2013

ZEV Action Plan

A roadmap toward 1.5 million zero-emission vehicles on California roadways by 2025

Governor's Interagency Working Group on Zero-emission Vehicles

Governor Edmund G. Brown Jr.

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Governor's Interagency Working Group on Zero-emission Vehicles

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California Air Resources Board (CARB)
California Department of Food and Agriculture, including the Division of Measurement Standards (CDFA)
California Department of Transportation (Caltrans)
California Energy Commission (CEC)
California Housing and Community Development Department (HCD)
California Independent System Operator (CAISO)
California Labor and Workforce Development Agency, including the Employment Training Panel (ETP)
California Public Utilities Commission (CPUC)
Department of General Services (DGS), including the Division of the State Architect (DSA) and Building Standards Commission (BSC)
Governor's Office of Business and Economic Development (GO-Biz)
Governor's Office of Planning and Research (OPR)

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INTRODUCTION & PURPOSE
2013 ZEV Action Plan

In March 2012, Governor Brown issued an executive order directing state government to help accelerate the market for zero-emission vehicles (ZEVs) in California. The Executive Order established several milestones on a path toward 1.5 million ZEVs in California by the year 2025. This *2013 ZEV Action Plan* identifies specific strategies and actions that state agencies will take to meet milestones of the executive order.

For the purposes of this executive order and action plan, ZEVs include hydrogen fuel cell electric vehicles (FCEVs) and plug-in electric vehicles (PEVs), which include both pure battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). These documents also address light-duty passenger vehicles and heavier vehicles such as freight trucks and public buses. Advancing the full range of electric-drive technologies rather than concentrating on one particular technology provides the state with the greatest opportunity to meet its zero-emission vehicle goals.

Accelerating the market for ZEVs is a cornerstone of California's long-term transportation strategy to reduce localized pollution and greenhouse gas emissions, save consumers money, and enable continued economic growth. In addition to promoting these vehicle technologies, the state supports the development and use of low carbon fuels, as well as planning more environmentally sustainable communities that reduce unnecessary vehicle travel and congestion. The Governor's Executive Order and this action plan concentrate on advancing ZEVs, recognizing the timely opportunity to accelerate use of this commercially available technology.

This action plan is the product of an interagency working group led by the Governor's Office that includes several state agencies and associated entities and builds upon significant work already undertaken by these agencies. The action plan also benefits from extensive input from outside stakeholders, including the California Plug-in Electric Vehicle Collaborative (PEVC) and the California Fuel Cell Partnership (CaFCP). PEVC and CaFCP are broad-based public-private partnerships, with industry, non-government organizations and government members that collaborate to advance ZEVs. The Governor's Executive Order specifically directs collaboration with these two organizations.

This action plan will have to be adjusted over time to meet the needs of a rapidly evolving ZEV market. Accordingly, the interagency group that developed the plan will modify it as needed in coordination with PEVC, CaFCP and other non-governmental stakeholders.

GOVERNOR BROWN'S EXECUTIVE ORDER

B-16-2012 issued March 23, 2012

Recognizing the multiple benefits of ZEVs, as well as challenges to growing the market, Governor Brown issued Executive Order B-16-2012 on March 23, 2012 that directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth and improve the quality of life in the State." The Governor's Executive Order sets a long-term target of reaching 1.5 million ZEVs on California's roadways by 2025. The Executive Order also sets a longer term target of reducing transportation-related greenhouse gas emission by 80 percent below 1990 levels by 2050.

The Governor's Executive Order establishes several milestones organized into three time periods:

By 2015

- The state's major metropolitan areas will be able to accommodate ZEVs through infrastructure plans and streamlined permitting
- Private investment and manufacturing in the ZEV sector will be growing
- The state's academic and research institutions will contribute to ZEV market expansion by building understanding of how ZEVs are used

By 2020

- The state's ZEV infrastructure will be able to support up to 1 million vehicles
- The costs of ZEVs will be competitive with conventional combustion vehicles
- ZEVs will be accessible to mainstream consumers
- There will be widespread use of ZEVs for public transportation and freight transport

By 2025

- Over 1.5 million ZEVs will be on California roadways and their market share will be expanding
- Californians will have easy access to ZEV infrastructure
- The ZEV industry will be a strong and sustainable part of California's economy
- California's clean, efficient ZEVs will annually displace at least 1.5 billion gallons of petroleum fuels

The Executive Order also directs state government to begin purchasing ZEVs. In 2015, 10% of state departments' light-duty fleet purchases must be ZEVs, climbing to 25% of light duty purchases by 2020.

To achieve these milestones, the Executive Order directs CARB, CEC, and CPUC and other relevant state agencies to work with PEVC and CaFCP. This *2013 ZEV Action Plan* contains the actions that these agencies and organizations must take to achieve the Governor's vision set forth in the Executive Order.

A copy of the Governor's Executive Order is provided as an appendix to this action plan.

PROGRESS TO DATE AND CURRENT OPPORTUNITY

California's share of the U.S. market for plug-in electric vehicles currently stands at nearly 40 percent and automakers are planning to launch fuel cell electric vehicles in California beginning in 2015. Several actions by government and private parties over the last two decades have complemented auto makers' technological innovation to advance ZEVs to this point:

- State policies and funding, beginning with CARB's 1990 Zero-emission Vehicle mandate, have catalyzed development of ZEVs. The state's Alternative and Renewable Fuel and Vehicle Technology Program and Air Quality Improvement Program (ARFVTP and AQIP and often referred to as the AB 118 Program) have funded state-wide consumer vehicle rebates, hydrogen infrastructure station development, installation of electric vehicle charging stations, medium and heavy-duty bus and truck demonstrations, alternative vehicle manufacturing, and workforce training to support zero-emission technologies. This funding has helped California-based companies to grow and develop a range of new technologies.
- The California State Legislature has passed important legislation to increase access to affordable, convenient electric vehicle charging and to define how the market for PEV charging is regulated.
- The U.S. Department of Energy has funded many local government activities and provided additional funding for statewide efforts to build the ZEV market.
- Electric utilities have planned for integrating PEVs into their electricity grids, piloted projects to better understand how the grid can facilitate vehicle charging and introduced PEVs into their own fleets.
- Local governments have facilitated plug-in electric vehicle charging and hydrogen stations in their communities, streamlined permitting processes for new infrastructure and planned how ZEVs will operate within their local transportation networks.

Strong public-private partnerships have enabled unprecedented coordination between the private sector and government, which has provided a better understanding of barriers to widespread adoption of ZEVs and strategies to overcome these barriers.

As a result of these collective actions, our state's ZEV market is poised for major new growth. Auto manufacturers now offer a range of attractive light-duty plug-in electric vehicles, including many manufactured by California companies. Two automakers offer light-duty fuel cell electric vehicles for consumer lease and several others have placed FCEVs in fleets. Companies have also introduced electric motorcycles and smaller, neighborhood electric vehicles authorized to travel on neighborhood streets. Heavy-duty ZEV options are also expanding for use in public and private fleets, as well as for public transportation and freight uses. Thousands of Californians have already transitioned to ZEVs, and they are joined by new ZEV drivers each month.

California-based infrastructure companies have built thousands of plug-in electric vehicle charging stations, while other companies are advancing different types of ZEV infrastructure such as battery swapping stations. Eight public hydrogen stations are already in operation and a larger network of hydrogen stations is being planned and built, with up to 19 stations scheduled to be operable by the end of 2013.

BENEFITS OF ZEVS

Zero-emission vehicles are becoming an accessible, attractive transportation option for California drivers.

More ZEVs coming to market is good news for California consumers.

Zero-emission vehicles offer expanded vehicle options for California consumers, with more than two dozen new PEV models available in 2013 and a number of FCEV models due to the market beginning in 2015. Zero-emission vehicles will save California drivers millions of dollars in reduced fuel costs over the life of their vehicles.[1] In many cases, these fuel cost savings will allow ZEV purchasers to recoup the increased purchase costs for their ZEVs and will have a multiplier effect, generating financial savings that can be reinvested into our state's economy. Plug-in electric vehicles allow drivers the convenience of charging their vehicles overnight in their own garages. FCEV drivers will skip the gasoline pump and fill with hydrogen, yet have driving range similar to that of a gasoline vehicle. Both options, electricity and hydrogen, support California's drive to diversify our transportation fuels.

More ZEVs on the road means cleaner air for Californians to breathe.

Increasing the share of ZEVs among vehicles using California roads is imperative for meeting federal air quality standards and the state's climate change targets. Transportation emissions are the primary source of particulates, air toxics and smog in California. Reducing vehicle emissions through increased use of light-duty and heavy-duty ZEVs will result in fewer respiratory illnesses and premature deaths in California. Additionally, as California's energy portfolio becomes less carbon intensive through increased renewable energy generation, environmental benefits of driving ZEVs will continue to increase. Replacing conventional vehicles with ZEVs also reduces greenhouse gas emissions that contribute to climate change.Currently, the transportation sector is the biggest contributor to California's greenhouse gas emissions, accounting for approximately 40 percent of this pollution. CARB's staff analysis concluded that ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.

ZEVs increase our energy independence.

California currently imports two-thirds of its petroleum from out of state, including half of its petroleum from foreign countries, and accounts for about 10 percent of U.S. gasoline and diesel consumption. In 2011, over 390 million barrels of crude oil were used to produce gasoline and diesel fuel consumed in California. Nationally, 95 percent of the transportation sector is dependent on petroleum, resulting in national vulnerability to potential supply disruptions, long gas lines, gas price spikes and a transfer of wealth to many countries hostile to the U.S. Recent estimates suggest that oil dependence has cost the U.S. over $2 trillion in direct costs over the last five years, including $500

1 Refer to CARB Zero Emission Vehicle Regulation Staff report, Table 5.7 (Dec. 2011)

billion in 2011 alone.[2] Zero-emission vehicles, fueled by electricity and hydrogen, reduce California's dependence on foreign oil, enhance energy security and economic competitiveness, and build resiliency into the state and federal economy.

ZEV expansion bolsters California's innovation-based clean technology sector.

A major share of international investment in ZEVs comes to California companies, which are breaking new ground in developing and manufacturing ZEV technologies. In 2010, California accounted for 80 percent of total U.S. venture capital investment in PEV-related sectors, and 60 percent of total global investment in this sector.[3] California also ranks first in the nation in total PEV technology patents, and third among countries throughout the world.[4] In 2011 and 2012, the number of fuel cell patents far outpaced all others in the Clean Energy Patent Growth Index, with most of the patents going to automakers with large presences in California.[5] Additionally, California is home to some of the world's most advanced technology companies that design and manufacture components used in hydrogen stations, fuel cells, batteries and charging equipment. Economic investment and innovation within this sector translates into job growth that benefits Californians.

ZEVs can benefit our electricity grid.

As plug-in electric vehicles become more common, their batteries can begin to offer the electrical grid something new and valuable: a large volume of modular, widely dispersed and dispatchable storage capacity for electrical power. Similarly, hydrogen offers energy storage and energy generation capabilities that help provide power during peak demand periods. By drawing as much of their power as possible from the cleanest and most efficient power plants, storing it in their batteries and then feeding that power back into the grid during times of high demand, ZEVs can make the power grid more flexible, durable and less polluting. ZEVs also hold potential to provide dispersed power during emergency situations.

2 Greene, D.L. "Low Carbon Transportation: A Crucial Link to Economic and Energy Security," Presentation at the Chair's Lecture Series, California Air Resources Board, Sacramento, CA, September 4, 2012. (http://www.arb.ca.gov/research/lectures/speakers/greene.pdf)
3 Next 10 and Collaborative Economics (2011) "Powering Innovation: California is Leading the Shift to Electric Vehicles from R&D to Early Adoption"
4 Next 10 and Collaborative Economics (2011)
5 Clean Energy Patent Growth Index (CEPGI) (2012)

CHALLENGES TO ZEV EXPANSION IN CALIFORNIA

Capturing the many consumer, environmental and economic benefits that ZEVs offer requires moving from modest commercial use of ZEVs (thousands of vehicles bought or leased per year) to mass commercialization (hundreds of thousands of vehicles bought or leased per year). To realize this growth, it is vital to address a range of challenges.

ZEVs require new infrastructure. PEVs and FCEVs require new infrastructure to enable convenient and cost-effective fueling. For PEVs, this means enabling electric vehicle chargers in homes, workplaces and public space, structuring electricity rates to allow for affordable fueling, and ensuring that PEVs integrate efficiently into the state's electricity grid. For FCEVs, challenges include locating and siting hydrogen dispensers within existing gas stations; developing mechanisms that enable selling hydrogen by the unit; and helping station owners, who are primarily small businesses, remain whole until fuel demand increases.

Consumer awareness of ZEVs is limited. Many consumers are unaware that ZEVs are available for purchase or lease. Others don't fully understand ZEV benefits such as operational cost savings, availability of High Occupancy Vehicle (HOV) lanes on state freeways, accessible public charging and—in some places—free or reduced parking.

Up-front costs for ZEVs remain high compared to traditional vehicles. Zero-emission vehicles are currently more expensive than equivalent conventional models. Despite a federal tax credit and California's state vehicle incentive, the higher initial ZEV costs remain a barrier for many California consumers. The purchase price for ZEVs is expected to decline as manufacturers sell more ZEVs and technology evolves.

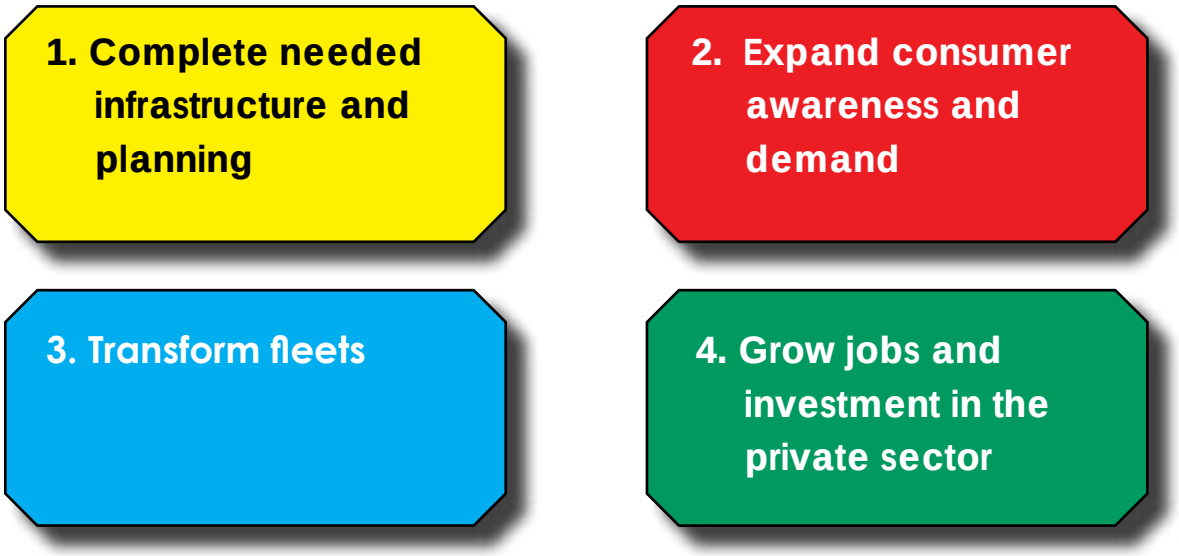
Current operational limitations of some ZEVs constrain consumer demand. Required recharge times and functional range for PEVs constrains demand among some portion of California consumers. Limited hydrogen stations will constrain FCEVs to certain communities until market expansion enables broader infrastructure development. As PEV performance continues to improve regarding range, battery life and other operational characteristics, and hydrogen stations become more widespread, a growing portion of consumers will be attracted to purchasing or leasing ZEVs.

ZEVs are not yet commercially available for all categories of vehicles. While PEVs and FCEVs are available in an increasing array of models, ZEVs are not available across all vehicle product categories. This lack of ZEV choices among some vehicle sizes and types constrains fleet managers from choosing ZEVs in these vehicle categories to improve efficiency and environmental performance in their fleets.

STRUCTURE OF THE 2013 ZEV ACTION PLAN

This action plan outlines significant actions grouped under four broad goals that state government is currently taking or plans to take to help expand the ZEV market. It is intended to serve as a "roadmap" that clearly communicates state government's efforts to advance ZEVs. It is also intended to serve as a "to-do" list for the Governor's Office and state agencies that enhances coordination on state actions moving forward.

Four broad goals for state government to advance ZEVs



The following abbreviations are used to denote the responsible agencies:

BSC	Building Standards Commission
CARB	Claifornia Air Resources Board
Caltrans	California Department of Transportation
CDFA	California Department of Food and Agriculture, Division of Measurement Standards
CEC	California Energy Commission
HCD	California Housing and Community Development Department
CAISO	California Independent System Operator
ETP	California Labor and Workforce Development Agency, including the Employment Training Panel
CPUC	California Public Utilities Commission
DGS	Department of General Services, including the Division of the State Architect and Buildng Standards Comission
GO-Biz	Governor's Office of Business and Economic Development
OPR	Governor's Office of Planning and Research

GOAL 1

Complete needed infrastructure and planning

The widespread use of ZEVs relies on adequate fueling and charging infrastructure for these vehicles. For PEVs, charging infrastructure must expand as the market grows. For FCEVs, adequate hydrogen stations must come online to enable the commercial launch of these vehicles.

Fueling infrastructure for PEVs and FCEVs is fundamentally different and each vehicle type presents distinct challenges. Plug-in electric vehicles primarily rely on strategically deployed charging stations in a variety of locations including drivers' homes, workplaces, fleet facilities and public places such as parking lots and parking garages. The process of installing PEV charging stations can sometimes be complex, protracted and expensive. Additionally, PEVs introduce new energy demand on the state's energy system and care must be taken to allow PEVs to integrate smoothly and safely into the state's electricity grid.

Fuel cell electric vehicles require hydrogen stations that are similar to today's fueling model in that one station serves hundreds of vehicles. In the coming years, hydrogen stations must be located in early market communities and along corridors between key destinations. This will enable early consumers to use their FCEV in the same manner as they would a conventional gasoline vehicle. Additionally, hydrogen dispensers must be certified before hydrogen can be sold on a per kilogram basis in a retail transaction.

Highlighted strategies and actions

- Support and advocate for reauthorization of infrastructure funding programs to fund essential early PEV and FCEV infrastructure.
- Ensure development of interoperability standards for electric vehicle charging stations that allow all drivers to charge at a station regardless of membership in a vehicle charging network.
- Ensure adequate funding to build a minimum network of 68 hydrogen stations to support the commercial launch of FCEVs between 2015 and 2017, and expand the network to 100 stations to match FCEV market growth.

Effective state and local government planning is essential to enable adequate and appropriately located stations for PEVs and FCEVs. Government policies and actions should also focus on reducing infrastructure costs for ZEV customers and ensuring affordable fueling.

This action plan is intended to help provide sufficient infrastructure to support up to 1 million ZEVs by 2020. Further actions beyond 2020 will likely be necessary to reach the Executive Order's target of 1.5 million vehicles by 2025. Due to the changing nature of the ZEV market, the action plan does not address infrastructure and planning-related actions after 2020.

Executive Order milestones related to completing infrastructure and planning:

- By 2015 the state's major metropolitan areas will be able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting.
- By 2020 the state's zero-emission vehicle infrastructure will be able to support up to one million vehicles.
- By 2020 electric vehicle charging will be integrated into the electricity grid.
- By 2020 there will be widespread use of zero-emission vehicles for public transportation and freight transport.
- By 2020 transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles.

Specific Strategies and Actions to Complete Needed Infrastructure and Planning	Lead Agency	Supporting Agency	Timeframe
Provide crucial early funding for ZEV charging and fueling infrastructure			
Support and advocate for the reauthorization of state vehicle and infrastructure funding programs (e.g. AB 118, AB 923 and Carl Moyer Program) to fund PEV and FCEV infrastructure. Determine whether funding from other revenue streams (cap-and-trade, EPIC program) is appropriate for supporting ZEV markets. *Also listed in other sections of this action plan.*	Governor's Office		Ongoing
Help California's metropolitan planning organizations understand funding opportunities to support PEV charging and hydrogen infrastructure within the recently signed Federal Transportation Law (MAP-21). Federal funding for these programs is contained in the Congestion Mitigation and Air Quality Improvement (CMAQ) program within Map-21.	Caltrans		2013-14
Advocate for ongoing and possibly expanded federal tax credits for hydrogen stations and PEV infrastructure. Tax credits for hydrogen infrastructure are currently 30% and capped at $30,000 per station, down from previous 30% and capped at $200,000 per station. Tax credits for PEV infrastructure have expired.	Governor's Office		Ongoing
Support ZEV infrastructure planning and investment by public and private entities			
Develop and implement automaker ZEV reporting requirements detailing the number of ZEVs sold by location and projected ZEV sales by using Low Emission Vehicle regulation reporting, Clean Vehicle Rebate Program data and other survey tools. Make efforts to provide this information to local and regional agencies for infrastructure planning purposes.	CARB		Ongoing
Continue to develop effective channels for utilities to identify where PEV chargers are being installed to understand local grid impacts from increased PEV use. These channels include auto manufacturers, auto dealers and various permit offices. Information about charger installations should be made available to state agencies for planning purposes.	CPUC		Ongoing
Oversee implementation of the legal settlement between the California Public Utility Commission and NRG, Inc. to ensure that PEV charging infrastructure required by the settlement is effectively located, constructed in a timely manner and coordinated with state, regional and local governments.	CPUC	Governor's Office	2013-15
Actively consider heavy-duty ZEVs when planning infrastructure for light-duty vehicles, including hydrogen stations, to ensure that infrastructure can benefit heavy-duty ZEV models where appropriate.	CEC		Ongoing

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Specific Strategies and Actions to Complete Needed Infrastructure and Planning	Lead Agency	Supporting Agency	Time-frame
Enable universal access to ZEV infrastructure for California drivers			
Require that future state-funded PEV charging stations are open to the public and accessible to all PEV drivers regardless of drivers' memberships or subscriptions to EVSE networks.	CEC		2013-on-going
Require that future state-funded hydrogen stations are open to the public, adhere to SAE standards, and are accessible to all FCEV drivers regardless of existing fueling agreements.	CEC		2013-on-going
Encourage industry efforts to develop interoperability standards for electric vehicle charging stations that enable PEV drivers to locate and reserve public charging stations and be billed regardless of drivers' memberships or subscriptions to a network of electric vehicle chargers.	Governor's Office	CEC	Ongoing
Foster standards-based dual-compatible charging infrastructure that enables PEVs to access chargers, regardless of whether they have CHAdeMO-certified or SAE-certified charging infrastructure.	CARB	CEC	2013-15
Encourage all public EVSE installations and hydrogen stations in California to be reported to the National Renewable Energy Laboratory Alternative Fuels Data Center database to provide a central clearinghouse for information that can be utilized to develop mapping applications.	CEC		Ongoing
Ensure pricing transparency for ZEV charging and fueling			
Support the development of standards for PEV chargers and hydrogen stations to ensure that drivers understand charging and fueling costs.	CPUC	CDFA	2013-15
Install signage at public PEV charging stations and hydrogen stations that informs drivers of prices per unit of measure, applicable charging voltages and filling pressures.	CDFA		2015
Expand appropriate ZEV-related signage on highway corridors and surface streets			
Standardize allowable signage for public PEV charging and hydrogen stations across the state and ensure local governments are aware of this standardized signage.	Caltrans		2013
Install signage along highway corridors and local roads to provide directions to PEV charging and hydrogen stations.	Caltrans	CEC, OPR	2013
Consider amending current state requirement that limits placement of fuel availability signage to non-urban areas, considering that most hydrogen stations and charging stations will be located in urban areas.	Caltrans		2013

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Specific Strategies and Actions to Complete Needed Infrastructure and Planning	Lead Agency	Supporting Agency	Time-frame
Support local government efforts to prepare communities for increased PEV usage and the coming commercializatizon of FCEVs			
Develop statewide PEV infrastructure plan to that will consider infrastructure needs of interregional corridors, encourage cohesiveness among regional plans, and provide guidance on high priority locations for infrastructure such as airports and near public transportation. The plan will also consider standards for privately developed infrastructure being constructed throughout the state.	CEC	Governor's Office, CARB	2013
Monitor completion of ten regional PEV plans funded by the CEC and provide support to see that these plans are comprehensive, cohesive, and appropriate to their respective local communities.	CEC		2013
Facilitate coordination between existing CEC-funded regional planning groups, regional coordinating councils, Clean Cities Coalitions, and other local organizations advancing ZEVs.	CEC		Ongoing
Support funding for ZEV planning by local governments and regional planning bodies, including funding for existing coordinating councils for PEVs and new councils for hydrogen FCEVs. Explore the possibility of funding this activity within the Strategic Growth Council's grant-making process.	CEC	Governor's Office, SGC	2013-on-going
Issue a ZEV Guidebook that recommends actions to facilitate widespread PEV and FCEV implementation, including permit streamlining, model codes and standards, parking and zoning policies, signage, and fueling and charging locations. The guidebook will provide guidance to local governments about ensuring legally required access to charging and fueling infrastructure and will be coordinated with existing guides and other information resources.	OPR		2013
Provide training and education to local building and fire inspectors about hydrogen stations and support development of codes and standards that regulate this infrastructure on a statewide basis.	OFSM		2013
Provide training and education to county weights and measures officials about testing and regulating hydrogen dispensers and support uniform standards throughout the state and enforcement of these standards once they are developed.	CDFA		2013-15
Create a new category within the Governor's Environment and Energy Leadership Awards (GEELAs) to recognize local governments that have demonstrated excellence enabling construction of hydrogen stations.	CalEPA		2013
Ensure that hydrogen and electricity can legally be sold as a retail transportation fuel			
Enact necessary legislation, regulations, standards or certifications to enable hydrogen to be sold commercially on per kilogram basis and electricity on a single unit of measure basis (e.g., kilowatt-hour). Investigate possible interim solutions in advance of permanent regulatory changes, including temporary site certification and relaxing accuracy requirements for hydrogen dispensers.	CDFA		2013

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Specific Strategies and Actions to Complete Needed Infrastructure and Planning	Lead Agency	Supporting Agency	Time-frame
Make it easier to locate and install public PEV infrastructure			
Encourage hosting of PEV chargers in multi-unit buildings. Develop model requirements for local government adoption that incorporate electric vehicle charging stations into new multi-family dwellings. Build awareness among state's major employers about the benefits of providing workplace charging. Leverage a recent U.S. DOE grant in California that will allow several organizations to promote workplace charging among employers.	OPR		2013
Consider expanding incentives, programs and technical assistance to California companies that install PEV chargers in their workplaces.	Governor's Office		2013
Advocate that federal tax rules be clarified by the IRS regarding provision of workplace charging by employers to employees.	CEC	CARB	2013-14
Promote cost-effective charging infrastructure at appropriate longer-term public parking locations such as airports and transit centers.	Governor's Office		2013
Provide a model permit streamlining process for fast charging stations that local governments can adopt to ensure timely and cost-effective approval of fast charging stations.	CEC		Ongoing
Ensure a minimum network of hydrogen stations for the commercial launch of fuel cell vehicles between 2015 and 2017			
Ensure adequate funding to build a minimal number of hydrogen stations to support the commercial launch of FCEVs. Current projections suggest that 68 stations are needed by the end of 2015 for initial vehicle launch and ultimately 100 stations for full commercial launch.	CEC	CARB	Ongoing
Collaborate with CaFCP, CEC, CARB and fuel station investors to evaluate and recommend innovative financing mechanisms to increase private investment in hydrogen stations.	CARB	CEC, Treasurer's Office	2013
Streamline permitting of hydrogen stations			
Develop permit standards for hydrogen stations to enable local governments to reduce the time and cost associated with constructing a hydrogen station.	OPR		2013
Consider designating a permitting ombudsman to actively support local governments as they review, approve and permit hydrogen stations. The ombudsman would act as a subject matter expert and provide technical support about codes, standards and safety matters for authorities having jurisdiction.	CARB		2013

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Specific Strategies and Actions to Complete Needed Infrastructure and Planning	Lead Agency	Supporting Agency	Time-frame
Plan for and integrate peak vehicle demand for electricity into the state's energy grid			
Ensure that rulemaking about smart grid enhancements include projections for ZEVs and their electricity demand, and maximize potential for ancillary services provided by PEV batteries and electrolysis-based hydrogen stations. (For example, within the context of discussing the benefits of policies such as net metering, the state should consider what the grid might look like in ten years if one million ZEVs are on the road.)	CPUC	CEC	2013-15
Develop electricity tariffs for public transit, fleets and the freight sector that encourage electrification, promote efficient utilization of grid resources and allow for recovery of utility capital costs.	CPUC	CEC	2013
Pilot infrastructure systems that avoid or minimize demand impacts on the grid from PEV charging through energy storage, demand response, distributed generation or other mechanisms.	CPUC		2013
Develop roadmap to commercialize vehicle to grid (V2G) services provided by PEV batteries. The roadmap will explore economic value of aggregated PEV storage and ancillary services to the California grid, and describe the technology, policy and regulatory environment that must be developed to deploy smart charging and V2G, including CAISO rules to enable energy services market. The roadmap should lay out a pathway for partners to help accelerate development, including research projects and pilot programs.	CASIO		2013
Demonstrate vehicle to grid and smart charging capabilities for medium-duty and heavy-duty PEV fleets.	CPUC	CEC	2013-15
Establish consistent statewide codes and standards for ZEV infrastructure			
Consider amendments to the California State Building Standards Code to ensure that new buildings are ZEV-ready, including criteria such as pre-wiring and electric panel capacity requirements.	HCD		2013-15
Consider requiring multi-unit building to dedicate a portion of their parking spots to PEV charging.	HCD		2013-15
Investigate if changes or additions are necessary to statewide code standards for hydrogen stations to ensure statewide consistency of requirements.	CDFA		2013
Coordinate with other "Section 177 states" that have adopted California's ZEV mandate to learn from each other's innovations and enable a seamless consumer experience for ZEV drivers across the country			
Coordinate interoperability standards with other states, recognizing that early policy adoption of common standards by multiple states can help to influence national policy making on this issue. Consider available national and international standards as part of the interoperability standards development process.	Governor's Office		2013
Identify a path to complete the West Coast Green Highway, which is intended to stretch from British Columbia to the Mexican border, in a manner that aligns with California's statewide infrastructure plan and the state's regional plans.	Governor's Office		2013

GOAL 2

Expand consumer awareness and demand

A wide variety of PEVs are now available to California consumers and FCEVs will become widely available beginning in 2015. Now that ZEVs are available to California consumers, the state can help industry take appropriate actions to build demand and maximize the "electric miles" that these vehicles generate.

Similar to many new technologies entering an established market, consumer demand for ZEVs will likely be moderate in the short term and may take time to expand. Generally speaking, most consumers are still unfamiliar with ZEVs. New car buyers who are aware of PEVs cite cost as the biggest impediment to buying a PEV.[1] Consumers may also be hesitant about performance attributes of ZEVs, including range limitations, uncertainty about fueling infrastructure, and uncertainty about durability and quality.

Demand for ZEVs will increase as these technologies become more familiar and the attributes of ZEVs become more widely known. Additionally, California has a strong market of "early adopter" consumers who pioneer innovative technology. As the California Plug-In Vehicle Collaborative's *Taking Charge* strategic report explains:

> "California's long history of cultural and technological innovation, particularly around automotive lifestyles, makes it well positioned to lead a transition to electric-drive transportation and plug-in electric vehicles. California consumers have a history of adopting new and 'green' technologies."

Highlighted strategies and actions

- Support and advocate for the reauthorization of funding programs to continue consumer rebates for purchase or lease of PEVs and FCEVs.
- Maintain HOV lane access for ZEVs.
- Participate in existing and planned consumer outreach campaigns to raise awareness about the availability and benefits of ZEVs and offering driving opportunities.

This action plan includes several strategies to help expand consumer awareness and interest in ZEVs, including reducing upfront purchase and operating costs, promoting consumer awareness and strengthening the connection between ZEVs and renewable energy.

1 J.D. Power and Associates 2012 Electric Vehicle Ownership Experience Study (Nov. 2012)

Executive Order milestones regarding expanding consumer awareness and demand:

- By 2015 the state's academic and research institutions will be contributing to zero-emission vehicle research, innovation and education.
- By 2020 the costs of zero-emission vehicles will be competitive with conventional combustion vehicles.
- By 2020 zero-emission vehicles will be accessible to mainstream consumers.
- By 2020 there will be widespread use of zero-emission vehicles for public transportation and freight transport.
- By 2020 transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles.

Specific Strategies and Actions to Expand Consumer Awareness and Demand	Lead Agency	Supporting Agency	Time frame
Reduce up-front purchase costs for ZEVs			
Support and advocate for the reauthorization of state vehicle and infrastructure funding programs (AB 118, AB 923 and Carl Moyer program) to fund PEV and FCEV incentives that reduce the purchase cost of vehicles. Determine whether funding from other revenue streams (cap-and-trade, EPIC program) is appropriate for supporting ZEV markets. *Also listed in other sections of this action plan.*	Governor's Office	CEC, CARB	Ongoing
Consider other approaches to reduce upfront purchase cost, including eliminating or reducing sales tax on ZEV purchases.	Governor's Office		2013-14
Support and advocate for a continued federal tax credit for ZEVs. Consider advocating that this tax credit be converted to a point-of-sale rebate, which would expand the benefits to those individuals who cannot take full advantage of the tax credit, enable government agencies and non-profits to utilize this benefit, and make the financial savings it enables more direct during the ZEV purchasing process. Advocate that this federal tax credit be leveled between PEV and FCEV technologies and expanded to incentivize the purchase of medium and heavy-duty ZEVs.	Governor's Office		Ongoing
Support approaches to financially decouple PEV batteries from the PEVs at the time of purchase, which can reduce the upfront cost of PEVs. Approaches include developing a secondary market for PEV batteries through demonstration projects to determine the value of used vehicle batteries as grid storage.	CPUC	CDFA	Ongoing
Consider integrating purchase of ZEV infrastructure into the eligible uses of PACE (Property Assessed Clean Energy) loans. California is currently working to expand the availability of these property-secured financing districts for residents and business.	Governor's Office		2013-on-going
Encourage and support auto dealers to increase sales and leases of ZEVs			
Encourage existing public-private ZEV-focused partnerships to include leaders from the auto dealership sector in their efforts and organizations.	Governor's Office		2013
Support expanded education at auto dealerships regarding ZEVs.	CEC	CARB	2013-on-going

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Specific Strategies and Actions to Expand Consumer Awareness and Demand	Lead Agency	Supporting Agency	Time frame
Reduce operating costs for ZEVs			
Encourage electric utilities to conduct targeted outreach to homeowners and fleets with new PEVs, to ensure they are aware of time of use electric rates and the potential cost savings to their households.	CPUC	CEC	2013
Consider revising utility time of use electricity rates for PEVs, based on PEV charging data, customer enrolment, and customer feedback, to incentivize off-peak charging, increase customer understanding, and maximize consumer savings.	CPUC		Ongoing
Evaluate ways to reduce costs of PEV home charging, including creating a simpler metering option for homes with PEV chargers and establishing sub-metering protocol or other policies to reduce costs for homeowners to access PEV-specific time of use rates.	CPUC	CDFA	Ongoing
Ensure that the current rule within the Low Carbon Fuel Standard program requiring the full value of electricity credits be returned to PEV users is implemented in a manner that maximizes financial benefit to the PEV owner.	CPUC		2013
Encourage the insurance industry to explore the possibility of premium reductions for ZEV policy holders.	State Insurance Commissioner		2013
Develop and maintain attractive non-monetary incentives for use of ZEVs			
Maintain HOV lane access for ZEVs.	Caltrans		Ongoing
Explore how to streamline issuing HOV stickers for recent purchasers or leasers of ZEVs, including the possibility of providing the HOV sticker at point of sale.	DMV		2013
Implement statewide policy that provides parking benefits for ZEVs at state-owned buildings, parking lots and properties.	DGS		2013-on-going
Promote non-monetary incentives currently in place in certain local jurisdictions, including preferential parking, reduced or waived parking fees, access to loaner vehicles and recognition programs for vehicle purchasers.	OPR		2013-on-Agoing
Strengthen connections between research institutions and auto makers to better understand how ZEVs are being used			
Continue funding research to reveal the behavior and preferences of ZEV users, households and fleets. This research provides information on ZEV drivers' use of public fueling infrastructure, their household travel behaviors, and their purchase and leasing preferences.	CARB	CEC, Caltrans	Ongoing
Assemble joint working group of research institutions focused on ZEV research and state agencies. Consider inviting auto manufacturers to join this group.	CEC		2013

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Specific Strategies and Actions to Expand Consumer Awareness and Demand	Lead Agency	Supporting Agency	Time frame
Promote consumer awareness of ZEVs through public education, outreach and direct driving experiences			
Provide outreach and education materials through the California Department of Motor Vehicles. Explore the possibility of distributing ZEV materials as inserts within vehicle registration packets for California drivers.	DMV		2013
Participate in consumer outreach campaigns that raise awareness about the availability and benefits of ZEVs and offering driving opportunities. Leverage existing regional and national activities such as National Plug-in Day and Clean Cities coalition programs. Also consider engaging early buyers as "ZEV ambassadors."	CARB	Governor's Office	2013-15
Pursue policies and incentives to increase ZEVs in rental car and car sharing fleets, particularly for use in high-profile locations such as airports, potentially through financial subsidies or state contract approaches.	CARB	DGS	2013-14
Promote privately financed ZEV-based car sharing programs throughout the state.	Governor's Office		2013
Integrate education and information about fuel cell electric vehicles into ZEV outreach websites and community readiness efforts currently geared toward plug-in vehicles.	CARB		2013
Explore presenting electric usage of PEVs more explicitly on consumers' utility bills to demonstrate savings compared to conventional gasoline and diesel fueling for same amount of travel.	CPUC		2013
Provide PEV drivers with options to connect PEV charging with energy efficiency and renewable energy			
Explore targeting voluntary green power purchasing programs to PEV users and encourage utilities that do not currently offer voluntary green power purchasing programs to develop programs that could be targeted at PEV customers.	CPUC		2013
Provide real time information about renewable generation during off-peak periods of electricity demand that can encourage PEV users to charge during these times and facilitate programs that maximize integration of off-peak renewable energy generation into the grid.	CPUC		Ongoing
Develop projects to demonstrate the potential of managed charging that allows for PEV charging during periods of off-peak electricity demand to facilitate the integration of off-peak renewable resources.	CPUC	CEC, CAISO	2013
Ensure the ability of owners of distributed generation systems, such as rooftop solar photovoltaic systems, to size their load with future ZEV ownership in mind.	CPUC		2013
Explore the possibility of pairing incentives that encourage distributed renewable energy generation with incentives to encourage ZEV usage.	CPUC		2013
Coordinate the installation of vehicle charging equipment with energy efficiency upgrades at state-owned buildings and parking structures.	DGS	OPR	2013

GOAL 3

Transform fleets

The Governor's Executive Order aims to expand ZEVs in both public and private vehicle fleets. It specifically directs DGS and state departments to increase the share of ZEVs in their own fleets through the normal course of fleet replacement requiring that:

- 10 percent of fleet purchases of light-duty vehicles be zero-emission by 2015
- At least 25 percent of fleet purchases of light-duty vehicles must be zero-emission by 2020.

This directive does not currently apply to vehicles that have special performance requirements such as public safety vehicles.

To accomplish these fleet targets, state agencies must be able to select from several models of ZEVs based on specific performance needs. These agencies must also have access to ample fueling infrastructure. Currently, plug-in electric vehicles offer the state a near-term path toward transforming its fleet by 2015. Fuel cell electric vehicles will likely play a key role in meeting Executive Order mandates beyond 2015 as these vehicles become commercially available.

DGS is leading the state's efforts to comply with the Governor's directive for 2015. DGS is actively working on several fronts: preparing specifications for multiple ZEV technologies, developing an efficient procurement method for agencies to purchase charging equipment and deploying pilots, including the installation of 24 electric charging stations at five state parking facilities in the Sacramento area and the addition of 10 PEVs into the state's rental pool. These pilots allow agencies and staff to gain first-hand experience using PEVs to meet their transportation needs and provide DGS important information that will inform the roll-out of additional purchases of PEVs and related infrastructure.

Highlighted strategies and actions

- Take necessary steps to ensure that at least 10% of state's light-duty vehicle purchases are ZEVs by 2015 and that at least 25% are ZEVs by 2020.
- Advance a statewide ZEV Fleets Users Forum or expand existing forums to support the efforts of companies and governments to integrate ZEVs into their fleets.
- Develop a multi-agency strategy to accelerate the commercialization of medium and heavy-duty ZEVs.

The action plan also calls for expanded ZEV deployment within private vehicle fleets, including public transportation and freight transport. Greater use of ZEVs in heavy-duty fleets will reduce greenhouse gas emissions and traditional criteria pollutants in urban areas, freight corridors, ports and other "non-attainment" zones with high amounts of pollution. In addition to reducing air pollution, incorporating ZEVs into fleet operations help drive demand for ZEVs and exposes a greater number of people to these vehicles.

This action plan identifies a range of actions that state government should take to encourage increased ZEV deployment in private fleets including providing funding support, keeping fueling affordable, increasing coordination and communication among fleet users and incorporating ZEV commercialization in state

Executive Order milestones related to transforming fleets:

- By 2015 California's state vehicle fleet will increase the number of its zero-emission. vehicles through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are zero-emission.
- By 2020 at least 25 percent of state fleet purchases of light-duty vehicles will be zero-emission.
- By 2020 there will be widespread use of zero-emission vehicles for public transportation and freight transport.
- By 2020 transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles.

Specific Strategies and Actions to Transform Fleets	Lead Agency	Supporting Agency	Time frame
Incorporate ZEVs into state vehicle fleet			
Conduct a usage assessment of all state vehicles to determine which fleet applications are best suited for ZEVs.	DGS		2013-on-going
Develop three-year implementation plan, with metrics to measure success, for state fleet ZEV purchases.	DGS		2013-on-going
Establish state fleet purchasing rules for ZEVs.	DGS		2013-on-going
Develop statewide contract for multiple PEVs and FCEVs as they become available. Ensure that state fleet rules and policies for ZEV purchases enable the full range of ZEVs to compete for state contracts.	DGS		2013-on-going
Provide information to state fleet managers about available and coming ZEV vehicles, including PEVs and FCEVs.	DGS		2013-on-going
Develop near-term pilot projects to enhance understanding of PEVs and PEV infrastructure within state departments.	DGS		2013-on-going
Encourage state and local motorcycle fleets to explore an increasing number of zero-emission alternatives for police and other end users.	DGS		2013-on-going
Explore the feasibility of pooling purchase of ZEVs with other jurisdictions, including local and regional governments within California, as well as other states including Oregon and Washington and the federal government. Assess the feasibility of opening this pooled purchase to private fleet providers.	DGS		2013
Consider removing the 1.9% surcharge to other jurisdictions for using DGS vehicle procurement contracts for ZEV purchases.	DGS		2013
Identify funding to expand fleet purchases of ZEVs and ZEV infrastructure			
Support and advocate for the reauthorization of state vehicle and infrastructure funding programs (AB 118, AB 923 and Carl Moyer program) to fund the Clean Vehicle Rebate Project (CVRP) and the Hybrid & Zero-Emission Truck & Bus Voucher Incentive Project (HVIP) programs. *Also listed in other sections of this action plan.*	Governor's Office	CEC, CARB	2013-on-going
Consider multi-year fleet budgeting that captures capital and operational expenditures.	DGS		2013-on-going
Utilize innovative financing mechanisms that allow fleet acquisitions to capture federal tax incentives, including partnering with auto manufacturers on programs developed by these manufacturers.	DGS		2013-on-going
Track benefits of fleets' transition to ZEVs to the extent practicable			
Record and share the operational cost savings from off-peak PEV fleet charging versus gasoline and diesel use. Record and share operational cost savings from FCEV fueling as it becomes available.	DGS		2013-on-going

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Specific Strategies and Actions to Transform Fleets	Lead Agency	Supporting Agency	Time frame
Complete necessary infrastructure to allow for 10% ZEV purchases by 2015			
Survey existing parking spaces and PEV charging stations at state facilities and identify necessary charging infrastructure to support DGS ZEV goals. Adopt plan and schedule to develop this infrastructure. Design and install PEV charging infrastructure.	DGS		2013-on-going
Develop statewide contract for multiple PEV charging stations.	DGS		2013
Maximize use of ZEVs in state-sponsored car rentals			
Include PEVs in statewide rental car contract, as well as FCEVs when they become commercially available.	DGS		2013
Consider integrating ZEV-based car sharing into the state's fleet management system.	DGS		2013-on-going
Ensure that state vehicles can benefit from evolving benefits associated with ZEVs and position state vehicle fleets to participate in technology demonstrations			
Participate in technology demonstrations as they become available, such as battery second market utilization and vehicle-to-grid services.	DGS		2013-on-going
Identify state fleets located near retail hydrogen stations and explore purchase or leases of FCEVs for these fleets.	DGS		2013
Expand use of ZEVs for private light- and medium-duty fleets			
Publicize the potential revenues available through Low Carbon Fuels Standards credits for incorporating ZEVs into fleets.	CARB		Ongoing
Support technology demonstrations within fleets of vehicle to grid systems and publicize the potential revenues available from vehicle to grid programs.	CARB	CAISO, CPUC	Ongoing
Explore establishing a state policy coordinator to coordinate existing state and local ZEV policies and incentives for private fleets. A central coordinator would ensure communication between bodies, help to coordinate planning processes and leverage incentives.	CARB, Governor's Office		2013
Explore establishing statewide ZEV Fleets Users Forum or expanding existing forums such as High-Efficiency Truck Users Forum to organize communication with ZEV manufacturers on fleets' needs, serve as an information and best-practices clearinghouse, provide a venue for coordinating research and data collection, and help fleet managers develop business case evaluations for integrating ZEVs into their fleets.	CARB		2013

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Specific Strategies and Actions to Transform Fleets	Lead Agency	Supporting Agency	Time frame
Help to expand ZEVs within bus fleets			
Monitor technology and market progress and update Zero-Emission Bus (ZBus) regulation, taking into consideration technology and market development, to expedite use of ZBuses.	CARB		2013
In partnership with CaFCP, develop roadmap for fuel cell bus deployment in California that outlines a pathway to deploy infrastructure in preparation for commercialization of fuel cell electric buses. Example strategies would include support for clusters of transit agencies undertaking technology demonstrations to deploy fuel cell buses at a volume that will reduce manufacturing costs and provide significant throughput in the fueling infrastructure.	CARB		2013-16
Reduce cost barriers to ZEV adoption for freight vehicles			
Continue to provide incentive funding (including purchase vouchers) for buses and heavy-duty vehicles to reduce up-front purchase costs and consider allowing freight vehicle purchasers to utilize multiple funding programs for the same vehicle purchases.	CARB/CEC		2013
Develop electricity tariffs for public transit, fleets and the freight sector that encourage electrification, promote efficient utilization of grid resources and allow for recovery of utility capital costs.	CPUC		2013
Assess need for incentive funding of zero-emissions trucks to include an infrastructure cost component.	CARB	CEC	2013
Integrate ZEVs into freight planning			
Develop multi-agency strategy to accelerate the commercialization of medium and heavy-duty ZEVs, which incorporates existing efforts including Caltrans' California Transportation Plan and CARB's Freight Strategy Update.	CARB	Caltrans	2013
Support regional efforts to integrate ZEV technologies into major freight routes, including regional assessments of freight electrification opportunities, technology demonstrations and operational pilots.	Caltrans		2013

GOAL 4

Grow jobs and investment in the private sector

California leads the world in both ZEV deployment and in financial investment in ZEV-related technology. Supportive policies and a receptive consumer market have translated into hundreds of millions of dollars of investment into California-based clean technology companies. In 2010, California attracted $840 million of general venture capital investment, representing 80 percent of total U.S. investment and 60 percent of total global investment in this sector. In the first half of 2011, California specifically attracted $467 million of ZEV-related venture capital investment.[1] Additionally, cost savings by California consumers who transition to ZEVs and reduce their vehicle fueling costs is likely reinvested elsewhere into California's economy, creating new jobs.[2]

Although ZEV design, development and manufacturing is still in commercial infancy, some the most successful companies within this nascent sector are located in California and are increasing research, development and manufacturing of ZEV technology in our state. In the coming years, expanding the supply chain presents a tremendous economic opportunity for California.[3]

While state government continues to provide publicly funded financial incentives to expand the consumer market for ZEVs, the state's actions are intended to ultimately build a ZEV market that is sustainable without public subsidies through growing consumer demand and private investment.

Highlighted strategies and actions

- Conduct supply chain assessment of ZEVs, components and infrastructure to develop a strategic plan to attract promising areas of ZEV supply chains to California.
- Identify pre-permitted facilities that can be quickly repurposed for ZEV and component manufacturing or hydrogen stations.
- Provide workforce training funds to employers, trade associations, Joint Apprenticeship Training Committees, and Chambers of Commerce to address employer-driven, ZEV-related training needs for existing and new workers.

Maximizing economic benefits from the growing ZEV market requires a comprehensive economic development approach in which local, regional and state governments collaborate with the private sector to grow and sustain ZEV manufacturing in California. Budgetary constraints limit the state's ability to offer public financing and economic development incentives, so state efforts must be carefully targeted to attract and retain manufacturing facilities. Ongoing public support for research, development and demonstration will continue to make California the innovation epicenter of the growing ZEV industry. California's universities, community colleges and labor organizations will also play a crucial role by preparing workers to fill jobs that develop in this industry.

1 Next 10 and Collaborative Economics (2011) *Powering Innovation: California is Leading the Shift to Electric Vehicles from R&D to Early Adoption*
2 *Driving California's Economy: How Fuel Economy and Emissions Standards Will Impact Economic Growth and Job Creation,* David Roland-Holst (Jan. 2012)
3 *Powering Innovation: California is Leading the Shift to Electric Vehicles from R&D to Early Adoption*

Executive Order milestones related to growing jobs and private investment:

- By 2015 the state's manufacturing sector will be expanding zero-emission vehicle and component manufacturing.
- By 2015 the private sector's investment in zero-emission vehicle infrastructure will be growing.
- By 2015 the state's academic and research institutions will be contributing to zero-emission vehicle research, innovation and education.
- By 2020 the private sector's role in the supply chain for zero-emission vehicle component development and manufacturing in the state will be expanding.
- By 2020 transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles.

Specific Strategies and Actions to Grow Jobs and Private Investment in the Sector	Lead Agency	Supporting Agency	Time frame
Leverage tools to support business attraction, retention and expansion of ZEV companies			
Provide appropriate support to ZEV-related companies that encounter challenges with state-required permitting for their facilities and operations.	GO-Biz		Ongoing
Identify pre-permitted facilities that can be quickly repurposed for ZEV and component manufacturing or hydrogen stations. This approach resulted in Tesla Motors locating its manufacturing facility at Fremont's former NUMMI plant.	GO-Biz		2013
Continue funding support to California-based ZEV manufacturers. AB 118 funding, the state's Sales Tax Exemption for green manufacturing equipment (SB 71), the U.S. Department of Energy's Alternative Technology Vehicle Manufacturing loan programs (AVTM) and other sources of public capital and incentives have been valuable to ZEV manufacturing to date.	Governor's Office	CEC	Ongoing
Support demonstration and commercialization of ZEV-related technologies by California companies			
Ensure that Electric Program Investment Charge (EPIC) funds can be directed to RD&D for ZEV technologies.	CPUC	CEC	2013
Support funding for ZEV demonstration and deployment projects.	Governor's Office	CEC, CARB	Ongoing
Advance the state's I-HUB Regional Innovation cluster program to support transfer of knowledge between national labs, academia and industry.	GO-Biz		Ongoing
Support new market opportunities for battery reuse and recycling.	CEC		2013-on-going
Support R&D activities at California universities and research institutions			
Ensure funding support for ZEV research, which should focus on areas that are of highest value to ZEV innovation, manufacturing and deployment.	CEC	Governor's Office	Ongoing
Develop and evaluate advanced technologies and methods for the safe and efficient recycling of battery packs from plug-in electric vehicles.	CEC		2013-14
Continue to support and invest in California's world-renowned hydrogen and fuel cell research programs at California universities. These programs help to retain California's lead on education, training and jobs related to fuel cell research, development and deployment.	Governor's Office		Ongoing

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Specific Strategies and Actions to Grow Jobs and Private Investment in the Sector	Lead Agency	Supporting Agency	Time frame
Prepare California workers to participate in ZEV-related jobs			
Provide workforce training funds to employers, trade associations, Joint Apprenticeship Training Committees and Chambers of Commerce to address employer-driven, ZEV-related training needs for existing and new workers. Coordinate efforts and funding across state programs with businesses.	ETP	CEC	Ongoing
Encourage education programs within university undergraduate and graduate programs in science, engineering and business that provide the skills and knowledge necessary to develop new ventures and contribute to the growing ZEV industry in California. Programmatic focus could include subjects such as advanced automotive and hydrogen infrastructure engineering and technology.	Governor's Office		2013-on-going
Provide opportunities for Local Workforce Investment Boards and community college programs to develop and implement job training programs in the ZEV sector, including contracting with the Employment Training Panel to fund workforce training programs. Allow flexibility to support programs that partner community colleges with four-year institutions.	ETP		Ongoing
Support training partnerships between business and state educational institutions and link employers to existing training programs to ensure their employees acquire requisite skills as they are needed.	ETP		Ongoing
Encourage companies that are building ZEV infrastructure to partner with community colleges to train qualified workforce for these infrastructure jobs.	CPUC		Ongoing

CONCLUSION

California's strong and lasting commitment to zero-emission vehicles reflects the understanding that advanced vehicle technology plays an important role in meeting our state's most pressing environmental challenges. By transitioning to plug-in electric vehicles and fuel cell electric vehicles, Californians are helping to reduce smog and other local pollutants that harm our state's residents. In the process, this transition to cleaner vehicles helps California lead the world in combating global climate change.

Zero-emission vehicles also represent the type of technological innovation that will serve as an important source of California's future economic and job growth. Technology development has driven California's economy over recent decades to become the ninth largest economy in the world. Continued economic growth in our state will be enabled by embracing new, evolving technologies such as ZEVs and working to locate this technological innovation within the state's borders.

In laying out the next steps to accelerate the ZEV market, this 2013 ZEV Action Plan can help our state capture the environmental and economic benefits of the transition to cleaner transportation. Our goal remains nothing less than a healthier and more prosperous state.

EXECUTIVE ORDER B-16-2012
MARCH 23, 2012

WHEREAS California is the nation's largest market for cars and light-duty trucks; and

WHEREAS the transportation sector is the biggest contributor to California's greenhouse gas emissions and accounts for approximately 40 percent of these emissions; and

WHEREAS California should encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth and improve the quality of life in the State; and

WHEREAS California is a leader of technological innovation, including the innovation necessary to produce commercially successful zero-emission vehicles; and

WHEREAS California attracts over half of the nation's venture capital for clean technology and ranks high among the states in the number of workers and facilities supporting the clean-car industry; and

WHEREAS California is leading the nation in enacting laws and establishing policies and programs that are reducing greenhouse gases, protecting air and water quality, promoting energy diversity and supporting low-carbon alternative fuel technologies; and

WHEREAS zero-emission vehicles provide multiple benefits in addition to reducing greenhouse gas emissions, such as reducing conventional pollutants, operating quietly and cleanly, allowing home refueling and lowering operating and fuel costs; and

WHEREAS California should support and encourage car manufacturers' plans to build and sell tens of thousands of zero-emission vehicles in California in the coming years.

NOW, THEREFORE, I, Edmund G. Brown Jr., Governor of the State of California, do hereby issue the following orders to become effective immediately:

IT IS HEREBY ORDERED that all State entities under my direction and control support and facilitate the rapid commercialization of zero-emission vehicles.

IT IS FURTHER ORDERED that the California Air Resources Board, the California Energy Commission, the Public Utilities Commission and other relevant agencies work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve by 2015:

- The State's major metropolitan areas will be able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting; and
- The State's manufacturing sector will be expanding zero-emission vehicle and component manufacturing; and
- The private sector's investment in zero-emission vehicle infrastructure will be growing; and
- The State's academic and research institutions will be contributing to zero-emission vehicle research, innovation and education.

IT IS FURTHER ORDERED that these entities establish benchmarks to help achieve by 2020:

- The State's major metropolitan areas will be able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting; and
- The State's manufacturing sector will be expanding zero-emission vehicle and component manufacturing; and
- The private sector's investment in zero-emission vehicle infrastructure will be growing; and
- The State's academic and research institutions will be contributing to zero-emission vehicle research, innovation and education.

IT IS FURTHER ORDERED that these entities establish benchmarks to help achieve by 2025:

- Over 1.5 million zero-emission vehicles will be on California roads and their market share will be expanding; and
- Californians will have easy access to zero-emission vehicle infrastructure; and
- The zero-emission vehicle industry will be a strong and sustainable part of California's economy; and
- California's clean, efficient vehicles will annually displace at least 1.5 billion gallons of petroleum fuels.

IT IS FURTHER ORDERED that California target for 2050 a reduction of greenhouse gas emissions from the transportation sector equaling 80 percent less than 1990 levels.

IT IS FURTHER ORDERED that California's state vehicle fleet increase the number of its zero-emission vehicles through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles be zero-emission by 2015 and at least 25 percent of fleet purchases of light-duty vehicles be zero-emission by 2020. This directive shall not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare.

This Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 23rd day of March 2012.

EDMUND G. BROWN JR.
Governor of California

ADDITIONAL INFORMATIONAL RESOURCES

Appendix B

State Government

California Air Resources Board Advanced Clean Cars Program
www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc.htm

California Department of General Services Executive Order B-16-12 Implementation Plan www.dgs.ca.gov/ofam/Programs/FARS/AFVP.aspx

California Energy Commission "Drive" website
www.energy.ca.gov/drive

California Heavy Duty Vehicle Incentive Program
www.californiahvip.org

"Drive Clean" Plug-In Electric Vehicle Resource Center
www.DriveClean.ca.gov/pev

California Fuel Cell Partnership

www.cafcp.org

A California Road Map: Bringing Hydrogen Fuel Cell Electric Vehicles to the Golden State
www.cafcp.org/sites/files/20120720_Roadmapv(Overview)_0.pdf

Frequently Asked Questions
www.cafcp.org/sites/files/20110825_factbooklet.pdf

Toolkit for Fire & Life Safety Professionals
www.cafcp.org/toolkits/ER

Upcoming: Roadmap for zero emission heavy duty fuel cell electric bus (FCEB) deployment in California that outlines a strategy that will promote a commercial market for FCEBs beyond 2016.

California Plug-in Electric Vehicle Collaborative

www.evcollaborative.org

A Community Toolkit for Plug-in Electric Vehicle Readiness
www.pevcollaborative.org/toolkit#overlay-context=toolkit

Streamlining the Permitting and Inspection Process for Plug-in Electric Vehicle Home Charger Installations Report
www.evcollaborative.org/sites/all/themes/pev/files/PEV_Permitting_120827.pdf

Accessibility and Signage for Plug-In Electric Vehicle Charging Infrastructure Report
www.evcollaborative.org/sites/all/themes/pev/files/PEV_Accessibility_120827.pdf

Maps and Apps, Today's Mapping and Location-Based Services for Plug-In Electric Vehicle Charging Infrastructure Report
www.evcollaborative.org/sites/all/themes/pev/files/PEV_Maps_Apps_120827.pdf

PEV Communication Guides
www.evcollaborative.org/policy-makers

Additional Resources

Clean Vehicle Rebate Project
www.energycenter.org/index.php/incentive-programs/clean-vehicle-rebate-project

Next 10 and Collaborative Economics (2011) *Powering Innovation: California is Leading the Shift to Electric Vehicles from R&D to Early Adoption*
www.next10.org/powering-innovation-california-leading-shift-electric-vehicles-rd-early-adoption

Developed by:

Governor's Interagency Working Group on Zero-emission Vehicles
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