks; develop implementation strategies as appropriate.	–	Direct	Direct	Indirect
Education and outreach around ratepayer funded ZEV programs, electric rates, charging behavior and fueling from the grid.	Indirect	Direct	Direct	Indirect

KEY CPUC DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Transportation Electrification Framework: Define role, guidelines, and requirements of IOUs for reaching the state's transportation electrification goals.	Lead Agency, Ongoing
VGI Working Group Report (CPUC, CEC, CARB, CAISO): Determine and enable opportunities to realize VGI benefits, responsibly accelerate ZEV market and achieve grid reliability and resiliency.	Lead Agency, Ongoing
SB 100 (CEC, CPUC and CARB): ZEV role in meeting 100% zero carbon by 2045 requirement.	Coauthor, Supporting Agency
SB 1000 (CEC, CPUC and CARB): Ensure chargers are equitably deployed and vehicles are integrated into the grid.	Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Low-Income Barriers Study, Part B (CARB, CEC, CPUC): Identify barriers for lower income communities to access enhanced mobility and ZEV market. Determine and implement strategies to address these barriers.	Coauthor, Supporting Agency
Electric Vehicle Charging Infrastructure Assessment - AB 2127 (CEC, CARB, CPUC): Amount/locations of chargers needed to serve the populations of battery-electric and plug-in hybrid electric vehicles envisioned in California's policy goals.	Coauthor, Supporting Agency
Vehicle-Grid Integration Roadmap (CEC, CAISO, CPUC, CARB): Actions state can take to advance VGI, accelerate development and deployment.	Coauthor, Supporting Agency
Integrated Resource Plans (IOUs): Ensure that electricity sector contributes to California's economy-wide ZEV adoption and GHG emissions reductions goals.	Receiving Agency

California State Transportation Agency (CalSTA)

CalSTA oversees California's transportation departments and can steer programs to emit zero emissions, where applicable.

Equity: Focus program investments on robust clean mobility access.

CALSTA ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Planning: Ensure state transportation planning prioritizes zero-emission mobility and freight movement, sustainable transportation, and mobility access. Focus on communities most in need.	Direct	Direct	Direct	Direct
Funding: Increase funding opportunities in ZEV fueling and charging infrastructure and ZEV fleet implementation funding programs.	Direct	Direct	Indirect	–
Equity and Sustainability: Make transportation systems more inclusive and sustainable (active transportation, integrated travel project, complete streets, VMT reduction).	–	Direct	Direct	Direct

KEY CALSTA DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
California Transportation Plan: 1) CalSTA and state's transportation agencies view of VMT and ZEV's as compatible and complementary, 2) How California can build a more efficient and more environmentally friendly transportation system through VMT and GHG reductions.	Lead Agency, Ongoing
Transit and Intercity Rail Capital Program: 1) Funding assistance for transit providers for the purchase of zero-emission buses and rail, along with the accompanying infrastructure 2) the role ZEBus and ZETrain play in the larger transit picture, 3) Methodologies to determine the funding for these technologies.	Lead Agency, Ongoing
Climate Action Plan for Transportation Infrastructure: How to leverage state funding programs where the State of California plays a role in scoping, recommending or selecting specific projects to further the implementation of the transportation vision.	Lead Agency, One-Time

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
AB 74/Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.	Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency

California Transportation Commission (CTC)

The CTC oversees funding programs with some opportunities to fund ZEV related projects.

Equity: Craft project applications that describe and highlight potential benefits of investing in priority communities.

CTC ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Align Funding: Prioritize ZEV investments, and align funding with sister agencies, where feasible.	Direct	Direct	Direct	–
Road Funding: Develop equitable strategies to ensure roads continue to be maintained as revenue generated from gasoline and diesel declines.	–	Direct	Direct	–
Regional Level Transportation Planning: Collaborate with regional transportation planning agencies to incorporate zero-emission infrastructure into transportation planning where feasible.	Indirect	Direct	Direct	Indirect

KEY CTC DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Active Transportation Program (ATP) Guidelines: Funds expansion of non-motorized infrastructure to increase walking and bicycling, such as walkways, bike lanes, and bike-share.	Lead Agency, Ongoing
Regional Transportation Planning Guidelines: Guides regional planning for Metropolitan Planning Organizations and Regional Transportation Planning Agencies, with opportunities to guide analysis and prioritization of ZEV related projects.	Lead Agency, Ongoing
Local Partnership Program (LPP) Guidelines: Funds road maintenance, other transportation infrastructure improvements, and transit vehicle acquisition.	Lead Agency, Ongoing
Trade Corridor Enhancement Program (TCEP) Guidelines: Funds infrastructure improvements on trade corridors, including limited freight rail and port investments.	Lead Agency, Ongoing
Solutions for Congested Corridors Program (SCCP) Guidelines: Funds multi-modal improvements along the state's most congested corridors.	Lead Agency, Ongoing

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Local Streets and Roads Program (LSRP) Guidelines: Sets rules for formulaic investment in local roadway maintenance — tangential opportunities to support ZEVs.	Lead Agency, Ongoing
California Transportation Plan (CTP) Guidelines: Provides guidance for the development of the CTP, which describes goals and objectives for the State's transportation system.	Lead Agency, Ongoing
Multimodal Corridor Planning Guidelines: Provides guidance for eligible programs that can receive funding through the Congested Corridors Program.	Lead Agency, Ongoing Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency
State Highway Operation and Protection Program Guidelines (SHOPP): Funds capital improvements relative to the maintenance, safety, operation, and rehabilitation of the state highway system.	Coauthor, Supporting Agency
State Transportation Improvement Program (STIP): Funds state highway improvements, intercity rail, and regional highway and transit improvements.	Coauthor, Supporting Agency

California Workforce Development Board (CWDB):

CWDB is uniquely positioned to facilitate relevant high-road job training and transition partnerships, with a focus on quality jobs and broader access to them, as well as related policy development and implementation.

Equity: Continue to focus programmatic and policy work directly on building economic opportunity and mobility for those who have been marginalized, disadvantaged, and/or denied opportunity.

CWDB ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Program Development and Administration: Invest in high-road workforce development projects in both private and public sectors that support State of California ZEV mandates and goals, including vehicle deployment, charging/refueling infrastructure installation, and vehicle operations and maintenance.	Indirect	Indirect	Indirect	Direct
Policy and Program Alignment: Provide state and local agencies with guidance to address job quality and job access in ZEV-related investments, and develop shared understanding of California's labor and workforce development systems as they relate to high-road ZEV market development (present and future).	Indirect	Indirect	Indirect	Direct
Local Guidance: Provide guidance to local workforce boards to support State of California ZEV mandates and goals. (Note: focus on areas with existing industry clusters — i.e., LA Basin and Bay Area).	Indirect	Indirect	Indirect	Direct

KEY CWDB DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
AB 398 (2017) Climate and Labor Report: Establish vision for ensuring major climate policies and programs support high-road jobs with accessible training pathways, particularly for disadvantaged Californians.	Lead Agency, Ongoing
High Road Training Partnership (H RTP): Invest in and assist local industry-based partnerships of high-road employers, workers and their representatives, and other entities that deliver economic equity, job quality, and sustainability for the ZEV market.	Lead Agency, Ongoing
High Road Construction Careers (HRCC): Invest in and assist local partnerships that link local building and construction trades councils to workforce boards, community colleges, and community-based organizations, creating structured pathways to state-certified apprenticeships relevant to the ZEV market.	Lead Agency, Ongoing
AB 74/Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.	Coauthor, Supporting Agency
Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.	Coauthor, Supporting Agency

Department of Finance (DOF)

DOF plays a pivotal role in budget development, which has a direct impact on ZEV related programs.

Equity: Promote long-term economic sustainability of all communities while recognizing the particular needs of priority communities.

DOF ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Public Investment: Steward budget process to support ZEV market development.	Indirect	Indirect	Indirect	Indirect

KEY DOF DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
California Climate Investment Framework: Strategy for the state's pension funds, with recommendations for making climate conscious decisions.	Lead Agency, Ongoing

Department of General Services (DGS)

DGS leads state agency procurement and ZEV adoption and integration into the State of California fleets, and enables municipal fleet adoption through contracting.

Equity: Leverage contracting to expand the ZEV market and enable equitable growth of high-road jobs.

DGS ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Procurement Policies: Implement vehicle and infrastructure procurement policies to exceed the timelines outlined in EO N-79-20.	Direct	–	Direct	–
Petroleum Reduction: Pursue strategies to reduce the state fleet's petroleum consumption by 50% (from 2015 levels) by 2030.	Direct	Direct	Direct	–
ZEV Procurement and Distribution: Enable non-state public entities to leverage state contracts to purchase ZEVs and supporting equipment and develop policies to encourage ZEVs retired from the state fleet directly benefit communities most in need.	Direct	Direct	Direct	–
Fleet and Workplace Infrastructure: Lead state government efforts to install fleet charging to enable accelerated fleet electrification; identify opportunities and encourage use of public hydrogen stations. Develop new strategy to address post-pandemic workplace charging needs in anticipation of accelerated EV adoption in California. (Partners: CEC, CPUC, CARB, Caltrans, CDCR, EDD, Fish & Wildlife; agencies with fleets).	Indirect	Direct	Indirect	Direct
Public EV Charging and Hydrogen Station Infrastructure: Encourage development of new stations by leasing out surplus property, when feasible.	Indirect	Direct	Indirect	Direct
VMT Reduction: Develop and maintain programs to reduce state worker vehicle miles traveled and/or enable shifts to less impactful travel modes. (Partner: CalHR, all agencies)	–	–	Direct	–
ZEVs on Rental Car Contracts: Make it easier to implement now that BEVs commonly have more than 200 miles of range, and FCEV market is expanding.	Direct	–	Direct	–
Division of the State Architect	–	–	–	–
Accessibility Regulations: Electric vehicle charging stations are completely integrated into California's building standards for commercial and public facilities. Collaborate with the Building Standards Commission to advance building standards for EV charging at public K-12 schools and community colleges.	–	Direct	–	–

KEY DGS DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
ZEV First Purchasing Policy Management Memos: How to leverage the state fleet to support ZEV adoption.	Lead Agency, Ongoing

Department of Housing and Community Development (HCD)

HCD develops building standards for private residences, including multifamily buildings, enabling cost effective home charging.

Equity: Pursue standards that preserve and expand safe and affordable housing opportunities, benefiting priority communities.

HCD ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Building Standards: Collaborate with expert agencies (CARB, BSC, CEC, CPUC, GO-Biz) to ensure ZEVs are adequately integrated into California's residential building standards.	–	Direct	Direct	–

Department of Motor Vehicles (DMV)

DMV handles registrations and ownership transactions. DMV also provides Motor Carrier permits (MCP), clean air decals (CAD), international registration plan (IRP) and other registration products/services that are essential to intrastate and interstate commerce.

Equity: Ensure that DMV customer processes are accessible to all. Track market data to enable assessment of market access to the new and used ZEV market.

DMV ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Data: Collect, maintain, and share ZEV registration and odometer data to enable robust market analysis, while protecting consumer privacy.	Indirect	Indirect	Indirect	Indirect
Market Access: Clearly delineate processes to enable new technology to be tested in real world settings, create opportunities for OEMs and fleets to work together to build market confidence.	Direct	–	Direct	–
Education: Increase awareness of ZEVs through various touchpoints (e.g., driver tests, DMV materials, mailers, etc.).	–	–	Direct	–

Employment Training Panel (ETP)

ETP specializes in employee training programs. These can be leveraged to introduce and improve ZEV related job skills and increase compensation and retention.

Equity: Prioritize investments and programs that serve priority communities.

ETP ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Training: Ensure California-based companies and public agencies can easily train current and future employees on ZEV related systems.	–	–	–	Direct

Governor’s Office of Business and Economic Development (GO-Biz)

GO-Biz leads the ZEV Market Development Strategy and serves as the first point of contact for ZEV related businesses to engage with state government.

Equity: Facilitate economic expansion in underserved communities and integrate minority and small owned businesses/suppliers into the growing ZEV market. Ensure program wide robust outreach and engagement with priority communities.

GO-BIZ ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
ZEV Strategy: Organize and lead the development and implementation of the ZEV Market Development Strategy.	Direct	Direct	Direct	Direct
Infrastructure Permitting: Streamline ZEV infrastructure development.	–	Direct	–	–
Market Development Growth: Actively support clean mobility business development and work with industry, labor agencies and stakeholders to enable equitable job growth (leverage Business Investment Services, Cal Competes, and the Office of the Small Business Advocate).	Indirect	Indirect	–	Direct
Incorporate Industry Voice: Feed business perspective into agency decision-making and regulatory processes—strategic problem solving, market enabler.	Indirect	Indirect	Indirect	Indirect
Market Innovation: Enable and catalyze innovation within California (innovation hubs).	Indirect	Indirect	Indirect	Indirect
International Business: Attract foreign direct investment, assist companies in gaining access to new markets (e.g. through iZEV Desk and iZEV Market Place), share lessons learned with, and learn from, global partners.	Indirect	Indirect	Indirect	Indirect
ZEV Advertisement: Utilize ZEVs when feasible in Visit California and related marketing campaigns.	–	–	Indirect	–

KEY GO-BIZ DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
<p>ZEV Market Development Strategy: 1) Articulate core principles for collective ZEV action, 2) Identify ZEV targets, 3) Establish roles and objectives of agencies and stakeholder groups, 4) Organize collective problem-solving, 5) Ensure lessons learned are captured and incorporated.</p>	Lead Agency, Ongoing
<p>Electric Vehicle Charging Station Permitting Guidebook: 1) Current plug-in electric vehicle (PEV) landscape in California, 2) Station development phases, process, best practices and pitfalls, 3) Future market perspectives.</p>	Lead Agency, Ongoing
<p>Hydrogen Station Permitting Guidebook: 1) Hydrogen and fuel-cell electric vehicles (FCEV) ecosystem and current landscape in California, 2) Hydrogen station development phases, process, best practices and pitfalls, 3) Future market perspectives.</p>	Lead Agency, Ongoing
<p>Sustainable Freight Action Plan (CTC, CARB, CEC, CPUC, Caltrans, CalSTA, GO-Biz): Actions each agency can take to 1) achieve California's vision of a modern, safe, integrated, and resilient freight system that continues to support California's economy, jobs, and healthy, livable communities and 2) reach the Plan's targets for freight system efficiency, transitioning to zero-emission technologies, increased competitiveness and economic growth.</p>	Coauthor, Supporting Agency
<p>Evaluation of Fuel-Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development — AB 8 (CARB, CEC, GO-Biz): 1) CARB's analysis of current status and near-term projections of FCEV deployment and station network development, 2) actions necessary to maintain progress and continued future expansion, 3) recommendations to CEC on future station development co-funding through AB 8.</p>	Coauthor, Supporting Agency
<p>Electric Vehicle Charging Infrastructure Assessment — AB 2127 (CEC, CARB, CPUC, GO-Biz): Amount/locations of chargers needed to serve the populations of battery-electric and plug-in hybrid electric vehicles envisioned in California's policy goals.</p>	Coauthor, Supporting Agency
<p>AB 74/Carbon Neutrality Studies (CalEPA, CEC, CARB, GO-Biz, OPR, CalSTA, Labor and Workforce Development Agency, Natural Resources Agency): 1) Identify strategies to significantly reduce vehicle emissions and achieve carbon neutrality. 2) Identify strategies to decrease demand and supply of fossil fuels, while managing the decline of fossil fuel use.</p>	Coauthor, Supporting Agency
<p>Agency Action Plans — ZEV Market Development Strategy: Actions each agency will take to achieve their ZEV Market Development Strategy objectives.</p>	Receiving Agency

Governor’s Office of Planning and Research (OPR)

OPR serves as California's comprehensive state planning agency — driving land use, economic development and workforce insights and guidance that directly impact the ZEV market.

Equity: Lead the development and implementation of the “Just Transition Roadmap” and support local and regional resilience planning and implementation through the Integrated Climate Adaptation and Resiliency Program.

OPR ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Land Use Synergies with ZEV: Support cross-sectoral and interagency conversations that bring priorities together, including around land use planning and guidance, implementation of SB 743, transportation, housing and development, freight and logistics, etc.	–	–	Direct	Direct
Just Transition: As specified in EO N-79-20, work with the Labor Agency to establish a Just Transition Roadmap for workers and communities impacted by the transition to carbon-neutrality.	–	–	–	Direct

State Treasurer’s Office (STO)

The Treasurer’s Office has broad authority to finance, provide tax relief, and invest in ZEV related projects.

Equity: Increase knowledge of and access to capital for small and minority owned businesses and manufacturers.

STO ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Finance ZEV Projects: Identify and implement creative approaches to financing ZEV related projects. Coordinate with federal Green Bank Accelerator initiatives to provide a variety of financial incentives and support to public and private projects.	Indirect	Indirect	Indirect	Indirect
Tax Exclusions: Identify and implement creative approaches to support alternative energy and advanced transportation manufacturing.	Indirect	Indirect	–	–

KEY STO DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
California Capital Access Program for Small Business (CalCAP): Loan loss reserve program that encourages banks and other financial institutions to make loans to small businesses that have difficulty obtaining financing, particularly women, minority, veteran and LMI communities.	Lead Agency, Ongoing
A: CalCAP/California Air Resources Board Truck Loan Assistance Program: Provides financing opportunities to qualified small-business owners to purchase cleaner and zero-emission heavy-duty vehicles.	Lead Agency, Ongoing
B: CalCAP/EVCS Financing Program: Provides small-business borrowers and lenders with incentives to finance electric vehicle charging station equipment acquisition and installation at businesses and multi-unit dwellings.	Lead Agency, Ongoing
Sales and Use Tax Exclusion Program: Provides a sales and use tax exclusion to manufacturers that promote advanced transportation, renewable fuels, alternative energy, and recycling.	Lead Agency, Ongoing
Industrial Development Bonds: Low-cost financing for businesses that feature a manufacturing component related to pollution control, including ZEV related projects.	Lead Agency, Ongoing
Tax Exempt Bonds: Tax-exempt financing for projects that purchase clean-air vehicles for solid and water waste facilities and recycling facilities, with additional incentives for small businesses.	Lead Agency, Ongoing
Green Bonds: Financial instruments issued by the public sector, private sector, and multilateral institutions specifically to finance climate and environmentally-friendly projects.	Lead Agency, Ongoing

Strategic Growth Council (SGC)

SGC invests in communities, creating opportunities to enable ZEV adoption.

Equity: Support job development and mobility improvement in priority communities.

SGC ZEV MARKET DEVELOPMENT OBJECTIVES

Objectives	Vehicles	Infrastr.	End User	Workforce
Incentivize ZEVs in All Programs: Infrastructure and planning grant programs incorporate ZEV and ZEV infrastructure incentives and funding in their sustainable community development strategies.	Indirect	Indirect	Direct	Direct
Update Guidelines with ZEVs in Mind: ZEV deployment and infrastructure incentives/guidelines in SGC grant programs are continually updated to reflect State of California priorities, including proactive support for small minority owned businesses.	Indirect	Indirect	Direct	Direct

KEY SGC DOCUMENTS RELATED TO ZEV MARKET DEVELOPMENT

Report & Key ZEV Market Related Questions Addressed	Role & Frequency
Affordable Housing and Sustainable Communities (AHSC) Program Guidelines: Supports opportunities to fund ZEVs and ZEV infrastructure in AHSC projects.	Lead Agency, Ongoing
Transformative Climate Communities (TCC) Program Guidelines: Supports opportunities to fund ZEVs and ZEV infrastructure in TCC projects.	Lead Agency, Ongoing

Appendix B: Key Stakeholder Groups and High-Level Objectives

Numerous stakeholder groups beyond California State Government Agencies play key roles in advancing the ZEV market — the state cannot achieve scale alone. This section offers an overview of these key groups and their high-level objectives. While comprehensive, it is not all inclusive; as the ZEV market continues to evolve, roles and objectives may change, and new entrants will emerge to respond to the needs of a mature market.

The level of detail provided for these groups is intentionally less than what is outlined for state agencies. The purpose of including key stakeholders in this Strategy is to illuminate the broader ZEV stakeholder landscape, highlight key areas of focus for each group, provide an entry point for those aiming to join the ZEV market development movement, and help identify gaps and areas of overlap so that we can more effectively organize our collective effort.

Governor's Office and California Legislature

The Governor's Office and California Legislature set the vision for the state. The Governor's Office establishes budget priorities with the legislature and helps focus the state agencies' collective effort on targets to achieve California's environmental, economic, and social goals.

The Legislature plays a foundational role in building the ZEV market by setting aggressive targets and passing permit streamlining laws, working with the Governor's Office to establish budget priorities, and raising awareness of critical challenges and solutions.

Local and Regional Government

Local and regional governments serve pivotal roles in ZEV market development. From permitting to building standards, transportation planning to investments, we rely on local leaders and policies to hasten the transition to zero emissions for all Californians.

California has 482 cities, 58 counties, 35 air districts, 18 metropolitan planning organizations, and 26 regional transportation agencies, each with different realities and constituencies. The following objectives are high-level and directional — their application will vary across the state.

LOCAL AND REGIONAL GOVERNMENT

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Air Districts	California's 35 air districts play varying roles in ZEV market development depending on district size, population, air quality, and other local factors. They lead and collaborate with regional stakeholders to broaden and promote ZEV adoption and innovative clean mobility and administer rebate programs like Clean Cars 4 All.	<ul style="list-style-type: none"> • Shared understanding of local air quality • Enable and fund, as appropriate, broad ZEV adoption and innovative clean mobility • Push the technology/deployment envelope • Support ZEV infrastructure networks • Tailor local education, outreach, and incentives to the needs of community • Develop strategies to increase ZEV adoption, as appropriate • Measure impacts of strategies in reducing air pollution regionally and in AB 617 communities • Manage settlement programs • Adoption of local facility based mobile source rules that require ZEVs at commercial airports, warehouse distribution centers, seaports, and railyards 	Lead	Lead	Lead	–

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
City/County Government	Local governments approve and oversee ZEV infrastructure permitting, zoning building code, certify weights and measures, operate their own fleets, lead land use planning, and implement policies that directly impact ZEV deployment.	<ul style="list-style-type: none"> • Reduce car dependence in communities, including transit and micro-mobility • Streamline permitting for ZEV infrastructure • Develop of City or Regional ZEV Readiness Plans or Roadmaps • Adopt aggressive building standards that facilitate the transition to ZEVs, micro-mobility, and reduced car dependence; and ensure new construction can meet future demand to avoid unnecessary retrofitting costs • Direct investment in ZEV infrastructure in well-attended, frequently used and municipally-owned property; and deploy and/or create concessions to encourage private investment • Explore reduced parking requirements in exchange for charging infrastructure installation • Support consumer awareness programs such as ride-and-drives and targeted outreach • Engage large employers and property owners to encourage ZEV infrastructure deployment • Create emissions-free zones • Prioritize ZEV deployment in fleets and procurement decisions (leading by example) • Create or facilitate ZEV programs that focus investment in priority communities 	Support	Support	Support	Support
Metropolitan Planning Organizations (MPOs)	MPOs lead regional transportation planning. They play a pivotal role in getting people out of cars, optimizing freight corridors, and deploying strategies to encourage ZEV adoption.	<ul style="list-style-type: none"> • Develop and implement Sustainable Community Strategies and Regional Transportation Plans that incorporates ZEV related policies • Implement projects that support the Sustainable Freight Action Plan • Permit streamlining outreach and support • Apply for and implement state and federal funding that encourages ZEV adoption • Develop regional ZEV readiness plans, tools, and studies 	Support	Support	Support	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Regional Transportation Planning Agencies (RTPAs)	RTPAs serve a role very similar to MPOs, but for rural regions. They develop long range planning to ensure their region's vision and goals are clearly identified, and effective decisions are made to reach those goals. These plans should support the state's ZEV goals.	<ul style="list-style-type: none"> • Develop and implement strategies to integrate ZEVs into Regional Transportation Plans • Identify and communicate ZEV related opportunities and barriers; work with stakeholders to implement solutions • Permit streamlining outreach and support • Apply for and implement funding that encourages ZEV adoption • Develop regional ZEV readiness plans, tools, and studies 	Support	Support	Support	Support

FEDERAL AND TRIBAL GOVERNMENTS

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Federal Government Agencies and National Labs	Through policy priorities and funding decisions, the federal government plays a key role in how quickly we can accelerate the ZEV market throughout the country. Federal environmental, energy and transportation agencies and national labs set vehicle emission standards, provide funding and thought partnership for early stage R&D, data collection and analysis, and facilitate stakeholder collaboration.	<ul style="list-style-type: none"> • Set policies and provide incentives to encourage development and deployment of ZEV technologies by OEMs and fuel providers, and that support workforce development to support the ZEV market • Set policies and provide incentives that enable broader access and greater uptake of ZEVs among end users • Invest in ZEV related R&D and technology advancement, leveraging national labs and other resources • Collaborate with key stakeholder groups to identify ZEV market barriers and potential solutions • Continue, expand, or create tax related opportunities to encourage investment in renewable generation, storage and ZEV infrastructure • Pursue ZEV advancements and deployment with the US military 	Lead	Lead	Lead	Lead
Tribal Governments	California is home to 109 sovereign Tribes. Engagement by and with tribal leaders can help ensure equitable transportation solutions and ZEV access to tribal communities.	<ul style="list-style-type: none"> • Work with state agencies and tribal associations to identify areas of mutual concern and strengthen partnerships to implement solutions • Work with stakeholders to ensure infrastructure planning is inclusive of tribal communities • Collaborate with outreach and educational entities to ensure messaging and outreach efforts reflect tribal community perspectives and needs 	Support	Lead	Lead	Lead

VEHICLE MANUFACTURERS AND SUPPLY CHAIN

Delivering zero emissions to all is only a dream without vehicle manufacturer investment in, and commitment to zero-emission technologies. Success hinges on automaker ability to deliver products that meet and exceed customer expectations across all vehicle classes. Further, California will need vehicle manufacturers to market their ZEVs more prominently to build consumer awareness and demand.

California has a long history of working constructively with automakers to develop policies and incentives to seed the ZEV market. This work will be leveraged and expanded in working with other vehicle and infrastructure manufacturers, with an aggressive eye toward scale.

The following are some of the components of various supply chains in automobile and rail industries that could grow in California.

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Dealerships (and dealership groups; direct sales)	Auto dealerships are on the front line of customer and fleet engagement. They can encourage ZEV adoption and grow consumer and fleet confidence in ZEV technology. Dealers are often the first place for consumers to have questions answered about ZEV infrastructure. It is critical that agencies work with dealerships (including used car dealerships) to understand consumer ZEV needs and preferences and provide information on critical incentives and low-cost financing.	<ul style="list-style-type: none"> • Stage new and used ZEVs on the lot in visible locations • Train sales and service people with continuous training programs • Provide marketing and education materials to trainees and customers for more informed car buying choices • Facilitate transparency in ZEV ownership, including helping customers understand total cost of ownership • Partner with ZEV education and outreach organizations • Pursue opportunities to support and enable charging and fueling infrastructure 	Lead	Support	Lead	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Light-Duty Manufacturers	With nearly 30 million passenger vehicles on California roads, this market segment plays a key role in the development and cost reduction of components. Cars are also important in raising the awareness and visibility of ZEVs among the public.	<ul style="list-style-type: none"> • Develop desirable products in all vehicle classes and platforms • Increase number of affordable models • Create ZEV platforms that perform well in various use cases • Develop used vehicle market • Increase awareness and excitement for ZEVs through diverse marketing and advertising • Infrastructure needs identification and deployment support 	Lead	Support	Lead	Support
Medium- and Heavy-Duty Manufacturers	The largest contributor to GHG emissions and air pollutants. Many priority communities disproportionately suffer from medium- and heavy-duty truck emissions.	<ul style="list-style-type: none"> • Products that meet various needs of fleet owners and operators • Continued product improvement and cost reduction • Operations and maintenance training for fleet operators • Early customer assistance and total cost of ownership analysis • Insights on ZEV and infrastructure experience • Input into infrastructure planning, timing, and scaling help coordinating with local utilities to ensure grid planning begins prior to vehicle arrival • Network development for service, repairs, parts 	Lead	Support	Lead	Support
New Market Entrants (note: applies to all categories)	New market entrants challenge the status quo by bringing new vehicles, infrastructure, components, software, innovation and human behavior solutions (and attendant data). Applies to multiple categories (but only included here).	<ul style="list-style-type: none"> • Introduce disruptive technologies and business models • Increase access to priority communities 	Lead	Lead	Lead	Lead

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Off-Road Vehicles and Equipment Manufacturers	Forklifts, farm and construction equipment, rail, aviation, etc.	<ul style="list-style-type: none"> • Zero-emission technology development and deployment • Input into infrastructure planning, timing, and scaling, including connections between on-road and off-road vehicles • State-of-the-art verified³⁰ and certified vehicles and equipment³¹ that meet performance and operational requirements • Robust supply chain • Input into co-locating ZEV infrastructure • Early customer hand-holding • Operation/maintenance training and workforce development 	Lead	Support	Lead	Support
Suppliers	Robust, local supply chains can bring down cost, reduce emissions, and increase resilience.	<ul style="list-style-type: none"> • Create components that improve ZEV and ZEV infrastructure processes and opportunities 	Support	Support	–	Support

30 CARB: *Locomotive Emission Verifications, Technology Demonstrations, and Incentives*

31 CARB: *Certified Vehicle and Engines*

FLEETS

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Fleets (public and private)	(e.g., Local and regional public fleets, transit agencies, freight and logistics, ports, airports, warehouses, Transportation Network Companies, vehicle and equipment rental companies, corporate fleets, etc.) Fleets represent unique opportunities to scale the market, especially for fleets that “return to base” regularly to recharge or refuel. ZEV adoption in fleets can drive down costs, create market opportunities, and facilitate rapid learning. Fleet operators’ understanding of total cost of ownership introduces opportunities that can help scale vehicle production. Entities that enable fleet adoption, but may not own all vehicles on location, play a pivotal role as well, such as airports, ports, warehouses, etc.	<ul style="list-style-type: none"> • ZEV adoption in increasing amounts over time; share lessons learned • Evaluate routes and duty cycles to determine operational feasibility of BEVs and/or FCEVs, as well as needed infrastructure locations and throughput capacity to support • Direct communication and collaboration with automakers, fueling providers, and ZEV car sharing/rental companies • Quantified shift to eVMT, including for both passenger and freight • Larger fleets help pave the way for smaller fleets • Case studies, best practice sharing and pros and cons assessments - private or public infrastructure, upfront cost/funding challenges • Assess utilization gains of fleet chargers to inform future programs • Workforce development and training • Infrastructure deployment 	Lead	Lead	Support	–

GRID OPERATORS, ELECTRICITY AND HYDROGEN PROVIDERS

Electricity and hydrogen providers are keystone players in the market. Reliable, affordable, renewable energy delivery systems will serve to expand the market.

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Balancing Authorities	Balancing authorities, such as the California Independent System Operator, maintain reliability on the grid and operate transparent, wholesale energy markets. Both components are core to end user and investor/operator confidence.	<ul style="list-style-type: none"> • Ensure electricity is available when needed • Optimize the connection of renewable electricity • Support multi-stakeholder efforts to enable robust vehicle grid integration • Develop opportunities to accelerate renewable electricity-based production of hydrogen as a strategy to increase grid resilience, and increase renewable energy utilization and production 	Support	Lead	Support	Support
Community Choice Aggregators (CCAs)	CCAs serve as a backbone of transportation electrification in the communities they serve, from procuring renewable resources, designing rates, expanding storage and ensuring resilience, to interfacing with customers through their electricity account and customer-facing programs that help facilitate the transition to ZEVs. CCAs are uniquely positioned to work with their local government partners to leverage local data to make strategic investments that maximize community benefit and streamline local process.	<ul style="list-style-type: none"> • Develop ZEV enabling rates • Support local permit streamlining and reach building code adoption • Innovate ways to enable transportation electrification • Incentives for drivers, fleets, new mobility and charging infrastructure • Deploy charging infrastructure in underserved communities • Build support to increase ZEV resilience, including storage • Consumer adoption/education/technical assistance • Vehicle-Grid Integration pilots and programs • Invest in system reliability and resilience 	Support	Lead	Lead	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Electric Utilities, Load-Serving Entities	<p>Public- and investor-owned electric utilities serve as a backbone of transportation electrification, including installing ZEV charging infrastructure, procuring renewable resources, providing long-term rate options, managing the grid, timely interconnecting new ZEV loads, expanding DERs including storage and renewables, and ensuring resilience, to interfacing with and educating customers, as well as providing customer-facing transportation electrification programs.</p>	<ul style="list-style-type: none"> • Encourage investments in and enable charging infrastructure and ZEVs broadly, at scale, and with prioritization of underserved communities; such as through incentives for charging infrastructure and ZEVs (e.g., Clean Fuel Reward program) • Long-term ZEV-enabling rate design (charging and hydrogen production) and affordable, equitable rates for all ratepayers • Fast and safe interconnection and energization through streamlined process • Identify available capacity for ideal interconnection locations to provide grid benefits at lower cost for charging infrastructure and electrolytic hydrogen production, and refueling facilities • Deploy distribution level power systems for electrolytic hydrogen production and refueling in underserved communities • Provide an environment to beta test emerging ZEV technologies • Build grid infrastructure to support increase in ZEVs, including grid-scale storage and onsite clean power generation • Appropriately targeted consumer outreach and education • Vehicle-Grid Integration pilots and programs • Reliability and resilience of grid and ZEV-fueling infrastructure 	Support	Lead	Lead	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Electric Vehicle Charging Station Providers and Installers	Electric Vehicle Charging Stations (EVCS) and their providers are cornerstones of the ZEV market — charging stations enable electric vehicle adoption. Positive charging experiences facilitate market growth and beneficial charging supports grid integration and state energy goals. Charging options are rapidly increasing, from an expanding network of public DC charging stations to mobile solutions for charging flexibility.	<ul style="list-style-type: none"> • Network and market expansion, sustainability, reliability, and resilience, and expansion • Inform policy, regulation, and incentive design • Grid integration and customer experience support • Charging strategy development and education • Network and cybersecurity • Charging standards and protocol development and implementation • Enable technology development • Workforce development • Share permit and interconnection experience to identify streamlining opportunities 	Lead	Support	-	-
Gas Utilities	Gas utilities can leverage their systems safely to enable an increase in the production and distribution of renewable natural gas and hydrogen, both of which can serve as electrification feedstocks. ³²	<ul style="list-style-type: none"> • Develop strategies for natural gas pipelines to become hydrogen carriers, as feasible, such as: accelerated interconnection process for hydrogen injection into the gas grid, including permit streamlining • Identify ideal interconnection locations to enable green hydrogen injection from electrolytic hydrogen production facilities • Develop strategies to enable hydrogen supply and hydrogen station expansion 	Lead	Support	-	-

32 RNG can be used to create electricity or hydrogen. Hydrogen is used to create electrons, either in stationary applications or onboard fuel-cell electric vehicles.

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Hydrogen Producers	Hydrogen has been used at scale in industrial applications for decades — success hinges on scaling a dedicated hydrogen production stream to support the retail and commercial vehicle markets. Producers will also need to continue to innovate and develop decarbonized production technologies that drive down costs.	<ul style="list-style-type: none"> • Advance innovative business models to drive down the cost of hydrogen • Cost reduction to be competitive with gasoline and diesel • Cross sector connection • Establish a reliable renewable hydrogen supply chain, including feedstock and renewable electricity sources • Distribution of molecules reliably, safely, and efficiently with competitive options • Technology advancement for decarbonized or renewable production • Active engagement in codes and standards development 	Lead	Support	-	-
Hydrogen Station Developers and Operators	Station developers and operators are crucial to the consumer and fleet facing side of the hydrogen marketplace — hydrogen stations enable the adoption of fuel-cell electric cars, trucks, and buses. Success hinges on deploying a sufficient number of stations to get broad geographic coverage to support the consumer and commercial vehicle adoption.	<ul style="list-style-type: none"> • Market and network expansion • Station locations to leverage wide geographic distribution while serving demand near our urban cores, suburban and rural destinations • Partner with existing gas/diesel fueling operators to provide an opportunity to transition these small businesses 	Lead	Support	-	-
Registered Service Agencies	RSAs install, repair and service commercial fueling devices to ensure they dispense accurate quantities of electricity or hydrogen.	<ul style="list-style-type: none"> • Keep training up to date so that metrology does not become a station opening bottleneck 	Support	Support	-	-

NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

NGO's serve critical broad ranging functions throughout the ZEV market. They use their insights to improve policymaking, conduct education and outreach, bring parties together, employ experts who help push the boundaries of what the collective believes is possible. From a state perspective, we need environmental, equity, and community-based NGOs to hold us all accountable to our goals, help us identify blind spots, particularly when it comes to ensuring we are building a diverse, inclusive market.

We have grouped NGOs by primary purpose below (the grouping is imperfect).

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Codes and Standards Bodies	Groups such as the American Society for Testing and Materials (ASTM) International, National Fire Protection Association (NFPA), National Institute of Standards and Technology (NIST), Society of Automotive Engineers (SAE) International set model codes, standards and protocols that facilitate safe operation and enable scale by organizing industry around shared standards.	<ul style="list-style-type: none"> Align stakeholders around shared charging and fueling standards Maximize safety and consumer protection for charging and fueling stations and within vehicles Enable market innovation 	Support	Support	Support	-

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Collaboratives	<p>Various state agencies are members of, or partners with the following collaboratives that bring multiple stakeholders together to problem solve and create opportunity (alphabetical order): the California Electric Transportation Coalition, California Fuel Cell Partnership, California Hydrogen Business Council, CALSTART, Coast to Coast Smart eMobility, Electric Vehicle Charging Association, Electric Vehicle and Hydrogen Infrastructure Strike Forces, International ZEV Alliance, National Governors Association, Pacific Coast Collaborative, Regional ZEV Collaboratives (e.g., Sacramento PEV Collaborative, Bay Area EV Council, LAEDC E4 Mobility Alliance, Los Angeles Transportation Electrification Partnership, San Diego Regional Accelerate to Zero Emissions Collaboration), Clean Cities Coalitions, U.S. Climate Alliance, Under2° Coalition, Transportation Decarbonization Alliance, Western Governors Association, and Veloz.</p>	<ul style="list-style-type: none"> • Education and awareness • Multi-stakeholder problem solving, setting forward-leaning agendas • Cross-sector relationship building • Collaborative vision setting • Thought partnership • Implementation 	Lead	Lead	Lead	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Community-based NGOs	NGOs across sectors — whether focused on environmental, social, or economic outcomes — play a key role in raising core issues at the local, state, and national levels, ensuring agency accountability, and providing results from research and studies to help inform ZEV policy and market development. They can also serve as a trusted resource for public outreach and education and can mobilize their constituents to help advance goals.	<ul style="list-style-type: none"> • Bring in localized voices and expertise • Inform policy, regulation, and incentive design • Help design transportation systems that can meet unique community needs • Build capacity and community awareness • Workforce development 	Support	Support	Support	Support
Environmental NGOs		<ul style="list-style-type: none"> • Provide policy recommendations based on research and analysis • Encourage and enable policy, regulatory, and incentive design innovation • Hold agencies accountable • Implementation of programs 	Support	Support	Support	Support
Equity NGOs		<ul style="list-style-type: none"> • Bring in new voices and expertise • Represent the underrepresented • Help design transportation systems that can address multiple barriers, while also meeting unique community needs • Advise on equity pilots and programs • Collaborate on equity and mobility metrics for success • Build capacity and community awareness • Hold agencies and programs accountable — and enable opportunities to better reach priority communities 	Support	Support	Support	Support

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Trade Associations	Trade associations serve to advance the specific needs of their members in advancing the ZEV market. They can also serve to convene stakeholders for collaboration and information sharing, research and analysis, and development of advocacy materials.	<ul style="list-style-type: none"> • Work with stakeholders across sectors to determine, amplify, and advocate for policies and legislation that will accelerate the ZEV market • Provide consolidated feedback representative of the specific industry group 	Support	Support	Support	Support

INVESTORS

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Investors/ Financing Institutions	Private investment, and a robust private market, plays a pivotal role in getting to 100% ZEV sales. The system works equitably if investors (broadly defined) make money selling or operating ZEV mobility at prices that welcome the entire market. Getting there requires active and ongoing collaboration between investors and the public sector.	<ul style="list-style-type: none"> • Thought partnership on how to bring in more private capital • Forward-looking investment to help accelerate technology development and ZEV utilization • Communicate investment priorities 	Lead	Lead	Lead	Lead

ACADEMIA

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Community Colleges	Community colleges play a fundamental role in training California's workforce, exposing students to new technology, establishing training partnerships with ZEV companies, and more.	<ul style="list-style-type: none"> • Build robust ZEV related training programs that build transferable skills and are connected to both current and future jobs • Maintain close connection with industry partners to ensure students are trained for what the marketplace needs • Pilot programs such ZEV carsharing, e-bike sharing, and EV charging 	Support	Support	Support	Lead
Universities (University of California, California State Universities, Private Universities)	Universities serve a key role in educating students and the future workforce, as well as producing primary research and analyses from a trusted third-party source.	<ul style="list-style-type: none"> • Create future employees for ZEV companies, government and local agencies/groups • Research, internships, and development/innovation • Pipelines to bring innovations to market • Pilot programs such ZEV carsharing, e-bike sharing, and EV charging • Enable ideas to move from bench to market 	Support	Support	Support	Lead

ORGANIZED LABOR

Stakeholder Group	ZEV Connection	Objectives	Vehicles	Infrastr.	End Users	Workforce
Organized Labor	Labor unions both train and represent workers. They can deliver the job quality essential to a high-road ZEV industry, and the skilled workforce needed to build it.	<ul style="list-style-type: none"> Promote high-quality jobs for ZEV workers Deliver highly skilled workers across ZEV industries and occupations Generate equity and opportunity in the ZEV labor market through industry partnerships that join business, labor, education, community, and social services 	Support	Support	Support	Lead

INTERNATIONAL RELATIONSHIPS

California is a global hub for ZEV deployment and remains invested in success - our international efforts underscore our commitment to the success of the ZEV market in California, other states, and nations. Our international cooperation includes information-sharing and engaging in policy dialogue with our overseas partners, recognizing that California plays an outsized role as a subnation in helping advance the global ZEV market. We also help California ZEV companies gain access to new markets through export development programs and trade missions. Additionally, our foreign direct investment efforts aim to attract international ZEV companies that will bring high-road jobs to our state directly and through the diverse supplier networks they support, while also maintaining California's position as the epicenter of innovation. "California ZEV" is a brand with enormous international recognition and influence and we engage internationally because we know that each ZEV that replaces an internal combustion engine makes the world incrementally better.

Appendix C: Measuring Success

California has a series of targets, reports, and tools to pull from to measure ZEV market success. The following sections organize these targets and resources around six sections: Outcomes, Vehicles, Infrastructure, End Users, Workforce, and Investment. The ZEV Market Development Strategy website will pull from these sources to help stakeholders easily assess ZEV market health and outcomes. It will point to existing tools, such as the CEC's ZEV stats website, whenever possible.

Developing the metrics for the website will be an iterative process and rely heavily on stakeholder input. The website will be adjusted over time to include additional or refined metrics to better capture progress towards meeting our targets. For reference, Table 1 in the main report summarizes the key questions the ZEV Strategy website will help stakeholders answer.

- 1. Air quality** improvement, including criteria pollutant and toxic emissions reductions, throughout California with focus on achieving attainment of air-quality standards and particularly in vulnerable communities.

AIR QUALITY IMPROVEMENTS

Target	Target Date	Policy Driver	Measurement Resource
Reduction of specified pollutants, including PM10 and PM2.5, Ozone, Nitrogen Dioxide, and others	Ongoing	California Ambient Air Quality Standards (CAAQS)	Compliance with CARB California Ambient Air Quality Standards
8-hour Ozone Standard of 80 parts per billion (ppb) for South Coast and San Joaquin Valley	2023	U.S. EPA standard	Compliance with 2016 Mobile Source Strategy and Revised 2016 State Implementation Plan ; 2016 South Coast and San Joaquin Valley Air Quality Management Plans.
70% reduction in NO _x from 2016 levels	2023	CARB 2016 Mobile Source Strategy, necessary to achieve ozone and PM2.5 standards	
AB 617 Localized Community Emission Reductions	2024	AB 617 (2017), Community Air Protection Program	CARB Community Air Protection Blueprint and Local Community Emission Reduction Plans
Micrograms per cubic meter (µg/m ³) annual PM 2.5 standard for South Coast, San Joaquin Valley, Imperial County, City of Portola in Plumas County	2025	U.S. EPA standard	Compliance with 2016 Mobile Source Strategy and Revised 2016 State Implementation Plan ; corresponding local air quality management plans

Target	Target Date	Policy Driver	Measurement Resource
75 ppb ozone standard for South Coast and San Joaquin Valley 80% reduction in NO _x from 2016 levels	2031	U.S. EPA standard CARB Mobile Source Strategy, necessary to achieve ozone and PM2.5 standards	Compliance with 2016 Mobile Source Strategy and Revised 2016 State Implementation Plan ; corresponding local air quality management plans
70 ppb ozone standard for South Coast and San Joaquin Valley	2037	U.S. EPA standard	In development: CARB 2020 Mobile Source Strategy and corresponding regional air quality management plans

2. GHG emissions from transportation decline over time to meet overall state GHG emissions reduction targets.

GHG EMISSIONS REDUCTIONS

Target	Target Date	Policy Driver	Measurement Resource
GHG emissions 40% below 1990 levels	2030	SB 32 (2016)	Compliance with CARB 2017 Climate Change Scoping Plan, Low Carbon Fuel Standard (LCFS)
Carbon neutrality	2045	Executive Order B-55-18	In development: CARB Achieving Carbon Neutrality in California
GHG emissions 80% below 1990 levels	2050	Executive Order B-16-2012	Compliance with CARB 2017 Climate Change Scoping Plan and future Climate Change Scoping Plans; LCFS
Reduction of fossil fuel consumption in transportation sector	Ongoing	Executive Order N-79-20	California Retail Fuel Outlet Annual Reporting (CEC-A15) Results
Reduction of greenhouse gas (GHG) emissions from transportation network companies (TNCs)	GHG reduction targets beginning in 2023	Clean Miles Standard Regulation SB 1014 (2018)	CARB and CPUC regulatory implementation tracking of TNC progress to reduce GHGs

3. Access to high-quality clean transportation and mobility options for all Californians, with focus on ensuring the state's most vulnerable communities are prioritized and have more equitable access to and experience direct benefits of clean mobility.

EQUITABLE PRIORITY COMMUNITY ACCESS

Target	Target Date	Policy Driver	Measurement Resource
Projects funded with Community Air Protection Incentives achieve measurable emissions reductions in communities	Ongoing	AB 617 (2017) and CARB Community Air Protection Incentives	CARB project tracking and reporting for funded projects CARB Community Air Grants

Target	Target Date	Policy Driver	Measurement Resource
Increased transportation equity and quality in priority communities	Ongoing	CARB Sustainable Transportation Equity Project (STEP) CARB Clean Mobility Options Voucher Pilot Program SB 1275 (2014)	CARB project tracking and reporting for funded projects, <i>STEP</i> , <i>Clean Mobility Options Voucher Pilot Program</i> and <i>community transportation needs assessments</i> , Clean Cars 4 All. CVRP low- and moderator-income increased rebate, <i>Other light-duty equity projects</i> , <i>Medium- and heavy-duty projects</i> , <i>SB 150 Report</i> , <i>CCI Reporting Metrics</i> , Access Clean California “equity metrics” developed by The Greenlining Institute and Grid Alternatives, Greenlining <i>Mobility Equity Framework</i> , <i>Diversity Inclusion Framework</i> , and <i>Making Equity Real in Research</i>
At least 25% of Cap-and-Trade revenues allocated to projects in disadvantaged communities	Ongoing	AB 1550 (2016) and precursor SB 535 (2012)	CARB <i>Low Carbon Transportation Program</i> project outcome tracking through <i>Moving California</i> and <i>California Climate Investments Outcomes</i>
At least 35% of CPUC-approved IOU investments allocated to programs and projects in underserved communities	Ongoing	AB 841 (2020)	<i>CPUC tracking of IOU investments</i>
Implement priority recommendations of SB 350 Study Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents	Ongoing	SB 350 (2015) and CARB/CEC SB 350 Barriers Reports	CEC <i>Energy Equity Indicators</i> , and CARB <i>Accessible Clean Transportation Options SB 350</i> CARB <i>SB 350 Strategic Outreach Roadmap</i> , CARB <i>SB 150 Report</i> , Access Clean California “equity metrics” being developed by The Greenlining Institute and Grid Alternatives
Equitable statewide deployment and access to charging stations	Ongoing	SB 1000 (2018)	CEC <i>SB 1000 process</i> within <i>Clean Transportation Program</i>

Target	Target Date	Policy Driver	Measurement Resource
Increasing community ZEV readiness (light-, medium-, and heavy-duty), prioritizing vulnerable communities	Ongoing	CEC community ZEV readiness grants CEC mobility and access grants	California Climate Investments CARB <i>Low Carbon and Air Quality Improvement Program</i> CEC <i>Clean Transportation Program</i> outcomes <i>San Bernardino ZEV Readiness Efforts</i> Draft Assessment of CARB's Zero-Emission Vehicle Programs, <i>SB 498</i> GO-Biz Streamlining (<i>EVCS and H₂ Permitting, Building Standards</i>)
Leverage local clean transportation funding to enhance equity	Ongoing	SB 2297 (1988) SB 98 (1999)	<i>Mobile Source Air Pollution Reduction and Air Quality Management District</i> outcomes

4. Economic Development and Job Creation: Increasing the number of in-state **ZEV-related employers and high-road jobs** will maximize economic opportunities, increase participation in equity communities, and accrue the benefits associated with the transition to zero-emission transportation.

ZEV EMPLOYERS AND JOBS

Target	Target Date	Policy Driver	Measurement Resource
Increasing number of in-state ZEV employers	Ongoing, annual	Executive Order B-48-18, Executive Order N-79-20, AB 398 (2017), AB 841 (2020)	Tracking by Labor Agency (including Workforce Development Board and Employment Training Panel), CEC, Office of Planning & Research; tracking by local economic development entities; CPUC tracking of IOU investments
In-state growth in high-road jobs in ZEV sector			
Increasing diversity of ZEV workforce and prioritizing opportunities for priority communities		Executive Order B-48-18, Executive Order N-79-20, AB 398 (2017), SB 350 Studies	

Vehicle Metrics

1. The following metrics track progress toward the state's **medium- and heavy-duty and off-road vehicles and equipment**.

LIGHT-DUTY VEHICLES

Target	Target Date	Policy Driver	Measurement Resource
1.5 million ZEVs	2025	Executive Order B-16-12, CARB Advanced Clean Cars	CEC Data Portal: Vehicle Sales and On-Road Tracking , compared to overall vehicle market
5 million ZEVs	2030	Executive Order B-48-18, CARB Advanced Clean Cars	
100% of new car sales	2035	Executive Order N-79-20, CARB Advanced Clean Cars	
DGS ZEV Fleet Purchases: at least 50% of the light-duty vehicles purchased for state fleet each year are zero-emission	2024-25 and annual, ongoing	Executive Order B-16-12, SB 498 (2017), Green Fleet Initiative	Compliance with Zero-Emission Purchasing Mandate
Regional and local public fleet ZEV purchases	Ongoing	Executive Order N-79-20	Work with local governments for data, capture to extent feasible
Increased zero-emission micro-mobility options and usage	Ongoing	Executive Order N-79-20; California Climate Investments	Tracking of funded projects and deployments of zero-emission micro-mobility options, usage

MEDIUM- AND HEAVY-DUTY AND OFF-ROAD VEHICLES AND EQUIPMENT

Target	Target Date	Policy Driver	Measurement Resource
100% of new transit bus purchases are zero-emission	2029	Innovative Clean Transit Rule	Reporting for CARB Innovative Clean Transit
100% of on-road transit buses are zero-emission	2040		
100% of on-road airport shuttles are zero-emission	2035	Zero-Emission Airport Shuttle Rule	Reporting for CARB Zero-Emission Airport Shuttle
100% of in-use drayage trucks are zero-emission	2035	Executive Order N-79-20, Advanced Clean Trucks Rule	In development: reporting for CARB Advanced Clean Trucks and in-development Advanced Clean Fleets rules
100% of in-use off-road vehicles and equipment are zero-emission where feasible	2035	Executive Order N-79-20	In development: reporting for CARB rules like Transport Refrigeration Unit , Locomotives and Zero-Emission Forklift (under development)

Target	Target Date	Policy Driver	Measurement Resource
100% of on-road medium- and heavy-duty vehicles are zero-emission where feasible	2045	Executive Order N-79-20, Advanced Clean Trucks Rule	In development: reporting for CARB Advanced Clean Fleets rule (under development)
DGS ZEV Fleet Purchases: at least 15% of newly purchased vehicles with gross vehicle weight rating 19,000+ pounds for the state fleet shall be zero-emission	2025 and annual, ongoing	AB 739 (2017)	Tracking of ZEV & Hybrid First Purchasing Mandate for Medium- and Heavy-Duty Vehicles
DGS ZEV Fleet Purchases: at least 30% of newly purchased vehicles with gross vehicle weight rating 19,000+ pounds for the state fleet shall be zero-emission	2030 and annual, ongoing	AB 739 (2017)	
Regional and local public fleet ZEV purchases	Ongoing	Executive Order N-79-20	Work with local governments for data, capture to extent feasible

2. In addition to the state’s vehicle targets, **market expansion capability** is an important metric to show whether we are achieving adequate technology advancement and market transformation within vehicle classes to scale the ZEV market in all sectors and more broadly meet the needs of underserved communities.

VEHICLE MARKET EXPANSION CAPABILITY

Target	Target Date	Policy Driver	Measurement Resource
100% with increasing number of light-duty models for sale (used and new) in variety of vehicle classes	Annual increases until 100% in 2035	Executive Order N-79-20, ZEV Regulation	Annual number of announced vehicle models Annual number of available vehicle models, Veloz Dashboard Annual number of available models by vehicle type (e.g., compact, sedan, sport, CUV, SUV, van, pickup)

Target	Target Date	Policy Driver	Measurement Resource
100% where feasible with increasing number of medium- and heavy-duty models for sale in all 2b-8 vehicle classes	Annual increases until 2045 Annual increases until 2035 for drayage	Executive Order N-79-20, Innovative Clean Transit Rule, Zero-emission Airport Shuttle Rule, Advanced Clean Trucks Rule	Annual number of announced vehicle models Annual number of available models reported for CARB Advanced Clean Trucks manufacturer rule and Advanced Clean Fleets rule (under development) Annual number of available models by vehicle type (e.g., heavy tractor: day cab & line-haul, bus: shuttle, school & transit, step van, straight truck: hauler & power take off, box truck, refuse truck, fire engine, ambulance, etc.)
100%, where feasible, with increasing number of off-road models for sale in all vehicle and equipment classes	Annual increases until 2035	Executive Order N-79-20, Zero-Emission Forklift and Transport Refrigeration Unit Rules	Annual number of announced vehicle and equipment models Annual number of available models by equipment type (e.g., yard tractor, wheel loader, backhoe loader, excavator, skid steer, forklift, gantry crane, reach stacker, transport refrigeration units, locomotives, harbor craft, etc.)
ZEV lifecycle sustainability and end of life strategy clear and implemented	Ongoing	Executive Order N-79-20	Lithium-ion Car Battery Recycling Advisory Group and related efforts

Infrastructure Metrics

The following metrics track progress toward the state's **fueling targets for light-duty vehicles, medium- and heavy-duty vehicles, and off-road equipment.**

LIGHT-DUTY VEHICLE FUELING

Target	Target Date	Policy Driver	Measurement Resource
200 hydrogen stations	2025	Executive Order B-48-18	CEC Data Portal: Hydrogen Stations
250,000 shared chargers, including 10,000 DCFC			CEC Data Portal: EV Chargers
Timely deployment of hydrogen stations (and supply) to support at least 5 million ZEVs	2030	Executive Order B-48-18, AB 8 (2013) hydrogen reports	CEC Data Portal: Hydrogen Stations
Timely deployment of charging stations to support at least 5 million ZEVs		Executive Order B-48-18, CEC IEPR/AB 2127 (2018) process	CEC Data Portal: EV Chargers
Timely deployment of charging and hydrogen stations to support 100% zero-emission new sales of passenger cars and trucks (Targets under development) ³³	2035	Executive Order N-79-20	CEC Data Portal: Hydrogen Stations EV Chargers
Customers can access ZEV fuels that are cleaner and less costly than fossil fuels	Ongoing	Executive Order N-79-20, SB 350 (2015), CPUC Transportation Electrification Framework; and CARB LCFS program	CEC, CPUC, CARB tracking
Develop strategies to further enable VGI and increase renewable electricity penetration	2030	SB 676 (2018)	CPUC

³³ The California Energy Commission is assessing the fueling infrastructure needed to support the vehicle targets in Executive Orders B-48-18 and N-79-20. The CEC's [AB 2127](#) once finalized, will provide the targets for charging infrastructure.

MEDIUM- AND HEAVY-DUTY AND OFF-ROAD VEHICLE AND EQUIPMENT FUELING

Target	Target Date	Policy Driver	Measurement Resource
Timely deployment of charging and fueling infrastructure to support medium-, heavy-duty, and off-road vehicle and equipment targets	Ongoing	Executive Order N-79-20, Executive Order B-48-18, AB 2127 (2018), and CARB LCFS program	CEC Integrated Energy Policy Report and CARB Clean Transportation and Air Quality Improvement Program analyses CARB tracking of regulatory progress, LCFS Data Dashboard and Quarterly Summaries
Customers can access ZEV fuels that are cleaner and less costly than fossil fuels	Ongoing	Executive Order N-79-20, SB 350 (2015), CPUC Transportation Electrification Framework, and CARB LCFS program	CEC, CPUC, CARB tracking
Develop strategies to further enable VGI and increase renewable electricity penetration	2030	SB 676 (2018)	CPUC

End User Metrics

Consumer and fleet awareness of light-, medium-, heavy-duty, and off-road ZEVs must continue to expand to achieve market-advancing levels of consumer and fleet demand for ZEVs.

END USER AWARENESS, UNDERSTANDING, AND DEMAND

Target	Target Date	Policy Driver	Measurement Resource
<p>Increasing general consumer and fleet awareness and understanding of ZEVs</p> <p>Consumer exposure to ZEVs: ZEV carsharing and ridesharing; ride and drive (statistics)</p> <p>Consumer and fleet outreach, education awareness campaigns across vehicle classes and vocations</p> <p>Emphasis on engagement with priority communities in all of the above</p>	Ongoing, Annual	Executive Order B-48-18, Executive Order N-79-20	<p>Tracking of Veloz <i>Electric for All</i> campaign</p> <p>Tracking of Electrify America consumer awareness campaign</p> <p>CEC Clean Transportation Program and CARB Low Carbon Transportation Program tracking</p> <p>UC Davis Institute of Transportation Studies <i>Surveys and Analysis (particularly for used ZEV market)</i></p> <p>CARB Access Clean California</p> <p>SB 350 Outreach Strategic Roadmap, technical assistance and capacity building efforts</p>
<p>Increasing consumer and fleet demand/purchase of ZEVs</p>	Ongoing, Annual		<p>CEC Data Portal Vehicle Population and New ZEV Sales</p> <p>CEC Clean Transportation Program and CARB Low Carbon Transportation and Air Quality Improvement Program tracking</p> <p>Clean Vehicle Rebate Project Statistics</p>

Workforce Metrics

A trained and sufficient **workforce** is fundamental to boost the California economy and scale the ZEV market. This set of metrics focuses on workforce as an input. Job growth is captured as an outcome earlier in the document.

WORKFORCE SUFFICIENCY

Target	Target Date	Policy Driver	Measurement Resource
In-state ZEV-related manufacturing and supply chain footprint, jobs	Ongoing	Executive Orders N-79-20, B-48-18	Quantity of in-state ZEV-related manufacturers, supply chain and other companies and corresponding jobs
Workforce that can meet timing, scale needs	Ongoing	Executive Order N-79-20	TBD — Industry Surveys Access to career technical education, training, and apprenticeship programs
Certified electricians that can facilitate state's ZEV infrastructure goals	Ongoing	AB 841 (Ting, 2020)	Number of <i>Electric Vehicle Infrastructure Training Program (EVITP) certified electricians</i>

Investment Metrics

Investment in ZEV manufacturing, consumer and fleet purchases, and fueling infrastructure must continue to rise and state investments should consider market readiness to appropriately leverage private investment.

TRACKING PRIVATE INVESTMENT

Target	Target Date	Policy Driver	Measurement Resource
Increasing private investment in ZEV-fueling infrastructure	Ongoing, annual	Executive Order B-48-18, Executive Order N-79-20, LCFS ZEV Infrastructure Crediting	CEC <i>Data Portal, Clean Transportation Program</i> CARB LCFS <i>Data Dashboard and Quarterly Summaries</i> CARB funding, or directed funding (e.g., settlement funds) for infrastructure <i>CPUC R.20-08.022 and Transportation Electrification Framework</i>
Increasing private investment in ZEV research and development, manufacturing and production	Ongoing, annual	Executive Order B-48-18, Executive Order N-79-20	GO-Biz Investment tracking (TBD) CARB <i>Advanced Clean Cars, Advanced Clean Trucks</i> (manufacturer and fleet rules)
Increasing private investment in ZEV procurement by consumers and fleets	Ongoing, annual	Executive Order B-48-18, Executive Order N-79-20	CEC <i>Clean Transportation Program</i> and CARB <i>Low Carbon Transportation and Air Quality Improvement Program</i> tracking

