Electrification Coalition

ZEV State Policy Rankings

June 2018

Summary

- The United States transportation system relies almost exclusively on petroleum-based fuels, which exposes the nation to profound economic and national security risks. Widespread adoption of plug-in electric vehicles (PEVs) will mitigate risks to consumers, businesses, and the broader economy by reducing U.S. oil dependence—insulating against oil price volatility and strengthening energy security.

- PEV sales increased steadily following mass-market introduction in late 2009 but slowed in early 2015 as oil prices fell to multi-year lows and as automakers failed to expand model availability or the types of vehicles available. Sales rebounded through 2016-2017 and reached new highs despite relatively low oil prices, yet still account for less than 1 percent of U.S. light-duty vehicle sales. Although there are more than 700,000 PEVs on U.S. roads, higher adoption rates are needed to achieve energy security goals.

- Government policy to catalyze a self-sustaining market for EVs is crucial. California's Zero Emission Vehicle (ZEV) Program is one such policy. The ZEV Program has been adopted by nine other leading states and requires automakers to acquire ZEV credits by producing and delivering EVs for sale. Governor Brown of California recently set a target of 5 million ZEVs in California by 2030. This effort should extend beyond requirements for automakers, as success will require coordination and investment among the auto industry, state and local governments, energy utilities, consumers, and others. Public outreach and education are essential to this effort.

- The ZEV State Policy Rankings provide a comprehensive assessment of participating states' policy actions and commitment to developing a sustaining EV market. The rankings will track policy changes over time and inform policymakers of actions that effectively spur EV adoption. The rankings include three weighted categories of metrics: state-provided incentives to consumers; availability and support of public refueling infrastructure; and outreach campaigns to educate the public.

- California ranks first in the inaugural ZEV State Policy Rankings as a result of its vast network of existing and planned refueling infrastructure, strong vehicle purchase incentives, and leading outreach programs. California is joined in the top tier by Maryland and Connecticut. All ten states are viewed as national leaders in supporting ZEVs. However, in coordination with other stakeholders, states can further establish and enhance policies that will more effectively support the development of the EV market and facilitate widespread EV adoption.

Oil Dependence and Energy Security

Almost 40 percent of total U.S. primary energy demand is met by oil, giving it an economic significance unmatched by any other fuel.[1] The transportation sector accounts for more than 70 percent of the approximately 19 million barrels per day (Mbd) the United States consumes, and the 250 million registered light-duty vehicles in the U.S. account for more than 60 percent of that consumption.[2] The transportation sector relies on oil for 92 percent of its total energy consumption, with no readily available substitutes.[3]

Higher oil prices added significantly to the U.S. federal debt between 2002 and 2012, and every U.S. recession over the past 40 years has been preceded by, or coincided with, an oil price spike.[4] Despite an increase in domestic oil production, the United States continues to send nearly $1 billion abroad each day to pay for oil, often to countries that share neither American interests nor values.[5]

The extreme economic importance of oil also creates adverse national security challenges and undermines the United States' ability to conduct effective foreign policy. Notably, more than 50 percent of daily oil supplies transit one of seven major chokepoints, many in unstable regions, particularly the Middle East.[6]

The global oil market is also frequently subject to unpredictable—and sometimes anti-competitive—behavior from oil-producing countries that supply it, most notably from members of the Organization of the Petroleum Exporting Countries (OPEC). For example, OPEC's November 2014 decision not to reduce output despite a growing imbalance between global oil demand and supply helped contribute to a more than 50 percent decline in oil prices between the summer of 2014 and January 2015, resulting in levels of oil price volatility not observed since 2009.[7] This phenomenon negatively affects the budgeting of consumers and businesses alike.

Electric Vehicles

The United States has made genuine progress toward advancing energy security since the country first became aware in the early 1970s of the risks posed by oil dependence. Most importantly, observed vehicle fuel economy has improved by more than 86 percent, from 13.6 mpg in 1974 to 25.3 mpg in 2017, though much of that progress was made between 1975 and 1986.[8] The oil intensity of the economy has been reduced by nearly 50 percent over the same period.[9] Although the United States has faced serious challenges over the

[1] SAFE analysis based on data from EIA.
[2] DOT, Bureau of Transportation Statistics; and ORNL, *Transportation Energy Data Book*, Edition 36, December 2017, at Table 3.4.
[3] SAFE analysis based on data from EIA.
[4] SAFE, *Oil and the Debt*, October 2013, at 1; and SAFE analysis based on data from BEA, EIA, and the National Bureau of Economic Research.
[5] SAFE analysis based on data from EIA.
[6] See, e.g., EIA, "World Oil Transit Chokepoints," July 25, 2017.
[7] SAFE analysis based on data from EIA.
[8] See, e.g., NHTSA, Historical Passenger Car Fleet Average Characteristics; and NHTSA, Summary of Fuel Economy Performance.
[9] Note: Oil intensity is defined as oil consumption per unit of economic activity (gross domestic product) and; SAFE analysis based on data from EIA and BEA.

past several decades as a result of its oil dependence, these would have been more severe without the progress made to improve the fuel efficiency of light-duty vehicles.

Yet, further strengthening U.S. energy security requires a transportation system no longer predominantly beholden to the global oil market and its structural volatility. Advanced fuel vehicles powered by non-petroleum energy sources—electricity, natural gas, hydrogen, or advanced biofuels—are an attractive solution. Plug-in electric vehicles (PEVs), for example, draw energy from the electrical grid's existing generation, transmission, and distribution infrastructure. This electricity is generated from a diverse set of largely domestic fuels including coal, natural gas, nuclear, and renewables. Petroleum was used to generate less than one percent of electricity in the United States in 2016.[10]

Electricity prices are substantially less volatile than gasoline or diesel prices, increasing by an average of less than 3 percent per year in nominal terms since 2000.[11] The electric power system is designed to meet peak demand at any time from existing generation sources—meaning throughout most of the day, and particularly at night, consumers demand significantly less electricity than the system can deliver. Assuming that charging patterns are well-managed, the system has substantial spare capacity to meet new demand from PEVs parked at homes and other locations during nighttime hours.

Operating a vehicle on electricity is considerably less expensive and energy intensive than operating one on petroleum fuels. In large part, this is due to the higher efficiency of electric motors. PEVs convert approximately 60 percent of the electrical energy from the grid into power for the wheels.[12] In contrast, conventional internal combustion engine (ICE) vehicles convert only approximately 20 percent of the energy stored in gasoline into power for the wheels.[13] Miles traveled by PEVs also emit less carbon dioxide than vehicles powered by petroleum fuels. This is true even with today's mix of electricity-generating resources—which will only get cleaner as more renewables are integrated into the grid.

Electric Vehicle Adoption

By the end of 2017, cumulative light-duty EV sales in the United States since January 2011 surpassed 700,000 units—ahead of the sales pace achieved by hybrid-electric vehicles like the Toyota Prius after their initial rollout in 2000 and 2001.[14] Perhaps most importantly, automakers continue to offer more vehicle options, expand geographical availability, and improve vehicle range. By the end of 2017, 40 different EV models were available in nearly every passenger vehicle segment—compact cars, sedans, SUVs, and minivans.[15] Initial estimates predict another 70 models will be available for sale by 2022.[16]

Despite this progress, EVs have not met the overly optimistic sales forecasts by automakers. Today, EVs only account for less than 1 percent of total light-duty vehicle

[10] SAFE analysis based on data from EIA.
[11] SAFE analysis based on data from Clean Cities Alternative Fuel Price Reports.
[12] Fueleconomy.gov, All-electric vehicles.
[13] Ibid.
[14] SAFE analysis based on data from hybridcars.com.
[15] Ibid.
[16] California Air Resources Board, "California's Advanced Clean Cars Midterm Review: Summary Report for the Technical Analysis of the Light Duty Vehicle Standards" January 18, 2017.

sales.[17] National sales remain heavily skewed, however, with more than 50 percent of EV sales in California, a state that represented only 12 percent of the new vehicle market in 2017.[18] The most notable barrier remains purchase cost, though other obstacles to broad commercial adoption remain. EVs are an inherently disruptive technology that can only succeed by driving change across multiple products, systems, and industries.

Volatile petroleum prices also affect demand for better fuel economy and advanced fuel vehicles.[19] Many recent gasoline price spikes have been both sharp and temporary, a phenomenon that often leads consumers to make decisions based on short-term thinking, causing consumers to undervalue efficiency and underinvest. Over the long term, analysis has shown that EVs' total cost of ownership is lower than that of comparable internal combustion engine vehicles. For example, the oil price decline that occurred largely between the summer of 2014 and early 2015 coincided with a significant shift in buying decisions. After increasing from just 17,000 in 2011 to nearly 120,000 in 2014, sales declined by 4 percent year-over-year in 2015.[20] Models that compete in luxury segments, where consumers are less price sensitive, fared slightly better. Nevertheless, the Nissan Leaf, Chevy Volt and most Ford models, which offer the best value for most Americans, saw sharp declines.

EV adoption rates are influenced by many factors, including seasonal weather conditions, training and enthusiasm of automotive dealers, vehicle availability, consumer knowledge, and gasoline prices. Research and development policy related to lowering the cost of batteries, tax policy related to vehicle purchase and infrastructure provisions, and other policies to incentivize EV adoption (waiving parking fees, for example) are also important.

Many states have sought to incentivize EV adoption. These efforts have in many instances achieved significant success. For example, Georgia offered an income tax credit of up to $5,000 per vehicle until 2015, and PEV sales there reached 1.9 percent of total new light-duty vehicle sales in 2014.[21] However, in April 2015, Georgia lawmakers voted to eliminate the tax credit. It was replaced with a $200 annual EV registration fee intended to help offset losses to state gasoline tax revenues.[22] PEV sales plummeted by about 90 percent by the end of the year.[23] The cumulative 16-year loss of state gross domestic product could be more than $250 million.[24]

There remain, however, reasons for optimism. With more competitive prices and increasing vehicle range, EV sales have rebounded since early 2015 and grown strongly in recent

[17] SAFE analysis based on data from hybridcars.com.
[18] SAFE analysis based on data from The Auto Alliance: Advanced Technology Vehicle Sales Dashboard; and SAFE analysis based on data from The California New Car Dealers Association: Fourth Quarter 2017 – California Auto Outlook.
[19] See, e.g., Bloomberg New Energy Finance, "Oil Price Plunge and Clean Energy – The Real Impact," December 22, 2014.
[20] SAFE analysis based on data from hybridcars.com.
[21] Keybridge, LLC., "Impact of Eliminating the Zero-Emissions Vehicle Tax Credit on the Georgia State Economy," February 18, 2015.
[22] John Voelcker, "Georgia Electric-Car Fee Cut From $200 to $75 By Proposed Bill," February 9, 2016.
[23] Michael Caputo, "Georgia EV sales sputter without tax credit," January 20, 2016.
[24] Keybridge, LLC., "Impact of Eliminating the Zero-Emissions Vehicle Tax Credit on the Georgia State Economy," February 18, 2015.

months. Several fuel cell electric vehicles (FCEVs) were also introduced by automakers in 2016, and efforts are underway to expand the availability and desirability of these offerings both in California and other states.

Electric Vehicle Policy and the ZEV Program

Throughout the past decade, the U.S. private and public sectors have invested heavily in developing EVs and an advanced transportation ecosystem. Bloomberg New Energy Finance estimated global venture capital and private equity investment in advanced transportation between 2007 and 2012 at $4.5 billion.[25] Ford alone has pledged a $4.5 billion investment by 2020 in electrified vehicle solutions.[26] Similarly, Daimler is investing more than $10 billion in next generation electric vehicles, including a $1 billion investment in a new battery plant in Alabama.[27] Tesla Motors recently started sales of the Model 3, and continues to expand its network of more than 1,000 free charging stations.[28] Public sector research, development, and deployment (RD&D) initiatives have complemented this private activity. Federal government spending on advanced vehicle RD&D alone has totaled more than $4.2 billion since 2000.[29]

The federal government offers a tax credit worth up to $7,500 to PEV buyers and several states also offer a rebate or tax credit.[30] Federal, state, and local governments have also incentivized and invested in the installation of PEV charging infrastructure. PEV-supportive policies are emerging at all levels of government, including non-monetary incentives like high-occupancy vehicle (HOV) lane access and preferred parking, which improve the buyer/driver value proposition. Increasingly, widespread efforts are also focused on community-level educational and experiential activities. These include partnerships between public and private entities like Drive Oregon or Drive Electric Northern Colorado (DENC), which are community initiatives designed to achieve widespread deployment of PEVs. This partnership brought together the Electrification Coalition, the City of Fort Collins, the City of Loveland, and Colorado State University.

California has taken the lead in promoting PEV development and adoption by introducing the Zero Emission Vehicle Program. The program is designed to substantially increase the number of PEVs on California's roads.[31] Automakers are required to obtain "ZEV credits," which they can receive for the EVs they produce and deliver for sale. They must maintain the requirement, which becomes more stringent and will rise from 4.5 percent in 2018 to 22 percent in 2025.[32] This percentage does not translate one-for-one into a sales percentage

[25] SAFE interview with Bloomberg New Energy Finance.
[26] Ford, "Ford Investing $4.5 Billion In Electrified Vehicle Solutions, Reimagining How To Create Future Vehicle User Experiences," December 10, 2015.
[27] Daimler AG official twitter feed, September 25, 2017.
[28] Tesla, "Supercharger."
[29] Kelly Sims Gallagher and Laura Diaz Anadon, "DOE Budget Authority for Energy Research, Development, and Demonstration Database," Energy Technology Innovation Policy, John F. Kennedy School of Government, Harvard University, June 2017.
[30] U.S. Department of Energy – Electric Vehicles: Tax Credits and Other Incentives. 2018.; and Colorado Energy Office – FYI Income 69: Innovative Motor Vehicle and Innovative Truck Credits for Tax Years 2017-2021.
[31] See, e.g., Office of Governor Edmund G. Brown Jr., "Governor Brown Takes Action to Increase Zero-Emission Vehicles, Fund New Climate Investments." January 2018.
[32] See, e.g., California Air Resources Board, California's ZEV Regulation for 2018 and Subsequent Model Year Vehicles, 2016.

because the credit per vehicle varies. Since its introduction, nine other states have followed California's lead and adopted the ZEV Program.[33]

States that adopted California's ZEV standard faced a primary challenge stemming from a key provision of California's regulation. In order to afford some flexibility in compliance with the ZEV standard, California permitted automakers to count ZEVs sold anywhere toward their requirements in any of the ZEV states.[34] In practice, automakers concentrated their ZEV sales in California and adjoining states, which afforded the logistical and marketing advantages that reduced costs, drove sales, and still enabled automakers to meet their ZEV requirements. As a casualty of that regulatory flexibility, consumers found limited offerings of ZEV models in the northeast states.[35]

The "travel provision," as the regulatory provision is termed, expired at the end of 2017. Now, automakers must meet individual state sales requirements. There is much work to be done on their part to increase the marketing and availability of a wide range of ZEV models in the northeast states.

The states have a critical role to play supporting the continued adoption of EVs with policy action. Such policy action will help position states to gain directly from the many benefits of widespread EV adoption including better insulating their economies from the effects of oil price volatility, capturing revenue in the form of the federal $7,500 tax credit, and improving air quality. The American Lung Association estimates, for example, that improving air quality through a transition to EVs in ZEV states would generate health benefits of approximately $13 billion by 2030 by reducing work-loss days, asthma exacerbations and other respiratory health impacts, and premature deaths.[36]

States can offer financial and non-financial incentives that make EVs more attractive to buyers. Ensuring these incentives and supportive policies remain properly aligned with program goals as the PEV market matures is important in the short to medium term.

Infrastructure development and public awareness campaigns will also be critical.[37] Facilitating these necessary developments requires high-level coordination among multiple stakeholders, including the auto industry, state and local governments, energy utilities, consumers, and others. Communities that effectively bring these stakeholders together will successfully drive adoption at far higher rates than the national average. Public outreach and education is a core component of this effort. State governments should also lead by example by offering workplace charging at state facilities, incorporating more EVs into their fleets and promoting the use of alternative fuels. They are well positioned to send a strong signal to vehicle and fuel providers that alternatives to oil are the future of the transportation sector.

---

[33] Note: These states are Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont.
[34] California Air Resources Board. *Zero-emission vehicle standards for 2009 through 2017 model year: Passenger cars, light-duty trucks, and medium-duty vehicles.(2016)* §1962.1(d)(5)(E).
[35] Union of Concerned Scientists. *What is ZEV?* 31 Oct 2016. Accessed: 23 Feb 2018.
[36] American Lung Association, *Clean Air Future: Health and Climate Benefits of Zero Emission Vehicles*, October 2016, at 5.
[37] See, e.g., International Council on Clean Transportation, *Principles For Effective Electric Vehicle Incentive Design*, Zifei Yang, Peter Slowik, Nic Lutsey, Stephanie Searle, June 2016.

ZEV State Policy Rankings

States that adopt ZEV standards can augment private sector investment in EVs by ensuring that all appropriate steps are taken to create a favorable environment for the adoption of PEVs and FCVs. The states that adopted California's ZEV mandate, while seen as national leaders, have achieved varying degrees of progress in their efforts to support the development of a self-sustaining market for EVs.

The Zero Emission Vehicle (ZEV) State Policy Scorecard provides a comprehensive analysis and assessment of the policy actions of participating ZEV states. The Electrification Coalition developed the scorecard to track changes in policy over time and to help inform policymakers and the public about the most effective actions states can take to spur ZEV adoption. The rankings are calculated using a uniform set of metrics applied to each of the ten ZEV states. These metrics cover a variety of actions states can take which are known to increase EV adoption. While not inclusive of every policy option, and cognizant that not all approaches are appropriate for every state, the rankings are intended to provide shareable insights about best practices. The calculations used will be regularly updated, and when possible, the methodology will be strengthened and adjusted as information and data availability and quality improve, and as more is learned about the effectiveness of different strategies intended to promote EV adoption.

The Scorecard includes three categories of metrics: State-provided financial incentives to consumers; support and availability for public refueling infrastructure, and public outreach and education campaigns. It uses 14 metrics across the three categories, and every state is awarded a 0-3 score for each metric. The model applies weightings for each metric based on its relative importance to ZEV adoption. The scorecard ranks the states, and they are then sorted into three tiers (see page 11 for full rankings).

California ranks first in the inaugural ZEV State Policy Rankings as a result of strong purchase incentives, a vast network of existing and planned refueling infrastructure, and leading outreach programs. California is joined in the top tier by Maryland and Connecticut. These states performed well across all three categories of metrics: consumer incentives, infrastructure, and public education.

Vermont, Rhode Island, Oregon, and Maine rank as tier 3 states, though all have policies that go above and beyond what the majority of non-ZEV states offer. Some tier 3 states offered few direct consumer incentives, and may also lack some important infrastructure incentives that drive adoption, which lowers their score. Each of the ten states, in coordination with stakeholders, can enhance their policies to effectively support the ZEV market and widespread adoption.

In addition to state policy and regulatory actions to support ZEV adoption, automakers—or original equipment manufacturers (OEMs)—have an important role to play. In some states, OEMs do not offer their full lineup of ZEVs or keep limited inventory, reducing consumer choice. OEMs could also offer resources at the state and local levels to support charging infrastructure buildout. The Electrification Coalition plans to develop specific recommendations for OEMs following its release of this state policy-focused ZEV Scorecard.

Methodology

The ZEV State Policy Rankings include three weighted categories of metrics: the provision of state-level incentives to consumers, the availability and support of public refueling infrastructure, and the use of public outreach and education campaigns.

Consumer Incentives

The existence of state-level incentives helps generate interest in, and stimulate demand for, EVs. These incentives typically either decrease the cost of vehicle purchase or operation, or offer an otherwise improved value proposition versus conventional ICE vehicles, or both. Such incentives could therefore include vehicle purchase rebates, tax credits for the installation of home charging equipment, and discounted vehicle registration fees, among others. The provision of incentives to consumers accounts for 40 percent of a state's total score.

Vehicle Purchase Rebates, Credits, and Exemptions: Consumer adoption of EVs remains hindered by higher initial purchase prices relative to comparable conventional ICE vehicles. State-level financial incentives help lower this upfront cost and make EVs a more attractive choice.[38] States are awarded points based on the size of the consumer financial incentive they offer.[39]

Residential Charging Rebates and Tax Credits: One major advantage of EV ownership is that the vehicle can be refueled (or charged) at home or at a workplace. Although it is possible to charge most personal vehicles overnight at home using a 120-volt outlet (known as AC Level 1 charging), some owners prefer to use a 240-volt outlet (known as AC Level 2 charging) to reduce recharging time. This will be increasingly necessary as battery capacity (and vehicle range) continues to increase. Level 2 home charging equipment costs approximately $600 plus installation (approximately $1,200), a roughly $2,000 addition to the upfront purchase price of an EV. State-level financial incentives help lower this cost. States are awarded points based on the size of the consumer financial incentive they offer.

Registration Fees: Some states have introduced new registration fees for EVs, creating a disincentive for adoption. Typically, these fees are implemented because unlike conventional ICE vehicles, EVs will not pay state (or federal) gasoline taxes. States are awarded points on whether they offer reduced registration fees for EVs.

Infrastructure

Appropriately located public charging infrastructure is a key indicator of states' EV readiness. Given the still relatively limited driving ranges of some commercially-available EVs, communities with sufficient infrastructure will help alleviate the concerns of some potential buyers that charging will not be available when needed (widely known as "range

[38] There is currently a $7,500 federal tax credit available for the purchase of a EV and a $4,000 federal tax credit available for the purchase of a FCEV.

[39] Note: States are scored based on their available PEV incentives. Several states offer incentives for FCVs as well, but with sales of FCVs currently limited to California, the FCV incentive was not included as part of the analysis. As FCV sales expand beyond California, future iterations of this scorecard may consider the availability of FCV incentives.

anxiety"). Installing charging infrastructure at way stations, for example, can be particularly valuable for linking EV-ready communities, providing comfort to drivers traveling between more distant destinations. States are awarded points based on several factors including the quantity and type of refueling infrastructure provided and policy support offered. They are also awarded points for their efforts supporting the deployment of hydrogen infrastructure. Infrastructure efforts account for 40 percent of a state's total score.

Public Charger Outlets: EV sales hinge on more than purchase incentives to boost price competitiveness in the near term. EVs depend on a robust network of recharging infrastructure to make EV use practical for longer trips farther from home—preferably in close proximity to major, highly-trafficked interstate highway corridors. States are awarded points based on how many public charging outlets are installed per 10,000 vehicles.

Public Charger Rebates, Grants, and Tax Credits: The network of public charging infrastructure must continue to expand, both for EVs to gain widespread consumer adoption and to support the steady increase of EVs in the national fleet. States can support investment in this critical refueling infrastructure by offering financial incentives for installed public charging stations. States are awarded points based on the presence of a monetary incentive, its size, and whether it has active funding support.

Workplace Charging Infrastructure Incentive: Charging a PEV while at the office eliminates charging wait time, reduces costs to consumers, and makes PEVs an attractive and viable option for millions of commuters who drive to work every day. States can support PEV adoption by offering financial incentives for installing workplace charging stations or adopting workplace charging policies for state facilities. States are awarded points based on the existence of an incentive program, active funding, and a program to promote the benefits of workplace charging to employers.

Utilities: Through their public utility companies and their regulatory commissions, some states offer differential rates for electricity consumed off-peak—when demand for power is low, strain on the grid is minimal, and the marginal cost of electricity generation is lower. This is called a time-of-use (TOU) rate, which incentivizes off-peak electricity consumption. States are awarded points if their utilities offer TOU rates to consumers, which make PEV adoption even more financially attractive to consumers.

EV Building Codes: Some states require large residential or commercial developments to be wired for EV charging and to make a specific quota of parking spaces EV-ready. These policies make refueling easier and help incentivize broader EV adoption. States are awarded points if their building codes require such EV-friendly policies.

Hydrogen Infrastructure and Funding: Hydrogen fuel cell vehicles also run emissions-free, and states can promote adoption of alternative ZEV types with investments in hydrogen refueling infrastructure. States are awarded points based

on hydrogen refueling stations per million vehicles, and whether or not there is funding available for the installation of new refueling stations.

Volkswagen Funds: Through its subsidiary Electrify America, Volkswagen (VW) has committed to spending $2 billion in ZEV infrastructure and education programs at the state level over the next 10 years. States can bolster their ZEV adoption by dedicating VW funds to ZEV infrastructure investment. States are awarded points based on the percentage of VW funds committed to infrastructure, up to 15 percent.

Outreach and Education

In addition to purchase incentives and infrastructure, states can encourage consumer demand for PEVs and FCEVs through public outreach. Several states have drafted a "ZEV Action Plan" to ensure they reach their goals. States are awarded points based on the comprehensiveness of their action plans and also their commitments to state vehicle purchases and state incentives for dealerships. Outreach and education efforts account for 20 percent of a state's total score.

MOU Commitment and Action Plan: In 2013, the majority of ZEV states (nine out of ten) committed to putting 3.3 million ZEVs on the road by 2025 when their governors signed a memorandum of understanding (MOU).[40] States also were encouraged to create more specific commitments through the development of a ZEV action plan, which identify key actions and efforts necessary to help reduce market barriers and support a growing EV market. States receive points based on whether they signed the MOU and developed an action plan.

Marketing, Advertising, and State Pilot Programs: Research indicates that ZEV adoption is aided by programs that raise consumer awareness.[41] Marketing and advertising for zero-emission vehicles, maintaining state websites dedicated to the ZEV Program, and funding of public private partnerships that administer ride and drive events all support states' efforts to increase ZEV adoption. States are awarded points for employing any or all of these strategies to support consumer outreach and education.

State Fleet Purchasing: States purchase significant numbers of vehicles for various official uses. Shifting some or all of this purchasing to ZEVs will position state governments as leaders in driving ZEV adoption. States are awarded points if they provide incentives for purchasing ZEV for governmental fleets.

Dealer Incentives: Since vehicles are generally not sold directly to consumers, automobile dealerships play an important role in ZEV adoption. Their efforts to convey the benefits of ZEV ownership are a key driver of consumer acceptance and purchase decisions. Some states have programs to reward the dealers who lead the state in overall ZEV sales or highest percentage of ZEVs sold. States are awarded points for having such dealer incentive programs.

[40] Multi-State ZEV Task Force.
[41] Jin, Lingzhi; Slowik, Peter, "Literature review of electric vehicle consumer awareness and outreach," The International Council on Clean Transportation, March 23, 2017.

State Rankings

Best Practice Ranking			
State	Tier	Total ZEV Sales (2011-2017)	ZEV Market Share of New Sales (2017)
California	Tier 1	356,241	5.02%
Maryland	Tier 1	11,604	1.05%
Connecticut	Tier 1	7,502	1.39%
Massachusetts	Tier 2	13,834	1.35%
New York	Tier 2	30,645	1.03%
New Jersey	Tier 2	16,716	0.91%
Vermont	Tier 3	2,483	2.13%
Rhode Island	Tier 3	1,347	0.92%
Oregon	Tier 3	15,457	2.36%
Maine	Tier 3	1,657	0.80%

California – Tier 1, Total ZEV Sales (2011-2017) 356,241; Market Share (2017) 5.02%
California is the benchmark state. California is ahead of other states on existing infrastructure and has a ZEV purchase incentive. It also has supportive policies allowing ZEVs to use HOV/HOT lanes in addition to generous incentives for installing future recharging or hydrogen refueling stations.

Maryland – Tier 1, Total ZEV Sales (2011-2017) 11,604; Market Share (2017) 1.05%
Maryland places near the top due to generous financial incentives for purchasing ZEVs and for incentives offering up to $5,000 for the installation of workplace chargers. The state could increase its score by allocating money toward hydrogen infrastructure.

Connecticut – Tier 1, Total ZEV Sales (2011-2017) 7,502; Market Share (2017) 1.39%
Connecticut scores near the top on all three categories. It is one of only a few states to offer reduced registration fees or funding for hydrogen infrastructure.

Massachusetts – Tier 2, Total ZEV Sales (2011-2017) 13,834; Market Share (2017) 1.35%
Massachusetts is the highest ranking Tier 2 state. It maintains a strong vehicle purchase incentive, but posts a middling score on infrastructure. It is buoyed by strong public outreach.

New York – Tier 2, Total ZEV Sales (2011-2017) 30,645; Market Share (2017) 1.03%
While New York posts respectable scores across the board, it is one of the only states to provide hydrogen infrastructure incentives. It also maintains strong public outreach and education. New York could raise its score with a better vehicle purchase incentive.

New Jersey – Tier 2, Total ZEV Sales (2011-2017) 16,716; Market Share (2017) 0.91%
New Jersey is the only state to offer a tax exemption on vehicle purchase, which is more generous for pricier vehicles. However, the state posts low scores on infrastructure metrics.

Vermont – Tier 3, Total ZEV Sales (2011-2017) 2,483; Market Share (2017) 2.13%
Vermont could bolster its score by offering direct government incentives for vehicle purchases and increasing its commitment to install refueling infrastructure. Despite its score, Vermont's EV sales in the past year, of more than 2 percent of new vehicles sales, suggest that additional efforts may be playing a role in growing its EV market.[42]

Rhode Island – Tier 3, Total ZEV Sales (2011-2017) 1,347; Market Share (2017) 0.92%
Rhode Island had offered vehicle purchase incentives, but exhausted allocated funding, which lowered its score. The state posts respectable scores on infrastructure and public outreach.

Oregon – Tier 3, Total ZEV Sales (2011-2017) 15,457; Market Share (2017) 2.36%
Oregon scores poorly on consumer incentives, but gets the top score on existing public charger outlets. It also provides the largest incentive for the installation of residential charging.[43]

Maine – Tier 3, Total ZEV Sales (2011-2017) 1,657; Market Share (2017) 0.80%
Maine scores below the other ZEV states because it offers no financial incentives for consumers or for the installation of charging stations. It also scores poorly on outreach and education.

Conclusion

The ten participating ZEV states have undoubtedly accomplished a lot to ensure a supportive environment for electric vehicles, and are well on their way toward deploying millions of ZEVs collectively across the United States. Achieving this goal will require further establishment and enhancement of policies to support the adoption of ZEVs. Effective communication and coordination between stakeholders will be critical. States are a key stakeholder and their policy actions are a necessary complement to the efforts of automakers and other stakeholders to grow demand for ZEVs.

All data supporting the Scorecard reflects research based on publically available information. The Electrification Coalition updated this in May 2018, and has done its best to ensure the information included is accurate at time of publication.

For media enquiries, please contact Leslie Hayward at (202) 461-2364 or lhayward@secureenergy.org.

[42] SAFE analysis based on data from The Auto Alliance: Advanced Technology Vehicle Sales Dashboard.
[43] Note: Oregon's legislature adopted a consumer incentive in 2017, and while it is technically open to consumers, the state must still implement a rulemaking before it can issue any rebates. Therefore, Oregon's incentive is not counted at this time.