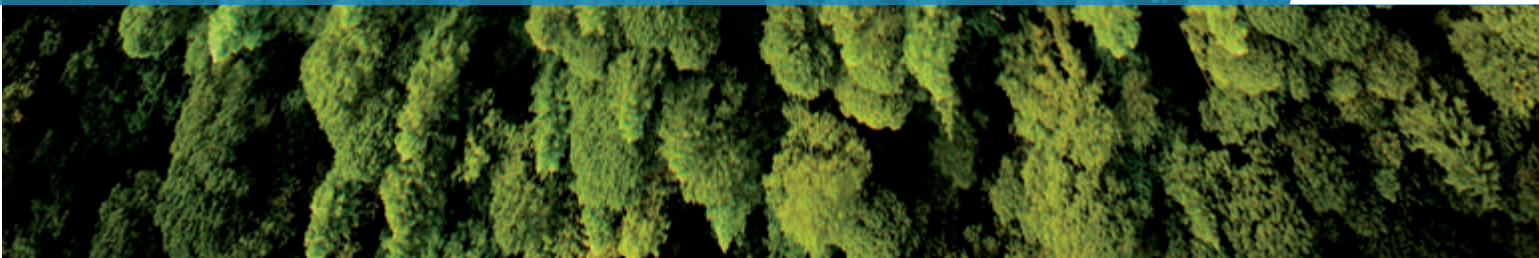




MULTI-STATE ZEV ACTION PLAN

ACCELERATING THE ADOPTION OF ZERO EMISSION VEHICLES

**2018
2021**



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SOME DEFINITIONS

This Plan uses specific terms to refer to cars regulated under state ZEV programs. In this Plan, the term

ZERO EMISSION VEHICLE (ZEV) includes:

BATTERY ELECTRIC VEHICLES (BEVs) powered solely by an electric battery

FUEL CELL ELECTRIC VEHICLES (FCEVs) electric drive fueled by hydrogen

PLUG-IN HYBRID ELECTRIC VEHICLES (PHEVs) powered by a combination of an electric motor and a gasoline engine

The term PLUG-IN ELECTRIC VEHICLE (PEV) is a subset of ZEVs and includes both PHEVs and BEVs.

** This Plan is downloadable (with live links) at www.nescaum.org*



INTRODUCTION

THE MULTI-STATE ZERO EMISSION VEHICLE (ZEV) TASK FORCE IS PLEASED TO PRESENT THIS NEW ACTION PLAN TO PROPEL RAPID ADOPTION OF THE CLEANEST PASSENGER CARS ON THE ROAD TODAY, INCLUDING BATTERY-ELECTRIC, PLUG-IN HYBRID ELECTRIC, AND FUEL CELL ELECTRIC VEHICLES.

The Multi-State ZEV Task Force was formed in 2013 when the governors of eight states—California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island and Vermont—signed a Memorandum of Understanding committing to coordinated action to support successful implementation of state ZEV programs. These programs require automakers to deliver increasing numbers of ZEVs to the states between now and 2025. The decision to form a collaborative multi-state initiative sprung from the states’ recognition that regulations alone would not be sufficient to achieve rapid expansion of the market for electric vehicles.

The first Multi-State ZEV Action Plan, released in May 2014,¹ served the Task Force states well. It guided many initiatives to support growth in the early market for ZEVs—from consumer purchase incentives, to grant programs that fund deployment of charging and hydrogen fueling stations, to a new partnership with automakers to educate consumers about the many benefits of driving electric.

The Task Force states also formed important international partnerships to promote transportation electrification.

The states were founding members of the International ZEV Alliance, a collaboration of 14 North American and European national and subnational governments formed in 2015 to accelerate the global transition to ZEVs.

Now it is time for a new Action Plan to accelerate ZEV adoption by mainstream consumers. This Plan was developed by nine states (New Jersey joined in 2018) and addresses priorities for action through 2021.

In the Task Force states, light-duty passenger vehicles are the single largest contributor to greenhouse gas (GHG) emissions and a significant source of pollutants that contribute to ground level ozone and other air pollution problems adversely impacting public health in the region. Transportation electrification is essential to achieving near- and long-term state GHG reduction goals, and effectively combating climate change.

Clean transportation will also deliver substantial energy security and economic benefits as cleaner electricity derived from renewable energy and other low-carbon sources replaces imported gasoline and diesel as transportation fuels.²

Transforming the automobile market will require strong and continuing public-private partnerships. It is incumbent upon automakers to continue producing an expanding array of models with longer electric ranges in a variety of price points to meet the different needs and preferences of today's car buyers. Automakers and dealers must ensure that the full line-up of models is available for sale in all ZEV states and that the vehicles are effectively marketed to car buyers.

Utilities, electric vehicle supply equipment (EVSE)* providers, hydrogen station developers, automakers, and our states must work together to ensure that charging and fueling infrastructure grows at a rate and in a manner consistent with projected sales and consumer demand in our jurisdictions. States need to work with utilities to encourage beneficial pricing policies that lower the cost of electricity and hydrogen as transportation fuels. Variable electricity rates and other rate design mechanisms can harness the benefits of electrification for all ratepayers by promoting off-peak charging and more efficient use of grid resources.

Today, the bi-coastal regions represented by the Task Force states are poised to become leading ZEV markets.

This ZEV Action Plan builds on the first 2014 Plan to accelerate market growth during this next phase of market development.

THE FOLLOWING PAGES:

- » **Summarize important developments since 2014 and identify the challenges ahead**
- » **Present priority strategies and actions for the Task Force states**
- » **Recommend actions for automakers, utilities, dealers and other key partners and stakeholders to support market acceleration and facilitate effective collaboration**

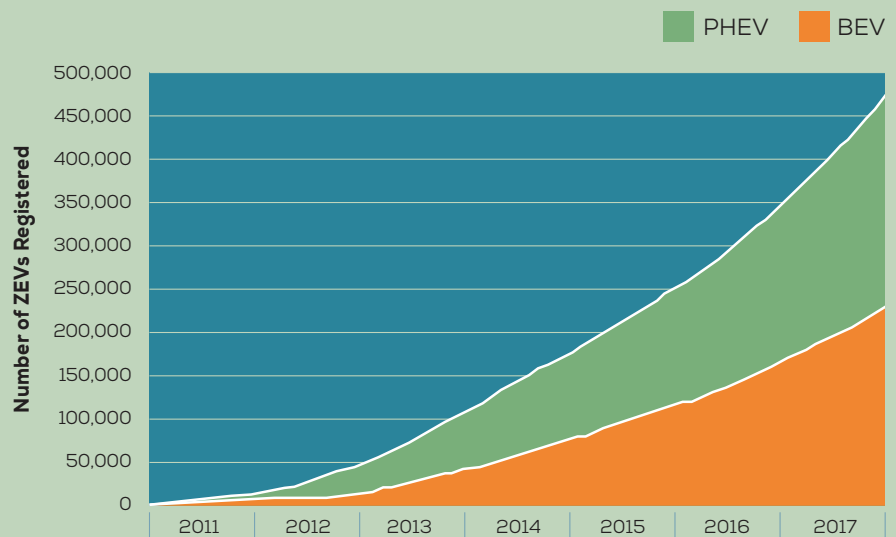
The Northeast States for Coordinated Air Use Management (NESCAUM), the non-governmental organization that facilitates the work of the Multi-State ZEV Task Force, assisted the states with development of this Plan and the solicitation of stakeholder input on draft recommendations as they began to take shape. Input from stakeholders resulted in many improvements to the Plan. We look forward to collaborating with our partners and stakeholders as we put this plan into action!

* The electric vehicle charging station and associated conduit, wiring and other electrical infrastructure.

fig. 1

CUMULATIVE ZEV REGISTRATIONS IN NINE MOU STATES

Despite strong growth in the ZEV market since 2011, the MOU states need a concerted effort to further accelerate the rate of ZEV adoption.



Source: IHS Polk



SUCCESSSES

SINCE 2014

THE FIRST ACTION PLAN: 2014–2017

California is the only state authorized by § 209(b) of the Clean Air Act (CAA) to adopt motor vehicle emission standards that are more stringent than federal standards. CAA § 177, in turn, authorizes other states to adopt California's vehicle emission standards. A total of nine states have exercised this authority and adopted the ZEV regulations promulgated under California's Advanced Clean Cars Program (ACC).

To support successful implementation of these state ZEV regulations, the 2014 Multi-State ZEV Action Plan focused on 11 key market-enabling initiatives ranging from adoption of financial incentives to implementation

of consumer outreach and education programs. Many of these initiatives have since been implemented by the states, and collectively they have helped to build consumer awareness and confidence, make ZEVs more affordable, spur sales growth, and demonstrate the viability of the ZEV program leading up to a scheduled 2017 review of California's ACC. The review concluded that no changes to the ZEV regulations were warranted and that regulatory stability would ensure a continued and achievable path of increasing ZEV sales. As a result of California's determination, automakers are required in 2018 for the first time to sell increasing numbers of ZEVs outside of California in the ZEV states. Market changes

and technology advances since 2014 have also laid a strong foundation for growth in ZEV sales, including:

Improvements in Battery Technology

The gap between the initial purchase price of plug-in electric vehicles (PEVs) and comparable gasoline-powered vehicles is narrowing quickly as battery costs fall. When costs reach \$100/kwh (which some projections suggest will occur by 2025) PEVs should approach or reach cost parity.

Investments in Vehicle Diversity

Automobile manufacturers are investing heavily in designing and producing electric options for a range of vehicles from sedans to minivans, SUVs, and light-duty trucks. The electric range of some lower-cost battery electric vehicles (BEVs) is now three times higher than the range of vehicles available in 2014 (rising from an EPA-estimated 84 miles to about 240 miles).

New partners are also increasing their efforts to support wider acceptance and adoption of ZEVs. Utilities are seeking approval from public utility commissions for investment in infrastructure and other transportation electrification programs. Employers are announcing commitments to provide workplace charging and electrify fleets, and local governments are adopting ordinances that assure new and retrofitted developments will be

PEV infrastructure-ready. Dealerships are beginning to ramp up their efforts to increase sales and are exploring opportunities to collaborate with the states.

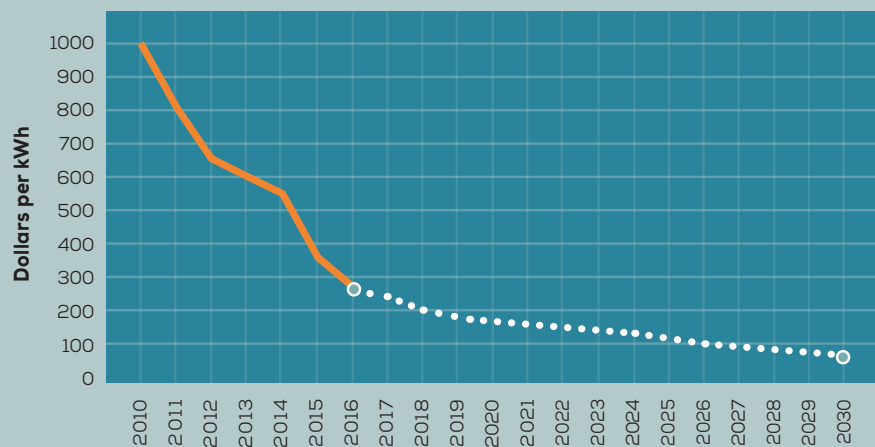
EVSE providers are investing in charging stations in settings from workplaces to downtown commercial locations. Electrify America, a subsidiary of Volkswagen, is poised to make significant new infrastructure investments in our states in fulfillment of Volkswagen's obligations under a settlement agreement with the federal government and California to address Clean Air Act violations. The Task Force states also intend to use funds allocated to them under the VW settlement to expand ZEV charging and fueling infrastructure.

Fuel cell electric vehicles (FCEVs), cars with electric drive trains powered by hydrogen fuel that can be refueled in five minutes, are a growing market segment in California and are beginning to arrive in other ZEV states. Three FCEV models are currently available in California, each with approximately 300 miles of range. Hydrogen fueling infrastructure companies are scaling up deployment of stations to serve anticipated demand, with support from the State of California. California's 35 open stations enable statewide travel, and an additional 30 are in development. In the northeast, two stations are fully operational and tested and twelve others are in development.

fig. 2

PAST AND FORECASTED COST OF LITHIUM-ION EV BATTERIES

Dramatic declines in the cost of EV batteries are expected to continue at a more tempered pace, making EVs increasingly cost-competitive with conventional vehicles.



Source: Bloomberg New Energy Finance—November 28, 2017

A woman in a purple jacket and grey pants walks past a store named 'IKE'S' which displays musical instruments like guitars and a banjo. A light blue car is partially visible in the foreground. The store has a red door with the number '441' above it.

A NEW GENERATION OF STATE ACTIONS

THE NEW ACTION PLAN: 2018–2021

While many of the recommended actions in the 2014 Action Plan remain valid today, the Multi-State ZEV Task Force developed this new Action Plan to build on early successes, redouble state efforts, and establish clear priorities for action for the next critical period in the evolution of the market.

Most consumers buying ZEVs still fall into the category of enthusiastic early adopters, and penetration of ZEV technology into the mainstream automobile market still falls far short of what is needed to combat climate change.

The best available science tells us that in order to minimize catastrophic damage from climate change, a reduction in GHG emissions of roughly 80 percent below 1990 levels is needed by 2050.³ Recognizing the urgency of this challenge, the Task Force states have set a combination of near-, mid-, and longer-term GHG emission reduction targets.

While the state GHG emission reduction targets are economy wide, transportation's dominant share of total emissions means that deep cuts in emissions from cars and light trucks are imperative.

Because new vehicles sold today will remain in use for many years, measures taken now to reduce fossil fuel use by the transportation sector over the coming decade can put our states on the trajectory needed to achieve mid-century GHG emission reduction goals.

As one example, California has determined that it will need to reduce transportation GHG emissions 40 percent below 1990 levels by 2030 in order to stay on track to meet its long-term GHG reduction goals. California proposes to achieve this 40% reduction with a mix of strategies, including increased ZEV deployments,

reductions in vehicle miles traveled (VMT), use of low-carbon fuels, and continued de-carbonization of its electrical grid. A key component of the strategy is the deployment of five million ZEVs by 2030.⁴

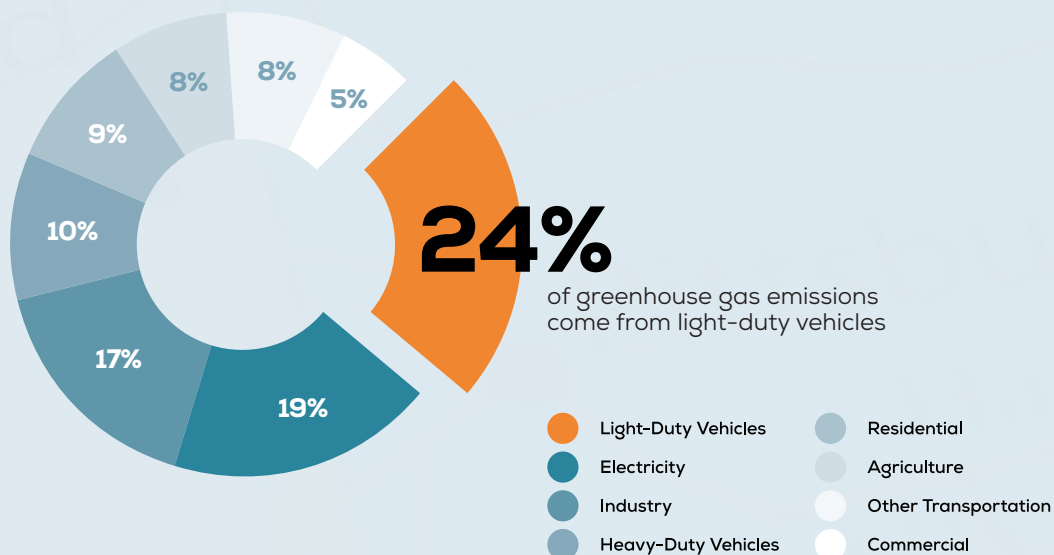
Applying California's ZEV target proportionally to the eight other Task Force states based on vehicle sales would equate to around 12 million cumulative ZEVs on the road by 2030 in the nine Task Force states (including California), or assuming a linear increase in market share, a 2030 ZEV sales share of 35 percent.

fig. 3

2015 GHG EMISSIONS IN THE NINE MOU STATES

Light-duty vehicles are the single largest contributor to greenhouse gas emissions in the states.

Data Source:
2018 State Inventory
Tool (EPA)












During the period from 2007 through 2016, the carbon-intensity of the electric grid in the nine Task Force states declined by 29%. Renewable energy standards and cap and trade programs in these states will further decrease the GHG emissions associated with the electricity used to charge PEVs, increasing the environmental benefit of driving electric even more.



fig. 4 STATE GREENHOUSE GAS EMISSIONS TARGETS

States have committed to ambitious GHG reduction goals, typically resulting in 80% reductions by 2050.

		2020	2030	2050
	CALIFORNIA	0% Below 1990 levels	40% Below 1990 levels	80% Below 1990 levels
	CONNECTICUT	10% Below 1990 levels	45% Below 2001 levels	80% Below 2001 levels
	MARYLAND	25% Below 2006 levels	40% Below 2006 levels	90% Below 2006 levels
	MASSACHUSETTS	25% Below 1990 levels		80% Below 1990 levels
	NEW JERSEY	0% Below 1990 levels		80% Below 2006 levels
	NEW YORK		40% Below 1990 levels	80% Below 1990 levels
	OREGON	10% Below 1990 levels		75% Below 1990 levels
	RHODE ISLAND	10% Below 1990 levels	45%* Below 1990 levels	80% Below 1990 levels
	VERMONT**	10% Below 1990 levels	50%*** Below 1990 levels	75% Below 1990 levels

* Rhode Island target date 2035

** Vermont Statutory goals (shown above) were established by Executive Order in 2005, and passed into law in 2006. The Comprehensive Energy Plan (CEP) goals established in 2016 set Vermont's goals at 40% below 1990 levels by 2030 and 80% to 95% below 1990 levels by 2050

*** Vermont target date 2028

Source: NESCAUM

THIS MULTI-STATE ZEV ACTION PLAN PRESENTS THE STRATEGIES THAT ARE ESSENTIAL TO ACHIEVE RAPID ZEV MARKET GROWTH IN FIVE CORE AREAS:

1

CONSUMER EDUCATION AND OUTREACH

2

CHARGING AND HYDROGEN FUELING INFRASTRUCTURE

3

CONSUMER PURCHASE INCENTIVES

4

LIGHT-DUTY FLEETS

5

DEALERSHIPS

The plan recommends high priority actions for states, automakers, charging and fueling infrastructure companies, utilities, dealers, and other partners. The recommendations for states are not intended to provide a uniform pathway

for states to follow, but rather to guide inter-state coordination and advise state-specific actions. Each state is expected to promote ZEV market growth in ways that best address its needs and unique opportunities.



STRATEGIES AND RECOMMENDATIONS

CONSUMER EDUCATION AND OUTREACH

OVERARCHING STRATEGY: INCREASE CONSUMER AWARENESS IN ZEVs THROUGH BRAND-NEUTRAL CAMPAIGNS, EXPERIENTIAL EVENTS SUCH AS RIDE AND DRIVES, AND BRAND-SPECIFIC ADVERTISING AND MARKETING

While existing ZEV owners have high levels of satisfaction with their vehicles,⁵ the vast majority of consumers still have little understanding and many misconceptions about the capabilities and advantages of ZEVs, how they operate, and the nature of the charging/fueling experience.⁶ It's not surprising then that most consumers are not considering a ZEV for their next car purchase or lease.

Addressing this gap in consumer awareness is central to increasing ZEV uptake. The good news, however, is that consumer interest is growing. According to surveys, there is a significant correlation between consumer knowledge of ZEVs and purchasing behavior—that is, more knowledge increases the likelihood of a ZEV purchase.⁷



DRIVE CHANGE DRIVE ELECTRIC

“This campaign is focusing attention on the availability of a growing variety of desirable, high-performing electric models, tax and purchase incentives, a rapidly-expanding network of charging stations and economic benefits—including fuel price savings—for current and next generation drivers,” explains Adam Ruder from the New York State Energy Research and Development Authority.

Elements of the campaign include a newly-launched website, strategic partnerships, advertising, social media, and other content efforts. The platforms work together to provide members of the public with information to help them experience and consider purchasing an electric car.

The new Driveelectricus.com website tells driver stories, helps consumers learn the basics, and provides tools for exploring a wide variety of ZEV brands and models, with the goal of generating real excitement about joining the electric car community.

www.driveelectricus.com



Story: The Beat of her Own Drum

Story: The Thrill of the Chase

Story: Finding Freedom

Story: A California Detour



Increasing consumer demand will require substantial investments in a spectrum of traditional advertising and marketing activities, as well as brand-neutral education and outreach efforts to familiarize consumers with the basic types of ZEVs, why they are desirable, and how they can fit seamlessly into modern life. Initiatives that allow consumers to experience ZEVs first hand will also play a critical role.

Progress Since 2014

The 2014 Multi-State ZEV Action Plan singled out the need for effective marketing for ZEVs. The Plan also recommended that states promote ride and drive events and explore ways to increase attention to ZEVs at auto shows.

Since then, a collaborative and extensive review of market research revealing a lack of consumer awareness and understanding of ZEVs as a category of vehicles prompted the Task Force states and their partners to focus on addressing this barrier to market growth.



75%
of consumers
know little or
nothing at all about
electric vehicles⁸

A New Campaign. At the New York International Auto Show in March 2018, northeast states and automakers jointly launched *Drive Change. Drive Electric.*, a brand-neutral campaign to increase awareness, consideration and acceptance of all types of electric cars in the Northeast. The campaign showcases the convenience, affordability, technology, sustainability and performance of ZEVs. A similar effort led by VELOZ is also underway in California.

Innovations in Experiential Outreach. Ride and drives giving consumers the opportunity to get behind the wheel of ZEVs have greatly increased since 2014, with a growing group of sponsors including Clean Cities coalitions, non-profit organizations, utilities, Electrify America, and the states.⁹

Other innovative approaches to consumer outreach have been spearheaded on both coasts and include brand-neutral ZEV showrooms,¹⁰ targeted social media advertising¹¹ and local neighbor-to-neighbor campaigns.¹²

Building on Early Successes

Drive Change. Drive Electric. has a multi-faceted strategy and a set of assets that are grounded in extensive market research and consumer testing, laying a strong foundation for campaign implementation. The principle challenge ahead is to expand the effort with additional campaign partners and sustainable funding.

In the next few years, states and a broad set of partners will also need to increase the number of events and venues that allow consumers to experience driving electric firsthand, and to interact with others who can answer questions and address concerns. Surveys of participants in ride and drives show the dramatic, positive impact they can have on consumer receptivity to ZEVs.

Robust brand-specific advertising and marketing by automakers and dealers across the Task Force states is also needed to introduce specific models to consumers as the diversity of product offerings expands and more vehicles are distributed to East Coast markets.

RECOMMENDATIONS FOR 2018–2021

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should support the brand-neutral *Drive Change. Drive Electric.* campaign in partnership with automakers and should work to bring in additional partners, highlight the expanding network of ZEV charging and fueling infrastructure, and amplify the campaign messages and materials. For example: state websites and social media channels, earned media, and collaboration with other ZEV stakeholders and coalitions.
2. **States** should support and encourage innovative state, local, and grassroots efforts to increase consumer experience with ZEVs, such as ride and drives in different settings (e. g., downtowns, large workplaces, multi-unit dwellings, etc.), car sharing, and rental programs and pop-up or permanent ZEV showrooms.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **Automakers, utilities, dealers, EVSE providers, national non-profit organizations, and others** should fund brand-neutral consumer awareness campaigns, such as *Drive Change. Drive Electric.*, to increase consumer understanding, consideration and adoption of ZEVs.
2. **Automakers and dealers** should increase brand-specific advertising and other marketing activities in all ZEV state markets, especially as new ZEV models become available.
3. **Automakers and dealers** should increase the availability of ZEVs for ride and drives and should streamline the process for supplying vehicles for these events.

NEW YORK LOCAL OUTREACH CAMPAIGNS



The New York State Energy Research and Development Authority (NYSERDA) is investing funds in the development of community-driven models for encouraging consumers to drive electric. **To boost ZEV sales in the Hudson Valley, NYSERDA awarded a grant to Drive Electric Hudson Valley.** The project leveraged networks developed during a successful Solarize campaign and organized 35 events, provided individual help for consumers, raised awareness through social media, trained dealerships, and advised potential charging site hosts. This coordinated effort produced 152 ZEV sales in this semi-rural area in nine months.



fig. 5

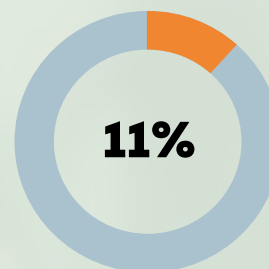
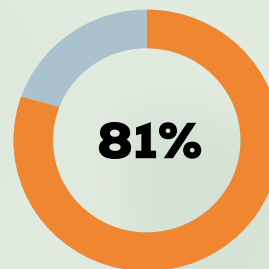
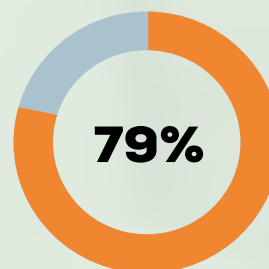
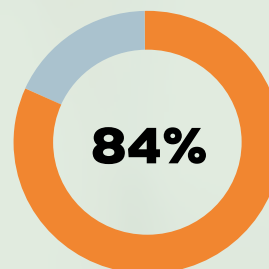
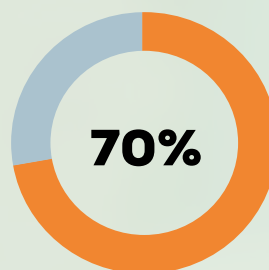
MASS DRIVE CLEAN 2017

Survey results from this state-sponsored ride and drive campaign show its effectiveness in changing consumer receptivity to ZEVs.

4. **Utilities** should include funding for consumer education and outreach activities, such as ride and drive events, in transportation electrification program proposals submitted to public utility commissions.

5. **States** should collaborate with dealership associations and automakers to promote ZEVs at auto shows through brand-neutral educational booths and ride and drives.

6. **States** should collaborate with ZEV research institutes, non-governmental organizations and other partners to evaluate different experiential education strategies and to identify and share best practices for maximizing their impact and cost-effectiveness.



Data Source: Reach Strategies

*Based on 1,076 Pre-Test Drive Surveys and 632 Post-Test Drive Surveys

** Based on 20% response rate more than 6 months after Test Drive Event



CHARGING & HYDROGEN FUELING INFRASTRUCTURE

OVERARCHING STRATEGY: FACILITATE PUBLIC AND PRIVATE INVESTMENT IN THE DEVELOPMENT OF ZEV CHARGING/FUELING INFRASTRUCTURE TO BUILD CONSUMER CONFIDENCE AND SUPPORT RAPID GROWTH IN CONSUMER DEMAND FOR ZEVs

Due to the efforts of states, automakers, businesses, and infrastructure providers, the number of public and private charging outlets in the Task Force states has more than doubled in the past four years to over 25,000 today (see fig. 6).

While these numbers reflect significant progress, today's charging network falls far short of what will be needed to serve the millions of PEVs that the ZEV states envision on their roads in the coming decade. The lack of visible public charging and hydrogen fueling networks stands as key barriers to consumer acceptance of ZEVs.¹³

Scaling up the level and pace of public and private investment in infrastructure at workplaces, retail and destination locations, and along commuting and major travel corridors is imperative to increase mainstream consumer awareness of ZEV technology and build consumer confidence in a convenient and reliable charging network.

Progress Since 2014

The 2014 Multi-State ZEV Action Plan placed a heavy emphasis on the importance of state action to support deployment of ZEV charging/fueling infrastructure. Task

Force states have taken many steps to fund and promote investment in electric vehicle supply equipment (EVSE) for PEVs. Key initiatives include:

Incentivizing Charging Stations. Most Task Force states offer grants, tax credits or rebates to public agencies, businesses and large institutions for EVSE deployment.¹⁴

Encouraging Business Investment. Through outreach, ride and drive events and recognition programs, states are showcasing private sector leadership.¹⁵

Enabling Utility Investment. State public utility commissions have exempted EVSE providers from regulation as utilities,¹⁶ and utility proposals for rate-payer funded charging infrastructure programs have been approved or are pending in a majority of the Task Force states.¹⁷

Investment in hydrogen fueling infrastructure is at an early stage in the states. The most progress has been made in California, with 35 public hydrogen fueling stations open to the public as of 2018, an additional 30 stations funded, and a plan to deploy 200 stations by 2025. California's efforts have laid the groundwork for

Surveys show availability of charging is a top concern of prospective northeast U.S. car buyers.¹⁸

deployment of hydrogen fueling infrastructure in the other Task Force states. Connecticut has two operational and tested stations, and there are 12 privately funded stations currently in the development phase in New York, Massachusetts, New Jersey, and Rhode Island.

Closing the Charging Gap

While owners of PEVs now have access to many more charging options than were available even a short time ago, a significant increase in both the pace and the level of infrastructure investment is needed in the coming years.

Significant new public and private infrastructure investment in the Task Force states is planned. Expanding charging stations in these states will be a focus of Electrify America's investments. States are developing plans to invest a portion of their Environmental Mitigation Trust allocations from the Volkswagen settlement in charging

and hydrogen fueling infrastructure. Finally, public utility commissions have approved or are considering utility infrastructure investments in a majority of these states.

Ongoing coordination of planned investments as well as additional investments needed from utilities, employers, businesses, automakers and EVSE providers to build a regional charging network in the Northeast Corridor and on the West Coast to scale that meets the needs of all PEV drivers is vitally important, in the Task Force states and also in nearby states.

To ensure a coordinated and strategic approach to infrastructure investment, states from Virginia to Maine convened a Steering Committee to develop a *Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure*, released in May of 2018.¹⁹ This ZEV Action Plan incorporates many of the infrastructure recommendations from that parallel effort, and like the Regional Strategy, is intended to promote strategically integrated investments that are aligned with state and regional goals.

The infrastructure recommendations contained in this updated Action Plan below are intended to:

- » **Address a set of overarching infrastructure issues**
- » **Promote deployment of charging and fueling infrastructure that is adequate to meet the needs of the primary use cases: charging at home, charging at work, charging around town and at destination locations, and charging/refueling on the road**



MARYLAND PUBLIC SERVICE COMMISSION'S EV DOCKET



A year-long open stakeholder process that brought four Maryland utilities together with state regulatory agencies, leading EV charging companies, retail electricity providers, and consumer, clean energy and transportation advocates laid the foundation for the development of a consensus-based proposed statewide utility transportation electrification portfolio. The four utility proposals now under consideration by the PSC provide for utility investment of more than \$100 million on 9,000 residential, multi-unit dwelling, workplace, commercial and public charging stations, consumer outreach and education initiatives, new beneficial rate offerings, measures to mitigate demand charges, and a study on electric mobility solutions for low- and moderate-income communities.

Together, these recommendations are designed to guide and drive coordinated and complementary infrastructure investments and policy initiatives by states and local governments, businesses, utilities, automakers and private sector EVSE providers to make residential, workplace and public charging the norm.

RECOMMENDATIONS FOR 2018–2021

Overarching Infrastructure Recommendations

Building consumer confidence in ZEVs requires states and their partners to work together to address overarching issues that could undermine consumer acceptance of public charging and its near-term economic viability.

It is essential, for example, that public charging stations are broadly accessible to consumers regardless of membership in a specific network and that the consumer’s charging experience is consistent and convenient. Existing electricity rate structures and other regulatory barriers that could act as a disincentive to growth of the private EVSE sector and the willingness of site hosts to invest in fast charging must be addressed

by utilities and public utility commissions (PUCs). The Task Force developed the following recommendations to address seven overarching infrastructure issues:

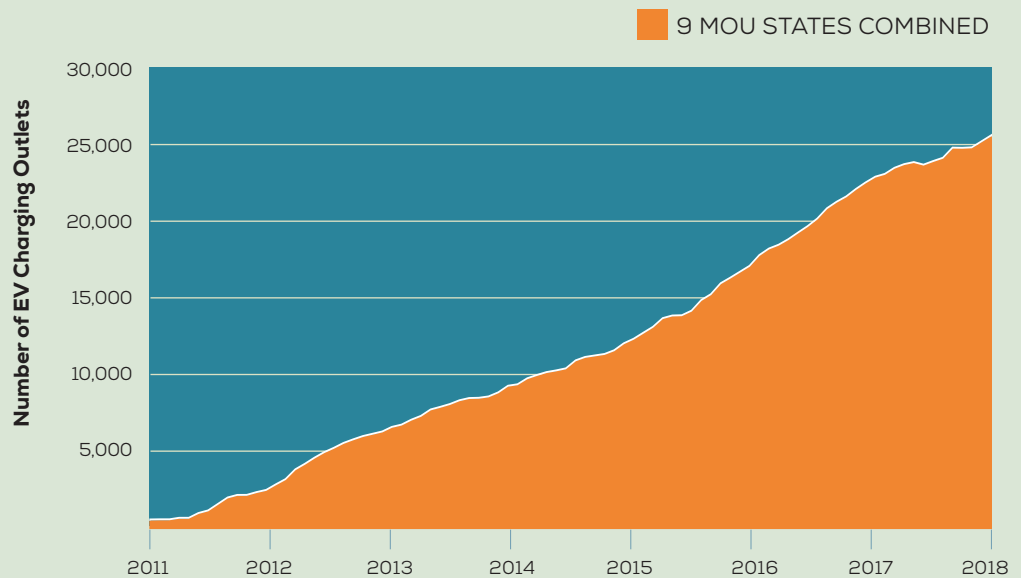
1. **States** should develop regional strategic plans to guide public and private deployment of electric vehicle supply equipment (EVSE) to support the broad portfolio of charging needs at home, work, around town, at destination locations and on the road.
2. **States** should revise residential and commercial building codes to require supporting electric infrastructure for EVSE in new construction and major renovations, and should encourage local governments to adopt ordinances requiring a minimum percentage of EVSE-ready parking spaces in new or re-constructed residential and commercial parking structures, and to incorporate goals for expanding charging/hydrogen fueling capacity into local plans.
3. **States** should open PUC proceedings to consider: (1) effective utility deployment of charging infrastructure and market acceleration; (2) variable electric rates (e. g., “Time of Use” (TOU) rates) or similar alternatives to provide clear grid benefit-focused price signals for residential customers; and (3) alternative demand charge rate designs, waivers or other options for public

fig. 6

PUBLIC AND PRIVATE EV CHARGING OUTLETS

Available charging has increased steadily over the years, however, significant increases are still needed to meet future charging demand.

Data Source: Alternative Fuels Data Center (NREL)





Vermont’s energy building code recognizes that including charging stations or conduit for stations in new residential and commercial developments is far more cost-effective than retrofitting charging infrastructure later. Both residential and commercial projects over a certain size must include a set percentage of EVSE or EVSE-ready parking spaces. *“At our energy efficient, technology-rich sustainable development, EV charging stations are an essential part of protecting our environment,”* said Don Sinex of Devonwood Investors, the developer of CityPlace Burlington, a new downtown mixed-use redevelopment.

charging to provide the most equitable and least burdensome price signals to EVSE hosts and end-users.

4. **States** should consider establishing workgroups comprised of Metropolitan Planning Organizations, environmental justice advocates, community and transportation thought leaders, utilities, and state and local government transportation leaders to develop action plans to address barriers to clean mobility in rural, low-income, and disadvantaged communities. For example: improving access to charging infrastructure and electrifying taxis and ride sharing/hailing fleets serving these communities.

5. **States** should require that public and utility funded ZEV charging/fueling infrastructure intended for public use be equipped to enable payment options for all ZEV drivers without restriction based on network membership or subscription.

6. **States** should convene a multi-state workgroup to agree on network interoperability requirements for publicly funded EVSE intended for public use and consider the establishment of regulatory frameworks for broader standardization of EVSE interoperability.

7. **States** should convene a workgroup to develop recommendations for streamlined EVSE permitting processes to incentivize infrastructure investment at priority locations.

Charging at Home

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should consider enacting “right to charge” laws that provide multi-unit dwelling (MUD) owners and residents with conditional rights to install home charging.
2. **States** should work with partners, particularly electric utilities, to educate consumers about the ease and convenience of charging at home, incentives for installing home chargers, available variable charging rates and the total cost of ownership of electric versus conventional vehicles.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **Automakers, dealers and utilities** should offer turnkey solutions for home charging or provide information about home charging options, licensed electricians for charging station installation and utility or other EVSE incentive programs as part of the purchase process for new and used ZEVs.
2. **Utilities** should play a key role in deploying EVSE at MUDs by helping to assess the need for electric service upgrades, and when authorized to rate-base infrastructure investment, by upgrading electrical service and offering a utility ownership option or incentives to defray the often higher costs of installing EVSE at these locations.



State programs that recognize leading employers for their investments in workplace charging and fleet ZEVs can help mobilize additional private sector investment.

3. **Utilities** should provide information to guide customers through the process of selecting and installing home chargers, such as information on types of chargers, available purchase incentives, local licensed electricians with EVSE expertise, “smart charging”^{**} through vehicles or EVSE for demand response applications, and the benefits of renewable integration.

4. **Utilities** should consider offering options for deploying Level 2 EVSE at single family homes, including turnkey programs and rebates or other incentives as a way to reduce costs for homeowners and to collect data on EVSE deployment that supports planning for service upgrades.

5. **Utilities** should offer customer incentives to charge at home during off-peak times, such as financial incentives linked to demand response programs or technologies enabling PEV-only TOU rates that avoid the need for installation of additional utility meters.

6. **EVSE providers** and automakers should pilot innovative solutions for MUDs that can increase resident access to charging, such as valet or mobile charging, preferential pricing at charging hubs, and community-based electric car sharing.

7. **State ZEV coalitions, NGOs, utilities, and others** should conduct education and outreach targeting MUD property owners/managers, homeowner associations, and MUD residents.

Charging at Work

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should make workplace charging a priority by establishing or maintaining financial assistance

for workplace charging through EVSE tax credits, matching grants, or other financial incentives; leading by example by offering charging options for state employees; and utilizing existing networks and conducting targeted outreach to businesses to encourage private investment in workplace charging stations.

2. **States** should organize events in collaboration with EVSE providers, automakers, business-focused NGOs, and other partners to provide high-level recognition for business leaders that commit to investments in workplace charging and fleet electrification, such as the “Drive the Dream” events held in California and Vermont.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **Utilities** should make expanding workplace charging a key priority of EVSE investment and outreach programs, for example by deploying stations or providing make-ready infrastructure; by developing programs that catalyze/leverage private investment in charging infrastructure; by offering information and training about workplace charging to commercial and institutional customers to encourage investments; and by assisting customers to develop and optimize building load energy management plans.

2. **Automakers** should work with dealerships to establish EV executive loaner programs to give executives direct experience with driving electric as a means of promoting workplace charging and fleet electrification.

3. **Organizations that convene and serve business leaders**, such as sustainable business networks and chambers of commerce, should recognize leading employers for their investments in PEV-ready workplaces and create opportunities for leading employers to support other employers through peer-to-peer mentoring.

** Smart charging allows charging to be shifted through utility programs based on grid loads and consumer needs.*

4. **Organizations with expertise in workplace charging** should offer workshops, webinars and educational materials for employers to support decision-making on workplace charging and promote efficient and high utilization of charging stations.

Charging Around Town and at Destination Locations

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should deploy level 1 and level 2 charging stations in parking lots and garages located at airports, train stations, and transit centers, and encourage private sector investments at these locations with long-term low-cost leases or no-cost use permits.
2. **States** should help build interest in the installation of charging stations at privately owned parking structures by sharing lessons learned, data, and business cases, and by actively recruiting private sector site hosts if possible.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND BY OTHER PARTNERS:

1. **Local governments and transit authorities** should also support the deployment of level 1 and 2 chargers at airports, train stations, and transit centers as described above for states.
2. **States and local governments** should make strategic investments in highly visible level 1 and level 2

chargers in state- and municipally-owned parking lots in downtown areas and at popular destinations (e.g. state parks and beaches year-round) and should promote private investment in EVSE at these locations with low-cost, long-term leases or no-cost use permits.

3. **States** should identify and publicize priority destination locations for charging infrastructure based on consultation with tourism boards, regional planning commissions, and Metropolitan Planning Organizations, and analysis of travel data and tourism statistics.
4. **States** should encourage private investment in EVSE at longer dwell time retail and other commercial locations, such as hotels, restaurants, movie theaters, and shopping malls, and by offering tax credits, matching grants, or other incentives.
5. **Utilities and EVSE providers** should strategically deploy charging hubs—with both DC fast charging (DCFC) and level 2, as appropriate—in communities without off-street parking and/or neighborhoods located near commuting travel corridors within metropolitan areas, to serve long distance and local PEV drivers, including PEVs in taxi and ride sharing/hailing fleets.
6. **EVSE providers, utilities, and automakers investing in ride sharing/ride hailing** should invest in DCFC stations and explore opportunities for valet charging services at airports, train stations, and strategically located charging hubs to serve PEVs in taxi and ride sharing/hailing fleets.



MASSACHUSETTS PEV-READY WORKPLACES



Many employers have received grants to install workplace charging stations from MassDEP's Workplace Charging Program, including AstraZeneca, Analog Devices, Mass Mutual, National Grid, Worcester State, and Boston University. When the investments prompted their employees to buy ZEVs, these employers sought additional grants. Massachusetts coordinated the successful incentive program with MASS DRIVE CLEAN, a state-led ride and drive campaign. Only 40% of participants at the ride and drives were aware of the installed charging systems at work; the events allowed the host to showcase their charging stations and help staff learn about the many benefits of driving electric.

7. **States, local governments and EVSE site owners** should deploy visible and easy to follow signage along access routes to charging stations and on site, respectively, to guide PEV drivers to charging locations.

8. **EVSE site hosts** should install wayfinding signs in parking lots and multi-level garages to direct drivers to the exact location of charging stations and use signs that restrict parking to PEVs that are actively charging to optimize utilization and facilitate enforcement of parking restrictions.

Charging on the Road

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should explore ways to support expanded DCFC investments by EVSE providers, automakers, utilities, and others in travel corridors. For example: assisting with identification of sites or site owners with possible interest in hosting stations.
2. **States** should continue to deploy ZEV charging/fueling station signage along travel corridors to

increase range confidence among ZEV drivers and awareness among other drivers of the existence of ZEV charging/fueling infrastructure.

3. **States** that wish to make direct investments in DCFC along travel corridors should ensure that those investments complement planned investments by private entities, local governments and electric utilities, and should consider targeting locations that are necessary for seamless interstate travel, but that are unlikely to attract private or utility investment in the near-term.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND BY OTHER PARTNERS:

1. **Utilities** should support expansion of DCFC along travel corridors, for example, by assisting with site selection, installing make-ready infrastructure, or deploying stations, particularly in areas where there are gaps in the charging network with low projected charging usage.
2. **Electrify America and other EVSE providers** should expand investment in the network of DCFC stations along heavily traveled interstate and state highways and popular destination corridors, especially

OREGON ZEV TOURISM



Thanks to Travel Oregon's efforts to create and market electric byways, BEV drivers in Oregon can travel to stunning mountain trails, meander through wine country, or visit towns along the coast. Byway charging stations are all sited at locations with restrooms and shelter, with many also offering access to shopping and restaurants. *These destination chargers have some of the highest utilization rates among chargers in Oregon, suggesting that this forward-looking investment in ZEV tourism is paying off!*

CALIFORNIA A GROWING HYDROGEN FUELING NETWORK



The Governor's 2018 Executive Order B-48-18 sets an ambitious 2025 goal for the deployment of **200 hydrogen (H₂) fueling stations across the state that are affordable and accessible to all FCEV drivers**. These drivers can already travel from the San Diego area to Lake Tahoe in the north and as far east as the Nevada border on clean hydrogen fuel. The State has taken many steps to support the development of 35 open retail stations, including simplifying the permitting process, ensuring station network development addresses early adopters' daily fueling needs, and providing matching grants for station construction.

where momentum for strong ZEV markets has been established by adoption of the ZEV mandate and complementary policies.

3. **The federal government** should actively support deployment of ZEV charging/fueling infrastructure by: providing funding as well as information and technical assistance to support state planning for ZEV charging/fueling infrastructure deployment along major corridors; and by conducting research to inform the efficient and effective buildout of ZEV charging/fueling networks.
4. **Roadside assistance service**, such as AAA, should offer mobile charging services to support BEV drivers.
5. **States**, along with affiliated transportation associations, EVSE providers, automobile manufacturers and other partners, should advocate for an amendment to federal law (23 USC 111) that would permit user-pay zero emitting refueling technologies including but not limited to EV and hydrogen at rest areas and fringe and corridor parking facilities located on interstate rights-of-way.

Recommendations for Hydrogen Fuel Cell Infrastructure

1. **States** should convene a hydrogen infrastructure workgroup comprised of hydrogen suppliers, station developers, automakers, and other key stakeholders to address dissemination of informational resources, share best practices, coordinate station location recommendations to create a regional station network, and support initial market launch of FCEVs beyond California, leveraging California's lessons learned and California's Fuel Cell Partnership resources.
2. **States** should engage with and support permitting, codes and standards that enable hydrogen station deployment and should help facilitate interactions with permitting and safety officials to ensure objective consideration of hydrogen fuel, providing supporting educational resources to officials when necessary.
3. **Hydrogen station developers** should continue investing in fueling equipment, hydrogen production and distribution systems, supply chains and development of networks.



CONSUMER PURCHASE INCENTIVES

OVERARCHING STRATEGY: PROVIDE, PUBLICIZE AND IMPROVE ACCESS TO FINANCIAL AND NON-FINANCIAL INCENTIVES FOR THE PURCHASE AND LEASE OF ZEVs TO RAISE CONSUMER AWARENESS AND EXPAND SALES

Since 2014, hundreds of thousands of consumers have benefited from federal and state funded ZEV purchase incentives. These short-term incentives will continue to be critically important to offset the higher purchase price of ZEVs until battery costs decline further and manufacturing economies of scale bring ZEV purchase prices into parity with comparable gasoline-powered models. In 2016, the majority of all new passenger vehicles sold in the United States had a base price of less than \$25,000; vehicles with additional option packages sold for an average of \$33,000. In the same time frame, the base price of more than half of the PHEV and BEV models that sold exceeded \$35,000 before federal, state, and automaker incentives.²⁰

Other non-monetary incentives, such as access to High Occupancy Vehicle (HOV) lanes or discounted downtown parking, have been shown to have a positive influence on consumer purchase decisions. A 2013 international study concluded that the most effective incentives for driving sales of BEVs are purchase subsidies, carpool lane access, and exemptions from emissions testing.²¹

Progress Since 2014

The first Multi-State ZEV Action Plan recommended continuation of federal incentives and implementation of more point-of-sale state funded incentives. Since 2014, Task Force states have:

Initiated and Renewed Incentive Programs.

Six states have joined California to establish a rebate, or a sales or excise tax exemption for purchases of PHEVs and BEVs.²² The amount of these incentives varies based on vehicle battery capacity. California and six other Task Force states also offer incentives for FCEVs.²³

Encouraged Utilities to Offer Incentives. One state established a Renewable Energy Standard that enables utilities to receive compliance credit for offering purchase incentives.²⁴

Introduced Non-Monetary Incentives. In several Task Force states, ZEV drivers can obtain HOV lane stickers for travel on major congested highways and pay discounted tolls.²⁵

New York's Drive Clean Rebates have helped more than 6,500 residents buy or lease a BEV or PHEV in just 12 months. Those vehicles saved 17,000 metric tons of GHG emissions.

Keeping ZEVs Affordable During the Transition

During the next three years and beyond, sustaining federal and state incentives and broadening access to them among moderate- and low-income consumers will be critically important for ensuring market growth until ZEVs achieve cost parity with comparable conventionally-fueled vehicles.

Surveys of California's Clean Vehicle Rebate recipients confirm that for nearly all, the rebate was essential for making their purchase possible. Carpool lane access was also a major motivating factor. Similar national surveys have shown that the federal income tax credit instituted

in 2008, which provides a tax credit of up to \$7500 for PHEV and BEV purchases depending on battery capacity, has enabled hundreds of thousands of car buyers to choose a ZEV rather than a comparable car with an internal combustion engine that is less expensive.²⁶

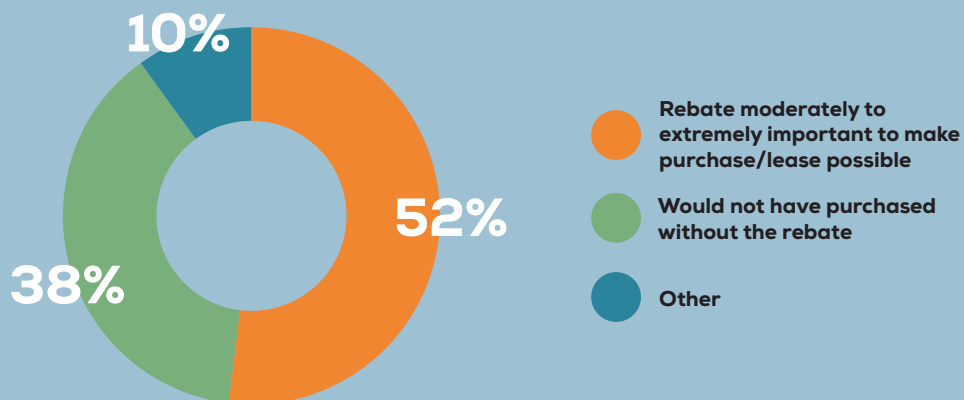
States, automakers, utilities, and other partners must take action to support the continuation of federal tax credits, which are currently scheduled to be phased out for individual manufacturers once they sell 200,000 ZEVs in the United States. Incentives for several manufacturers are expected to phase out in the next few years, creating a near-term challenge.

fig. 7

CALIFORNIA CLEAN VEHICLE PROJECT CONSUMER SURVEYS

Purchase incentives play a crucial role in early ZEV adoption and should be maintained or expanded to sustain growth in the ZEV market.

*Data Source:
Center for Sustainable Energy
Based on 39,870 survey
respondents (2013–2017)*



The recommendations below call for action to sustain monetary and non-monetary incentives. They also address other major challenges for states and other partners such as:

Increasing Predictability. Purchase incentives are most effective when consumers know that they will be offered over multiple years without lapses in availability, but providing that predictability necessitates securing sustainable funding sources, a challenge for governments at all levels.

Broadening Access. Purchase incentives can broaden access to the benefits of driving electric when they are applicable to used ZEVs or provide an increased price offset for moderate and lower income drivers.

RECOMMENDATIONS FOR 2018-2021

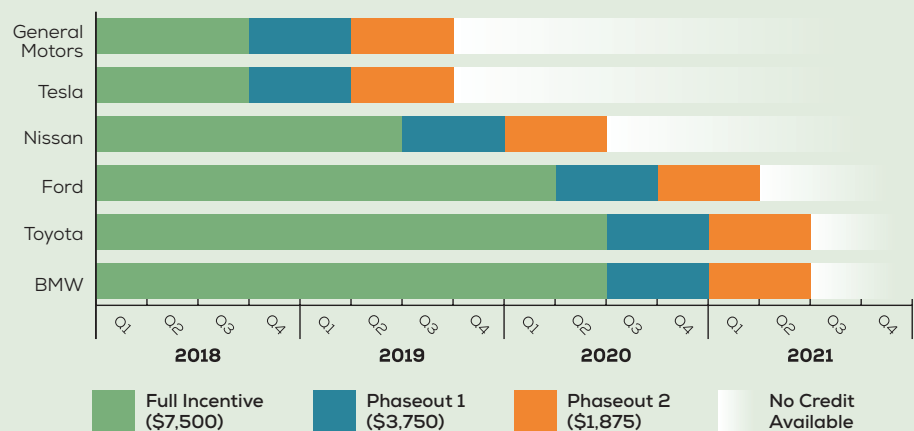
HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States**, in collaboration with automobile manufacturers, dealers, electric utilities, advocates and other partners, should advocate for continued availability of federal PEV and FCEV tax credits for all automakers.
2. **States** should continue to offer and promote existing state rebates, income tax credits, and sales and excise tax exemptions, and should consider new programs and outreach efforts that could improve access to incentives among moderate and lower income consumers. For example: expanding eligibility to used vehicle purchases.
3. **States** should share information on strategies to secure sustained funding and predictability for state funded ZEV consumer purchase incentives and should coordinate with industry and NGO allies to promote sustained funding.

fig. 8

PROJECTED PHASE OUT OF FEDERAL EV TAX CREDIT

EV tax credits for some major manufacturers could start to be phased out as early as 2018.



These are estimates; changes in production and sales may impact actual phaseout timelines.
Data Source: Inside EVs – January 2017



NEW JERSEY SUSTAINABLE CONSUMER INCENTIVES

7,000
ELECTRIC VEHICLES
have been eligible for the
SALES TAX EXEMPTION
since 2004

ZEV purchase incentives are most effective when they are available over multiple years, giving consumers and fleet administrators predictability. New Jersey's 6.6% sales and use tax exemption for BEVs and FCEVs is permanent; it has no sunset date. It also applies to the purchase, lease and even rental of both new and pre-owned used vehicles. *"The sales tax exemption is critical for closing the affordability gap in New Jersey between fuel efficient ICE vehicles and zero-emission vehicles,"* said James Appleton, President of the New Jersey Coalition of Automotive Retailers.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **States** should gather and share information about effective ways to implement monetary and non-monetary purchase incentives and should adjust the targeting of incentive programs as technologies evolve and the market matures, to continue promoting market growth in a cost-effective manner.
2. **States** should establish or continue a range of incentives to increase the attractiveness of driving ZEVs, such as providing access to HOV lanes and reducing or waiving tolls for roads, bridges and tunnels. States should refrain from adopting policies or fees that act as a disincentive to ZEV adoption.
3. **Automakers and dealers** should continue to engage with state and local ZEV and EVSE incentive programs, regarding monetary and non-monetary incentives such as preferential parking, discounted tolls, and HOV lane access.
4. **Public utility commissions and utilities** should, consistent with good business practices, support evaluation of the effectiveness of monetary incentives for PEV and EVSE purchases and should analyze the potential long-range benefits to ratepayers of PEV adoption.
5. **Businesses** should build incentives to promote ZEV adoption and commuting into employee benefit programs and should advertise those benefits through recruiting programs and employee communications.
6. **Business associations/chambers of commerce** should offer awards and other kinds of recognition for businesses that invest in making their workplaces ZEV-ready (*See recommendations under workplace charging*).



LIGHT-DUTY FLEETS

OVERARCHING STRATEGY: PROMOTE AND SUPPORT THE ELECTRIFICATION OF PUBLIC AND PRIVATE FLEETS TO BUILD BROADER CONSUMER INTEREST THROUGH EXPOSURE TO ELECTRIC VEHICLE TECHNOLOGIES, WHILE REDUCING THE ADVERSE ENVIRONMENTAL IMPACTS AND OPERATIONAL COSTS OF FLEET OPERATIONS

Public and private sector fleets represent a sizeable share of total vehicle purchases. The 2018 Annual Energy Outlook reported that 16.2% of all automobiles and 15.3% of all light trucks sold in that year were for fleet use. Many of these vehicles have high annual VMT and are replaced more frequently than vehicles owned by individuals or households. These factors magnify the boost that fleet electrification can deliver to ZEV market growth and associated reductions of transportation-related GHG emissions. In addition, ride-sharing and other transportation network company fleets can improve the business case for investment in DC fast chargers by serving as “anchor tenants” for DC fast charging networks.

In addition, organizations that use ZEVs and install charging and hydrogen fueling infrastructure become showrooms for the technology. Employees gain an opportunity to drive the vehicles and to talk with fleet administrators and fellow employees about the experience of driving electric.

Whether on the road or parked in public settings, ZEV fleet vehicles also send a clear positive message to the broader public—often from a trusted source—about the viability of the technology. As more people learn to differentiate electric drive from conventional vehicles, this effect will be amplified. Media coverage of business

leaders and employees driving electric presents an opportunity to champion the environmental, performance, fuel and maintenance cost savings, and driver satisfaction benefits of electric vehicles.

Progress Since 2014

The 2014 Multi-State ZEV Action Plan emphasized the importance of electrifying government and private fleets. The Plan made specific recommendations to: establish fleet purchase targets, explore pooled purchasing across state agencies or among states, and add ZEVs and EVSE to state purchase and rental contracts.

Since 2014, states have made progress on fleet electrification by:

Dedicating Funding. Some ZEV states have programs that provide matching grants to government agencies and businesses to offset the higher cost of PEVs and/or to reduce the installation costs of charging stations.²⁷

Setting Targets. Several states have established legislative or executive targets for including more PEVs or other alternative fuel vehicles in new fleet purchases.²⁸ In California, the state and local governments have fuel cell electric vehicles in their fleets as well.

From the town of New Bedford, Massachusetts with its 24 BEVs to New York City with its 1,500 BEVs and PHEVs, municipalities are reducing fuel and maintenance costs and transportation pollution with zero emission fleet vehicles.

Investigating Aggregate Purchasing. The states have explored the potential for aggregating fleet purchases to secure favorable bulk pricing from automakers and dealerships. This work produced surveys of state fleet administrators, fleet procurement analysis tools, case studies, and a new web site.²⁹

Municipalities in the Task Force states have also made progress on fleet electrification. While a growing number of companies and utilities have publicly announced plans for making employee transportation cleaner with ZEVs, electrification of private fleets remains a major area of opportunity.

Ramping Up Fleet Electrification

Promoting the incorporation of ZEVs into state and local government, corporate and institutional fleets is a high priority for the states between now and 2021. As ZEVs become more affordable and new product offerings such as SUVs and four-wheel drive vehicles become more widely available, the business case for fleet electrification will continue to improve, and ZEVs will satisfy a broader set of fleet needs.

Even as prices, model diversity and electric range improve, however, significant barriers to fleet electrification remain, including:

Lack of knowledge and expertise. Many fleet administrators are new to this technology and need more opportunities to learn about the different types of ZEVs, current product offerings, their benefits and charging and fueling options.

The need for high-level support. Government agency and corporate leaders often do not recognize the benefits derived from demonstrating corporate leadership in environmental stewardship, achieving measurable reductions in corporate carbon footprints, and enhancing recruitment and retention of employees that value commitment to sustainability.

Access to planning and purchasing tools. Fleet administrators may need tools to evaluate opportunities for replacing conventional vehicles with ZEVs, and contracts that make procurement of vehicles and charging or hydrogen fueling stations convenient.

Cost differentials. While improvements in battery technology are rapidly closing the purchase price gap between electric and conventional vehicles, purchase price parity is not likely to occur within the next few years. Even when lower fuel and maintenance costs result in a lower total cost of ownership, the higher upfront cost and the costs of installing charging/fueling infrastructure present obstacles, particularly in the case of government procurement where state and local government agencies may not be able to capture the benefit of federal or state tax credits.

RECOMMENDATIONS FOR 2018–2021

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should advance electrification of public fleets by: setting state-specific near- and long-term electrification

goals and procurement policies; including ZEVs in state-wide motor vehicle procurement contracts; conducting fleet-wide inventories of vehicles that could be replaced with ZEVs; quantifying potential fuel and maintenance cost savings and encouraging vehicle selection based on total cost of ownership; and assessing opportunities to secure the benefit of the federal electric vehicle tax credit through leasing or other means.

2. **States** should offer financial incentives to state and local government fleets for acquisition of ZEVs and EVSE.

3. **States and automakers** should collaborate to raise awareness and acceptance of ZEVs by offering information; maintenance training and opportunities for test drives to public fleet administrators; and presentations at conferences and events organized by national, state, and municipal fleet manager associations.

OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **States** should help to ensure that public and private fleet administrators can access tools and data for fleet electrification planning, such as model EVSE Requests for Proposals, electric fleet cost calculators, and lessons learned from private and public-sector fleet electrification initiatives.

2. **States** should enhance the positive impact of fleet electrification on consumer awareness by utilizing visible

electric vehicle decals and/or special electric vehicle registration tags, and by promoting media stories that showcase successful public and private sector fleet electrification initiatives.

3. **States** could establish recognition programs to showcase successful public and private sector fleet electrification initiatives.

4. **States** should explore innovative ways to reduce the total capital and operational costs of in-fleet charging stations, for example, through EVSE sharing agreements with other public institutions and private businesses.

5. **State, local government and private fleet managers** should collect data as ZEVs are integrated into fleet operations—including data on fuel use, maintenance, driver utilization and charging patterns—to inform future decision-making.

6. **Fleet Manager Associations** could provide information and guidance to members about the benefits of ZEVs and charging/fueling technologies and costs through ZEV-focused informational sessions and test drives at workshops, conferences, trainings, and other events.

7. **Dealerships** could develop targeted outreach and marketing strategies for the administrators of large fleets by visiting fleet programs with electric vehicle models and participating in agency-organized ride and drives.

RHODE ISLAND PUBLIC SECTOR FLEETS



A state public sector ZEV fleet goal and a directive to reduce fleet costs were key to developing the Office of Energy Resources' Charge Up! program. The program provides incentives to state and municipal agencies to purchase or lease ZEVs and install charging stations, provided they complete an efficiency or renewable project to offset expected station load. *"Charge Up!'s grants and the assistance that program staff offered us made this a no-brainer,"* said Tony Araujo, Senior Manager at the Providence Water Authority. *"And our employees love these cars!"*



DEALERSHIPS

OVERARCHING STRATEGY: SUPPORT DEALERSHIPS AND DEALERSHIP ASSOCIATIONS IN EFFORTS TO GROW CONSUMER AWARENESS OF ZEVS, IMPROVE CONSUMER SHOPPING EXPERIENCES, AND INCREASE ZEV SALES

Dealerships will have significant new opportunities to increase ZEV sales over the next three years. ZEV program requirements taking effect in 2018 will result in delivery of more vehicles in northeast markets, while automaker investments in new product lines will create a greater diversity of models, including SUVs and cross-overs, to meet consumer needs and preferences.

While dealers have deep expertise in marketing new products to prospective customers, marketing ZEVs presents a new set of challenges. Customers considering ZEVs must become comfortable with a new technology and fueling routine, and learn about an array of federal, state, and utility financial incentives for vehicles and charging infrastructure that require paperwork.

Dealers and automakers will need to work closely together during the next three years to ensure that marketing, advertising, and customer experience all work together to generate ZEV sales. Dealerships that have tackled the challenges associated with selling ZEVs are seeing their efforts rewarded; more customers are taking vehicles home.

Progress Since 2014 and Challenges Ahead

The 2014 Action Plan called for collaboration between the states and dealerships to accelerate ZEV adoption and

recommended the establishment of award programs to recognize leadership dealers and celebrate their successes. The 2014 Plan also urged automakers and dealerships to ensure that all PEV models are available for sale and are aggressively marketed in all ZEV states.

Since 2014, the states have worked with dealership associations and automakers to develop a better understanding of the opportunities and obstacles that dealerships face in this newly emerging market. A few highlights include:

A New Workgroup. Since 2016, representatives of dealership associations from East and West Coast states have been meeting regularly with the states through participation in a dealership workgroup. This forum has facilitated a productive exchange on the market for ZEVs, models for building consumer interest, and ideas for future collaboration.

Increasing the Motivation. Several states have included financial incentives for dealers in their consumer purchase incentive programs and established annual recognition awards for ZEV leadership dealers.³⁰

Partnerships for Experiential Education. States and utilities have helped fund and organize ride and drive



With a dedicated PEV salesperson, one dealership in Massachusetts saw its PEV sales reach 14% of all 2017 calendar year vehicle sales. For perspective, only 1.3% of the light-duty vehicles registered in Massachusetts during 2017 were PEVs.

events with active participation from dealerships. Dealerships anecdotally report that when they participate in ride and drives, customer visits to their lots increase.

Preparing for Accelerating Market Growth

The next period in the evolution of the ZEV market will require close collaboration between automakers and dealers to ensure that as more ZEVs are delivered, there is effective and aggressive marketing to improve awareness and interest among mainstream consumers.

Lack of consumer knowledge about the technology and its benefits can make the sales process more time-intensive. Many dealerships are discovering that taking proactive steps to provide good customer experiences—like designating sales staff to serve as ZEV technology experts and offering more extended test drives—can produce noteworthy sales growth.

Dealerships will benefit from the implementation of recommendations for states and other partners contained in the incentive, consumer outreach, and infrastructure sections of this Plan, such as continuation of financial incentives, implementation of brand-neutral consumer education, and deployment of infrastructure. States can

also help bring greater visibility to those dealerships with growing ZEV sales and can continue engaging with dealers to find collaboration opportunities.

RECOMMENDATIONS FOR 2018–2021

HIGH PRIORITY RECOMMENDATIONS FOR STATES:

1. **States** should identify ways to showcase successful ZEV dealerships and the practices they are using to expand sales through the use of media strategies, case studies, dealership award programs, and presentations at conferences and other events with a dealership audience.
2. **States** should continue engaging with dealers through the Task Force Dealership Workgroup to identify specific collaboration opportunities that could support sales, for example: (1) developing brand-agnostic dealer training workshops or videos; (2) increasing awareness of existing tools to help salespeople inform customers about incentives, utility charging rates and licensed EVSE contractors by market region; (3) distributing informational materials for display at dealerships; and/or (4) allowing dealerships to display HOV lane access stickers in car windows on the lot.



OTHER ACTIONS FOR CONSIDERATION BY STATES AND PARTNERS:

1. **Dealers and dealership associations** should commit to increasing sales of ZEVs by identifying and adopting best practices that help overcome the unique challenges of selling electric vehicle technology to consumers who are new to it.
2. **Dealers** should consider experimenting with sales practices that can help consumers overcome fears or concerns about driving electric—for example, by offering extended test drives (over several days), offering loaner ZEVs when customers are having their vehicles serviced, or providing loaner vehicles for longer trips to areas without adequate charging infrastructure.
3. **Dealership associations** should set up dealer vehicle service and customer service networks in markets where FCEVs will be sold.
4. **Automakers** should collaborate with states to showcase dealerships with strong ZEV sales through recognition and awards programs and media strategies.
5. **Automakers** should provide dealers and sales staff with opportunities to drive ZEVs for extended periods of time so that they are able to speak first-hand with potential buyers about the positive experience of driving electric.
6. **Automakers** should provide dealers with informational materials that help consumers at affiliated dealerships learn the basics about ZEVs and charging/fueling.
7. **States** should consider funding incentives for dealers as part of, or in addition to, consumer incentive programs.
8. **States** should explore ways to raise awareness of the availability of affordable used ZEV models and to encourage dealerships to carry them in inventory as availability improves.
9. **ZEV advocacy organizations** should help to recognize, showcase and provide information about leading dealers that offer excellent customer service to prospective and recent ZEV purchasers.

CONNECTICUT COLLABORATION WITH DEALERSHIPS



The Connecticut Automobile Retailers Association (CARA) has played a central role in state efforts to expand the ZEV market. CARA helped design the Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) program, which includes a pioneering \$150 incentive offered to individual dealerships each time they sell a ZEV. Dealers help advertise the rebates and assist customers with rebate applications. *“Our partnership with the State to develop and run the program demonstrates the effectiveness of innovative public-private efforts that recognize the business needs of auto dealers,”* said Jim Fleming, CARA’s President.

EXPANDING ELECTRIFICATION



MEDIUM- AND HEAVY-DUTY ZEVS

This Action Plan focuses on the adoption of light-duty zero emission vehicles. However, promising new developments in the application of zero emission technologies to medium- and heavy-duty transportation will complement the development of the light-duty ZEV market by increasing demand for advanced batteries and chargers, and by raising public awareness.

Some school districts have electric school buses operating and have plans to add more. Across the country, batteries and hydrogen fuel cells are powering transit agency buses in revenue service. Today there are more than 100 ZEV buses operating in California and many more are on order.

Major truck powertrain manufacturers also have testing and demonstration projects underway and several manufacturers have commercially available trucks and vans. There are presently more than 23 different models

of Class 3 and heavier trucks available with ZEV powertrain options—from delivery vans to pick-up trucks. Ongoing demonstrations of both FCEV and BEV Class 8 tractors indicate very strong potential for zero-emission technologies to compete in even the most challenging heavy-duty applications. Several multinational corporations are testing use of FCEVs in medium- and heavy-duty fleet applications, and at least one manufacturer has recently announced a major fleet investment in fuel cell semi-trucks. Companies are also experimenting with innovative charging technologies, such as electrified eHighway lanes for big-rig trucks.³¹

As with light-duty vehicles, continuing progress in reducing production costs (for both batteries and fuel cell systems) will continue to translate to real-world improvements in affordability and total operating cost. The Task Force plans to track these exciting developments closely.

ACKNOWLEDGMENTS

This Action Plan was developed by the Multi-State ZEV Task Force comprised of nine states: California, Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont. The Task Force is facilitated by NESCAUM. The following individuals participated in this effort:

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- 1 See www.nescaum.org/documents/multi-state-zev-action-plan.pdf
- 2 See *New Data Show Electric Vehicles Continue to Get Cleaner*, Union of Concerned Scientists blog post, March 2018
- 3 See https://unfccc.int/files/focus/long-term_strategies/application/pdf/mid_century_strategy_report-final_red.pdf
- 4 See *California's 2017 Climate Change Scoping Plan*, California Air Resources Board, Nov. 2017
- 5 A 2014 Center for Sustainable Energy survey found that 92% of PEV drivers in California were "extremely satisfied" (54%) or "satisfied" (38%) with their PEVs.
- 6 See *Literature Review of Electric Vehicle Consumer Awareness and Outreach*, www.theicct.org
- 7 See *Consumer Views on Plug-in Electric Vehicles – National Benchmark Report*, by Mark Singer, National Renewable Energy Laboratory, 2016
- 8 See Consumer Federation of America 2016 survey on attitudes toward PEVs, August 2016
- 9 Examples: Mass Drive Clean, National Drive Electric Week
- 10 Example: Forth Electric Vehicle Showcase in Portland, OR
- 11 Examples: www.driveelectricus.com, "What Drives You?" campaign by Drive Electric Vermont
- 12 Example: Rochester, NY's *Electric Vehicle Accelerator Initiative*, Smart Columbus program in OH
- 13 See, for example, *National Plug-In Electric Vehicle Infrastructure Analysis*, U.S Department of Energy, Sept. 2017
- 14 Examples: EVSE incentive programs in CA, CT, MA, MD, NY, OR, RI, VT
- 15 Examples: Drive the Dream (DTD) in CA, DTD in VT, NJ Charging Challenge
- 16 See, e.g., <http://apps.puc.state.or.us/orders/2012ords/12-013.pdf> (Oregon); http://mgaleg.maryland.gov/2012rs/chapters_noln/Ch_632_hb1280T.pdf (Maryland)
- 17 See, e.g., <http://www.ripuc.org/eventsactions/docket/4770-NGrid-PSC-Book1of3.pdf> (National Grid, Rhode Island PUC, filed November 2017); <https://eeonline.eea.state.ma.us/DPU/Fileroom/dockets/bynumber> (Eversource Energy, Massachusetts D.P.U., Docket No. 17-05, approved November 2017)
- 18 Edelman Intelligence, *Electric Vehicle Audience and Benchmark Survey*, Jan. 2017
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- 20 See California's *Advanced Clean Cars Midterm Review*, Jan. 2017, pg. ES-47
- 21 *Evaluation of State-Level U.S. Electric Vehicle Incentives*, 2014 White Paper, www.theicct.org
- 22 CA, CT, MA, MD, NJ, NY and RI have incentive programs; OR is developing one
- 23 CT, MA, NJ, NY, and OR have FCEV incentives
- 24 See VT's *Renewable Energy Standard (RES)*, Tier 3
- 25 Examples: HOV lane access and toll discounts in NJ, NY, and MD
- 26 See, for example, *Estimating the Impact of Monetary Incentives on PEV Buyers*, by Jenn, Hardman, and Gil, U.C. Davis Institute of Transportation Studies, STEPS 2017 Symposium
- 27 CA, CT, MA, MD, NJ, RI, and VT offer EVSE incentive
- 28 MA, NJ, RI, and VT have state targets
- 29 See www.evsmartfleets.com
- 30 Examples: CT CHEAPR's incentives and Electric Vehicle Champion Awards and CA GEELA awards
- 31 Example: CA Siemens / South Coast Air Quality Management District demonstration



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