CHARGING UP:

The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States

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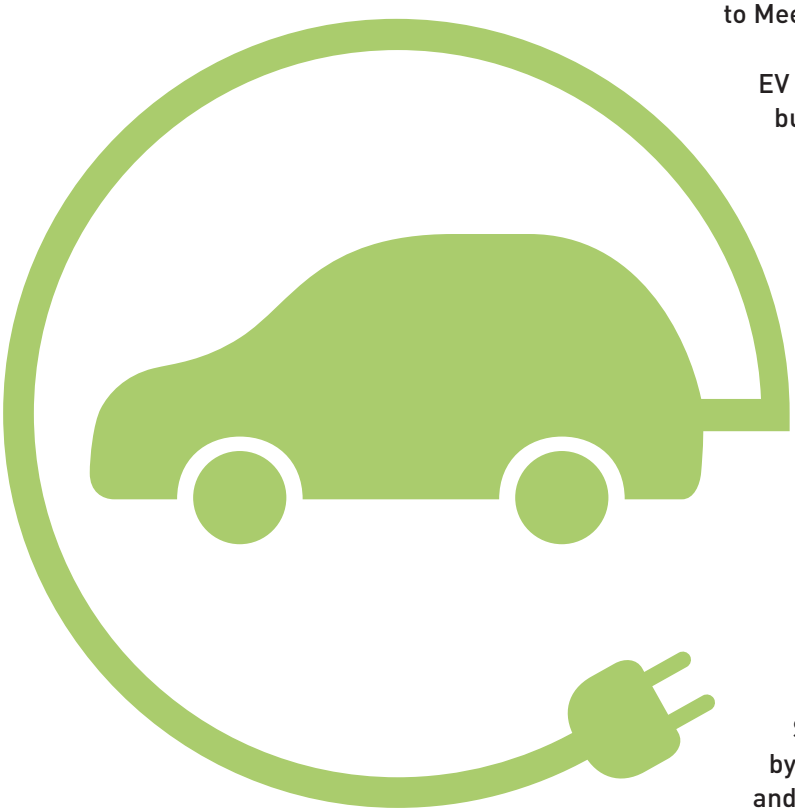

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The Role of States, Utilities, and the Auto Industry in Dramatically Accelerating Electric Vehicle Adoption in Northeast and Mid-Atlantic States

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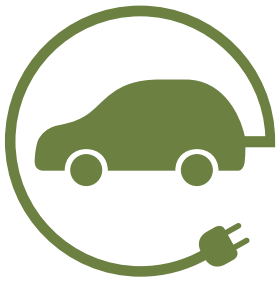


Every year, more consumers and businesses in the Northeast and mid-Atlantic region are plugging in their cars to run on electricity and avoid the gasoline pump. The result is a win-win for people and the environment.

Electric vehicles (EVs) include both all-electric and plug-in hybrid electric vehicles. A switch to EVs cuts air pollution that endangers health and fuels dangerous climate change. EVs boost the regional economy and promote energy independence by keeping at home money that was previously spent on imported gasoline and oil. Ramping up EV adoption can deliver more of these needed benefits sooner.

Some northeast and mid-Atlantic state government agencies, electric utilities, automakers, and auto dealers are already taking important actions to accelerate EV adoption in the region. **However, to have any chance of meaningfully slashing air pollution and climate disruption, much more is needed in each state in the near-term, and all stakeholders need to act boldly.**

Automakers and auto dealers often say that states need to create more EV consumer incentives. Government agencies and consumers often say that automakers and auto dealers need to do more to advertise EVs and make them available in more states and at more dealerships. Many question why utilities are not taking a more active role in helping consumers switch to EVs. **This report makes clear that we need an all-hands-on-deck effort from government, utilities, automakers, and auto dealers, and it lays out a full range of priority actions and policies to accelerate EV adoption.**

NINE VITAL STEPS FOR SUCCESS

1. High-level task forces or commissions to provide state-level leadership and coordination.
2. Consumer incentives to make EVs less expensive and more convenient.
3. Programs to make EVs more accessible to low-income residents.
4. Utility programs and investments that incentivize EV adoption as part of a modernized grid.
5. Policies to promote widespread availability of consumer-friendly charging stations.
6. State and local governments leading by example by integrating EVs into their fleets and other programs.
7. Increased efforts by automakers to manufacture EVs that appeal to a broad range of consumers, and to market and sell them aggressively in and beyond California.
8. Auto dealership programs that promote EVs.
9. Public education and outreach to ensure the vast majority of consumers view EVs as a viable and desirable option.

See page 2–3 for a chart showing the progress on selected EV policies and programs for each state in the region.

SELECTED EV POLICIES AND PROGRAMS FOR EACH STATE IN THE NORTHEAST AND MID-ATLANTIC

	LEADERSHIP			FINANCIAL/NON-FINANCIAL INCENTIVES					OUTREACH			INFRASTRUCTURE		
	ZEV STATE	MOU STATE	HIGH LEVEL TASK FORCE	CONSUMER EV PURCHASES	CONSUMER EVSE PURCHASES	HOV LANE ACCESS	FEE/TOLL WAIVERS	PREFERENTIAL PARKING	ROBUST STATE EV WEBSITE	WORKPLACE CHARGING OUTREACH	DEALER INCENTIVE / RECOGNITION	INVESTMENT IN PUBLIC EVSE: LEVEL 1/2	INVESTMENT IN PUBLIC EVSE: DC FAST	EV FRIENDLY BUILDING CODES
CONNECTICUT	●	●		●	●				●	●	●	●		
DELAWARE												●		
MAINE	●					N/A						●		
MARYLAND	●	●	●	●	●	●			●		●	●	●	
MASSACHUSETTS	●	●	●	●	●					●	●	●	●	
NEW HAMPSHIRE						N/A						●	●	
NEW JERSEY	●			●		●	●							
NEW YORK	●	●			●	●				●		●		
PENNSYLVANIA				●								●	●	
RHODE ISLAND	●	●	●			N/A	●			●		●		
VERMONT	●	●	●			N/A	N/A		●		●			In progress
CALIFORNIA	●	●	●	●		●	●		●		●	●		●

	UTILITY POLICIES		FLEET MANDATES		GHG REDUCTION POLICIES	
	EXEMPTING EV CHARGING STATIONS FROM UTILITY REGULATION	TOU / EV RATES	GOVERNMENT FLEETS INCLUDING TRANSIT	GRANTS FOR PRIVATE FLEETS (EVs, EVSE)	NEAR TERM	LONG TERM
CONNECTICUT			●		10% below 1990 levels by 2020	80% below 2001 levels by 2050
DELAWARE			●		None	None
MAINE	●				10% below 1990 levels by 2020	75–85% below 2003 levels
MARYLAND	●	●	●	●	25% below 2006 levels by 2020	None
MASSACHUSETTS	●		●	●	25% below 1990 levels by 2020	80% below 1990 levels by 2050
NEW HAMPSHIRE					10% below 1990 levels by 2020	75–85% below 2001 levels
NEW JERSEY			●		1990 levels by 2020	80% below 2006 levels by 2050
NEW YORK	●	●	●	●	None	80% below 1990 levels by 2050
PENNSYLVANIA			●		None	None
RHODE ISLAND			●		10% below 1990 levels by 2020	75–85% below 2001 levels
VERMONT			●		50% below 1990 levels by 2028	75% below 1990 levels by 2050
CALIFORNIA	●	●	●	●	1990 levels by 2020	80% below 1990 levels by 2050

DEFINITIONS

DC Fast
High current fast charging station

EV
Electric Vehicle

EVSE
Electric Vehicle Service Equipment (e.g., charging station)

HOV
High-Occupancy Vehicle

Level 1
120 volt charging station (standard outlet)

Level 2
240 volt charging station

MOU
Memorandum of Understanding

TOU
Time of Use

ZEV
Zero Emission Vehicle (state signed onto California's ZEV regulations)

Plug-in Electric Vehicles are Good for the Environment and Present a Clear Pathway to Meet Climate Goals

Our current transportation system is unsustainable. The transportation sector is the second largest source of US greenhouse gas emissions, responsible for 33 percent of emissions nationally, and more than 40 percent in northeast and mid-Atlantic states.[1] To reach science-based greenhouse gas emission reduction targets, which require cuts around 80 percent over time, emissions from this sector will need to fall rapidly. In addition to walking, biking, car-pooling, and using public transit, the clearest pathways to achieving these deep reductions include shifting our energy sources for transportation from direct combustion of fossil fuels to electricity and continuing to clean our electricity sector with renewable resources.

FIGURE 1: GREENHOUSE GAS EMISSIONS FROM ELECTRIC AND CONVENTIONAL VEHICLES IN THE NORTHEAST AND MID-ATLANTIC

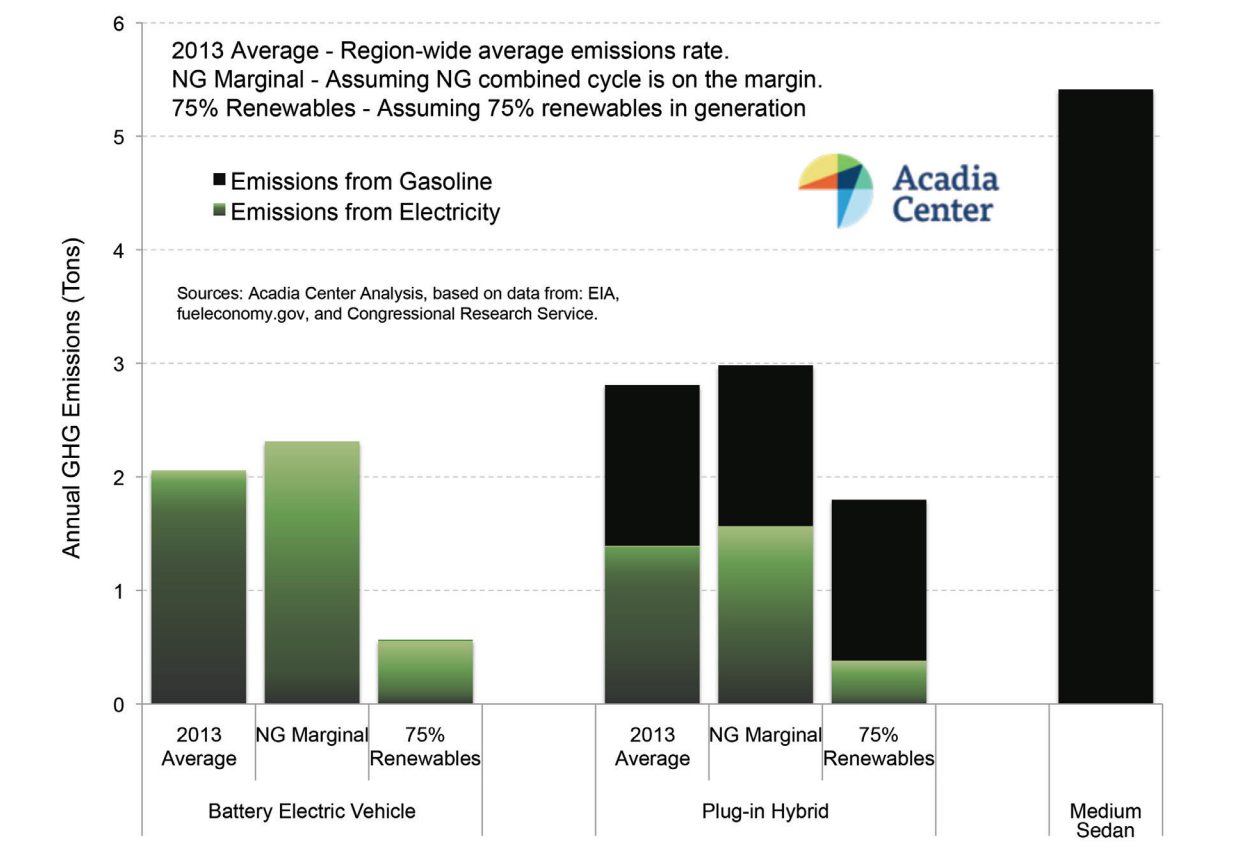


Figure 1 demonstrates that, right now, purchasing an electric vehicle instead of a conventional medium sedan can reduce transportation greenhouse gas emissions by 60 percent.[2] Furthermore, many of the states in the region are covered by the Regional Greenhouse Gas Initiative (RGGI), providing security that overall emissions will not increase in the short term. In addition, RGGI and numerous other policies are working together to clean up the sources of electric generation, helping to shift from coal to solar and wind installations at a faster pace. In the long run, electric vehicles will represent a 90 percent reduction from current gasoline cars when we achieve 75 percent renewable penetration, and they would have zero greenhouse gas emissions with a fully renewable electricity system.

EV Numbers in the Region are Growing, but Not Fast Enough

Recognizing the significant health, environmental, and economic benefits associated with zero-emission vehicle (ZEV) deployment, in October 2013 the governors of California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont signed a memorandum of understanding (MOU) committing to work cooperatively to put 3.3 million ZEVs on the road by 2025.[3] The MOU and subsequent Multi-State ZEV Action Plan identify specific measures that the states will take independently and jointly to build the market for electric and hydrogen fuel cell vehicles, in addition to specifying additional actions for each state to consider.[4] These commitments marked a large step forward for the six participating states in the Northeast and mid-Atlantic region.

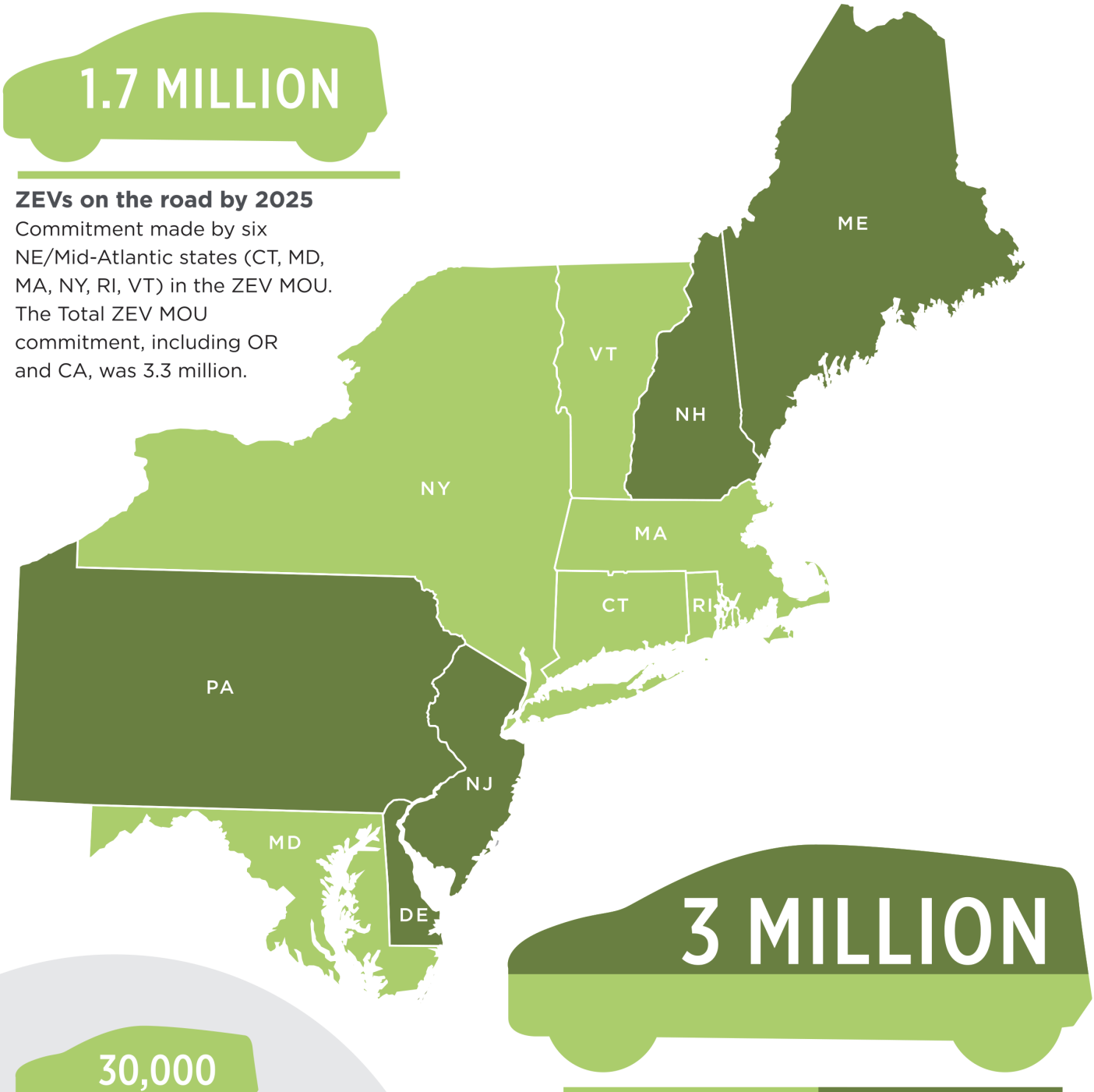
The automakers hold the keys to effective marketing and sales of their own products. In fact, they have good reason to do so. A recent survey by Ford Motor Company found that more than 90 percent of EV drivers love their cars and will make their next vehicle purchase another EV.[5] But there are actions that states can take to support the automakers in accelerating the EV market in the Northeast. Together the six northeast and mid-Atlantic states participating in the MOU account for approximately 50 percent of the goal of 3.3 million vehicles by 2025, with the remaining 50 percent allocated to California and Oregon. Table 1 below reflects approximately how many new EVs have been registered or reported in each of those six states as of August 2015, as well as how many will be needed cumulatively per state over the next ten years to meet the 2025 goal.[6] Registration numbers reflected here were reported to the authors directly from the states upon request in the summer of 2015. In some cases, registration numbers were reported as rounded or estimated figures and may not exactly reflect the number of vehicles registered as of the date of publication. The cumulative goals ramp up significantly in 2017. All of the states have significant work ahead to meet the 2025 goal.

TABLE 1: CURRENT REPORTED EV TOTALS AND CUMULATIVE GOALS FOR NORTHEAST/MID-ATLANTIC ZEV MOU STATES

STATE	REPORTED TOTAL EVs (MID-2015)	EVs NEEDED IN 2017 TO MEET 2025 GOAL	EVS NEEDED IN 2020 TO MEET 2025 GOAL	2025 GOAL
CONNECTICUT	2,957	9,613	41,835	155,105
MARYLAND	5,000	18,555	80,752	299,392
MASSACHUSETTS	5,475	18,829	81,944	303,814
NEW YORK	12,000	52,793	229,762	851,855
RHODE ISLAND	421	2,702	11,759	43,596
VERMONT	943	2,163	9,413	34,898

Sources: Registration numbers reported to authors upon request; ZEV Program Implementation Task Force. Multi-State ZEV Action Plan. NESCAUM, 2014. Web.

EV POTENTIAL IN THE NORTHEAST/MID-ATLANTIC



Delaware, Maine, New Hampshire, New Jersey, and Pennsylvania have thus far elected not to join the zero-emissions vehicle MOU. All of those states except New Hampshire, however, have adopted California's Clean Car Standards, although Delaware and Pennsylvania are not implementing the ZEV portion of the program. A key next step for those states is to join the rest of the region in fully adopting the California Clean Car Standards and joining the ZEV MOU. If the same modeling is used, adding those five states to the MOU would add 1.3 million zero-emissions vehicles to the 2025 target, bringing the total to 4.6 million on the road by 2025 among those eight MOU states in addition to these other northeast and mid-atlantic states.[7]

TABLE 2: CURRENT REPORTED EV TOTALS AND PROJECTED CUMULATIVE GOALS FOR NORTHEAST/MID-ATLANTIC NON-ZEV MOU STATES

STATE	REPORTED TOTAL EVs (MID-2015)	EVs NEEDED IN 2017 TO MEET 2025 GOAL	EVS NEEDED IN 2020 TO MEET 2025 GOAL	2025 GOAL
DELAWARE	146	2,670	11,622	43,089
MAINE	263	3,155	13,730	50,906
NEW HAMPSHIRE	835	4,881	21,244	78,763
NEW JERSEY	2,494	31,218	135,866	503,732
PENNSYLVANIA	2,087	36,369	158,281	586,835

Sources: Registration numbers reported to authors upon request; ZEV Program Implementation Task Force. Multi-State ZEV Action Plan. NESCAUM, 2014. Web.

In sum, there were approximately 31,834 ZEVs reported as of August 2015 in the Northeast and mid-Atlantic region, including MOU states and non-MOU states. In order to comply with the zero-emissions vehicle MOU, and to realize the full benefits available to the region from electrifying the transportation sector, northeast and mid-Atlantic states need to take action to substantially increase that number over the next ten years.

In fact, according to one recent analysis commissioned by the Sierra Club, we actually need upwards of 10 million EVs on the road nationwide by 2025 to be on track to meet the 2050 climate goals cited in an analysis by the US Energy Information Administration.[8]

Because the EV market relies so heavily on northeast, mid-Atlantic, and western states to be early leaders, even the above trajectory is well short of what is necessary. While setting the MOU goal in itself does not guarantee EV deployment, it is a useful measure of the ambition and support levels necessary from the northeast and mid-Atlantic states. It also provides a sense of how much more needs to be done: this goal is only ten years away, so we must pick up the pace to achieve success.

Actions to Accelerate EV Adoption

The following sections describe priority policy and program actions that states, industry (including automakers, auto dealers, and employers), utilities, and other stakeholders should take to accelerate EV adoption in northeast and mid-Atlantic states. Some of these activities are already underway and are helping deploy electric vehicles in the region. However, broader adoption of these measures in all states, as well as continuing development of more aggressive measures, will be necessary in order to meet long-term EV adoption goals.

High-Level Government and Stakeholder Leadership Ensures Commitment and Efficiency in Decision-Making

Several of the states in the region that have been most successful in promoting EVs have established high-level task forces or commissions run by government or other stakeholders. These groups have typically included members with significant authority, such as agency heads (e.g., environment, transportation, energy, and public utility) and legislators. They have also included stakeholders from utilities, transportation, urban planning, building codes, universities, EV advocacy groups, environmental/health/ transportation advocacy groups, and marketing and communications. Ideally with support from the administration and legislature, these task forces typically focus on developing holistic programs to advance EVs in a given state, including laws and regulations, charging infrastructure, utility programs, and incentive and public outreach programs to encourage EV adoption. Several states in the region have established such task forces:

MARYLAND

The Maryland EV Infrastructure Council (EVIC) is charged with ensuring the smooth transition to electric transportation in the state. The EVIC played a role in establishing a Maryland EV rebate program and identifying that the state's charging-unit-incentive program needed improvements to be more effective. Other policies put in place by the EVIC include the establishment of high occupancy vehicle (HOV) lanes and a prohibition on regulating charging stations as if they were electric utilities.

MASSACHUSETTS

Governor Patrick created an EV task force after a successful 2013 electric vehicle roundtable event, which was sponsored by the administration and Conservation Law Foundation and drew stakeholders to discuss advancing EVs in the commonwealth.[9] The task force has working groups focused on incentives, infrastructure, and outreach. As a result of the task force's recommendations, the Patrick administration undertook several ambitious efforts to promote EVs, including starting a consumer purchase incentive program The task force was formalized in the legislature's 2015 budget, and is now, under the Baker administration, the Governor-appointed Zero Emission Vehicle Commission. The consumer purchase incentive program has been re-funded and extended.

Baltimore, MD, Mayor Stephanie Rawlings-Blake at Baltimore's National Drive Electric Week event, September 2015.
PHOTO COURTESY OF CARLING SOTHORON.

RHODE ISLAND

In late 2014, Rhode Island established the Zero-Emission Vehicle Working Group, inspired by the example set in Massachusetts. This collaboration of Rhode Island state agencies and outside stakeholders is currently formulating an action plan that should serve as a blueprint for progress in the coming years.

VERMONT

Drive Electric Vermont is a public-private partnership dedicated to promoting the spread of electrified transportation in the state. This stakeholder group is coordinated by the nonprofit Vermont Energy Investment Corporation and is transforming the vehicle marketplace through policy initiatives, infrastructure development, education, and ongoing coordination to support consumer and business adoption of electric vehicles. By using an account manager approach derived from statewide energy efficiency programs, Drive Electric Vermont has established contacts with many of the largest employers and other businesses across the state to encourage electric vehicle charging installations. The group is also organizing an event titled Drive the Dream Vermont, modeled after a successful California program to encourage employers to support EVs in the workplace. Vermont's Climate Cabinet also issued the Vermont Zero Emission Vehicle Action Plan in September 2014 "to identify strategies and actions that best address Vermont's own needs and advantage our unique opportunities to achieve the commitments made by Governor Shumlin in the ZEV MOU."[10]

Thanks in part to these effective high-level task forces and stakeholder groups, Maryland, Massachusetts, Rhode Island, and Vermont are making strides advancing EVs. These groups have helped focus state efforts on programming and policy activities that will result in the greatest EV deployment and strengthen relationships among various sectors. In addition, the groups are improving relationships among state agencies that need to work together effectively to advance EVs. These four states have seen faster EV advancement than they likely would have without task forces in place. The other seven states in the Northeast and Mid-Atlantic would be well-served by developing similar bodies to help strategically advance EV deployment. As the states continue to develop these high-level task forces, they should also seek out informal and formal opportunities to collaborate across states to learn from each other's experiences.

Consumer Incentives will Increase Sales

Financial Incentives

Making electric vehicles and their attendant infrastructure affordable for consumers is arguably the most important aspect of encouraging EV deployment. Initial selling price—even more than fuel costs—is the biggest factor influencing new vehicle sales.[11] The first line of defense for keeping EVs affordable lies with the automakers themselves, who have many opportunities to manage pricing and offer favorable financing for EV purchases and leases. General Motors and Nissan, for example, have experienced a spike in sales each time they cut their prices on the Volt and Leaf, respectively.[12]

Financial incentives are an important tool for boosting EV adoption, at least until economies of scale and ongoing reductions in battery prices make them unnecessary.[13] EV buyers are currently eligible for a federal tax credit of up to $7,500, but many states offer an additional consumer incentive.[14] **A 2014 study showed that the states with the largest EV incentives had EV sales shares approximately 2–4 times the national average.**[15]

NORTHEAST AND MID-ATLANTIC STATES OFFERING FINANCIAL INCENTIVES TO CONSUMERS TOWARD THE PURCHASE OF AN EV

DIRECT REBATES

- Connecticut offers an immediate rebate at the dealership up to $3,000 for purchases and leases 24 months or longer. For selling the EV, dealers receive an incentive payment worth 10 percent of the consumer rebate.[16]
- Massachusetts offers a rebate of up to $2,500 for purchases and leases of at least 36 months.[17]
- Pennsylvania started out with a $3,500 rebate in 2011, but as more EVs have been purchased, the rebate gradually has been reduced to the current level of $2,000.[18]
- In 2014, Drive Electric Vermont ran a pilot program offering a $500 rebate to the consumer, paired with a $200 bonus to the dealer that sold the EV.[19] This program is currently not funded.
- In Maine, the utility Central Maine Power ran a series of pilot programs in 2013-2014 resulting in grants to businesses and organizations to purchase or lease an EV and install charging station equipment, as well as grants to install three DC fast charger stations. An additional matching grant program was announced in 2015 to help non-profits purchase EVs or charging equipment.

TAX CREDITS

- Maryland offers a $3,000 excise tax credit for purchased and leased vehicles.[20]
- New Jersey exempts ZEVs sold, rented, or leased from state sales and use tax.[21] A $30,000 vehicle, for example, receives an exemption worth $2,100.

Sources: Dowling, Brian. "Connecticut Offers Cash To Buyers, Sellers Of Electric Vehicles." Courant.com. Hartford Courant. Web. 19 May 2015; "Massachusetts Offers Rebates for Electric Vehicles." MOR-EV.org. Center for Sustainable Energy. Web. 29 July 2015; "Massachusetts Offers Rebates for Electric Vehicles (MOR-EV) Terms and Conditions." MOR-EV.org. Center for Sustainable Energy. Web; "Alternative Fuel Vehicles Rebate Program." Pennsylvania Department of Environmental Protection. Commonwealth of Pennsylvania. Web. 29 July 2015; "Vermont Electric Vehicle Incentives." Drive Electric Vermont. Vermont Energy Investment Corporation. Web. 29 July 2015; Farber, Kenneth. "Central Maine Power Company, Proposed Electric Vehicle Pilot and Request for Accounting Order, Docket No. 2012-350." Central Maine Power. 5 August 2014; "Electric Vehicle Matching Grant Program." Giving Back. Central Maine Power. Web. 22 September 2015; "Excise Tax Credit Request For Plug-In Electric Vehicle." Maryland Maryland Department of Transportation Motor Vehicle Administration. State of Maryland. Web; Ibid.; "Sales Tax Exemption Zero Emission Vehicles. N.J.S.A. 54:32B-8.55." State of New Jersey Department of the Treasury. State of New Jersey. Web.

States should consider a number of ways to maximize the efficacy of financial incentive programs. For example, an immediate rebate is more attractive to consumers than a year-end tax credit, and nonrefundable tax credits are only useful to those that have tax liability in the first place. In fact, California's ZEV Action Plan and a recent National Research Council report recommend converting the tax credit to a point-of-sale rebate to increase its effectiveness.[22] Additionally, because EVs are popular to lease, incentive program eligibility should include both leases and purchases.

Financial incentives also could be applied toward electric vehicle charging equipment. While many EV owners find that a simple level 1 (120V) electrical outlet is sufficient for their home charging needs, others appreciate having the ability to charge more quickly with a level 2 (240V) charger.[23] Two states in the Northeast and Mid-Atlantic currently offer consumers financial incentives for EV charging equipment: Maryland offers homeowners a 50 percent rebate—up to $900—toward the full installation cost for an EV charger. And New York offers an income tax credit to individuals and businesses for the lesser of $5,000 or 50 percent of the cost of the charging unit.[24] Incentives also have helped finance a range of public charging options.

Other forms of financial incentives are waivers for tolls and/or emissions testing fees and free parking. For instance, Connecticut exempts EVs from a required biennial emissions inspection, and New Haven offers free parking on all city streets for EVs registered in the municipality.[25]

Finally, many states in the Northeast and Mid-Atlantic also offer grant programs to municipalities, universities, employers, and other institutions to cover some or all of the cost to purchase EVs or EV charging equipment. Incentives for charging equipment can be linked to other state goals, such as economic development or land-use objectives. For instance, Vermont incentivizes municipalities to install EV charging equipment in designated downtowns.[26]

National Drive Electric Week event in New Britain, CT, September 2014.
CREDIT GIAN METZGER.

EV CONSUMER INCENTIVE FUNDING SOURCES

To date, most funding for incentive programs in the region has come from either temporary sources or previously existing revenue streams, such as the Regional Greenhouse Gas Initiative and Congestion Mitigation and Air Quality Improvement programs. Pennsylvania's rebate is paid for from its Alternative Fuel Incentive Fund, which relies on a tax on the gross receipts collected by utility companies. In the near term, it is highly desirable to have a funding stream for incentive programs that is dedicated by statute and doesn't eliminate investments in other important priorities. In the long run, new revenue streams will be needed to provide funding for incentive programs.

For comparison, California has funded its consumer rebates through auction proceeds from its cap and trade policy; proceeds from the Greenhouse Gas Reduction Fund are appropriated to state agencies through the legislative budgeting process; and the California Air Resources Board receives funds to support the California Vehicle Rebate Program. Development of an economy-wide cap and trade, carbon tax, or clean fuels standard program in the northeast and mid-Atlantic states would achieve tremendous greenhouse gas reductions and provide a revenue source to fund incentive programs. Some states, including Connecticut, have green banks, which generally provide low-cost financing support to clean energy projects utilizing public funds. In those states, these banks are another potential source of support.

Sources: "Alternative Fuel Vehicles Rebate Program." Pennsylvania Department of Environmental Protection. Commonwealth of Pennsylvania. Web. 29 July 2015; "Auction Proceeds Funded Programs and Events." California Environmental Protection Agency Air Resources Board. California Environmental Protection Agency. Web; "Sparking a Green Energy Movement." Connecticut Green Bank. State of Connecticut. Web.

Nonfinancial Incentives

While financial incentives are most powerful, nonfinancial incentives can help tilt vehicle purchase decision-making as well. These incentives focus on saving time or reducing hassles associated with car ownership, such as traffic, parking, and emissions testing. Examples of nonfinancial incentives are high occupancy vehicle lane access and preferential parking for EVs. Among northeast and mid-Atlantic states, New York (on Long Island) and Maryland[27] allow EVs access to HOV lanes. States in the Northeast should follow the example of other states in and outside the region by offering access to HOV or carpool lanes, exemption from emissions testing, and priority parking.

Equitable Distribution of EV Benefits

All northeast and mid-Atlantic states could improve substantially the attention they give to how EV deployment could benefit low-income communities. For example, in order to maximize the potential economic and environmental benefits offered by EV ownership to all of the region's residents, these states should pay greater attention to ensuring that purchasers across the entire economic spectrum have access to the EV market. Because many low-income communities are situated in high-traffic locales, such as near highways, they stand to benefit most tangibly from reduced air pollution from an increased EV market: these communities suffer disproportionate impacts from substandard air quality in the form of higher rates of respiratory illnesses, hospitalizations, and premature death.[28] However, without focused efforts from the states, those communities may not be able to afford new EVs at current prices and may not reap the full set of benefits associated with them.

California provides a model for spreading the benefits of EV ownership to lower-income communities: the state's Charge Ahead law established the goal of placing at least 1 million ZEVs or near-zero-emission vehicles on the road by 2023, and the California governor's ZEV Action Plan calls for 1.5 million ZEVs on the road by 2025.[29] In addition, the law amended California's Cash for Clunkers program to provide low-income residents who agree to scrap older, more polluting cars with a clean vehicle, including new or used EVs.[30] The law also aims to provide assistance to car-sharing programs in low-income neighborhoods and install charging units in apartment buildings in those communities.[31]

States in the Northeast and Mid-Atlantic should prioritize this important aspect of EV deployment by advancing similar initiatives and policies. Because low-income households generally do not buy new vehicles, states should focus on making sure used EVs are available and marketed. High-level task forces can provide opportunities to take up this issue prominently and to engage a broad array of stakeholders, including those representing the interests of low-income communities.

Electric Utilities and their Regulators Should Help Promote EV Adoption and Optimize the Electric System

Through their influence on electricity rates and investment programs, utility policies have significant power to affect how quickly electric vehicles become widely adopted. To be most effective, any regulatory changes to benefit EVs must be pursued in conjunction with other trends in our energy systems, such as the widespread adoption of solar and other clean distributed generation, microgrids and energy storage. New York's proceedings around Reforming the Energy Vision serve as a good example of big-picture thinking on the overarching role of utilities.[32] In general, these policies can be sorted into two categories: (1) smart rate structures and other programs that incentivize EV purchases and reduce barriers to electric vehicle charging and (2) policies that allow utility investments to be optimized for a future with a smarter grid and widespread clean distributed energy resources.

First, rate reforms and new programs can serve as an incentive for EV adoption, allow for more charging infrastructure, and decrease long-run costs to ratepayers.

- **Time-varying rates, managed charging, demand response, and vehicle-grid integration programs can benefit EV drivers and minimize ratepayer costs.** These types of programs give electric vehicle drivers the opportunity to increase their savings on fuel and provide good incentives to charge at low usage hours. This will encourage off-peak charging and put downward pressure on electricity rates for all customers. In the long run, EV batteries can become a flexible storage resource that allows optimal use of the electric grid and avoids investments in transmission, distribution, and generation capacity. EV drivers should be paid fairly for providing these benefits to the broader electric grid, and this can provide an additional reason to buy an EV. [33]

- **Certain types of rate structures, such as high demand charges, can inhibit otherwise sound investments in public fast-charging and other high-power-draw applications like electric buses.** Unnecessarily punitive rates should be reformed to allow good investments while ensuring that these installations will contribute equitably to system costs in the long run.

Customer-facing utility programs for electric vehicles should have robust educational components to encourage proper use of the programs and maximize benefit to the grid. In addition, utilities should be allowed to educate customers on the advantages of electric vehicles and other efficient electric end-uses that replace direct combustion of fossil fuels.

Second, changes to utility investment policies would help capture a range of benefits from a modern, flexible electric system. These changes could include specific enabling investments, as well as a more general shift in thinking about best practices for the future system.

- **Planning and investments should improve opportunities to charge EVs and manage demand.** As a part of broader grid modernization efforts, utility planning processes must project additional load from electric vehicles and fully evaluate a range of EV-related investments. Investment to enable time-varying rates and other demand-management programs, as discussed above, is just one possible area. Other categories include investments that allow two-way power flow and investments that reduce the upfront cost of charging stations, while still respecting a competitive marketplace and innovation.

- **Criteria for evaluating utility investments should include benefits from reduced oil consumption, healthier air, and lower greenhouse gas emissions.** Traditional practices for evaluating investments can be very narrowly focused and, for example, only consider direct electric system costs. This way of thinking keeps utilities locked in old patterns and prohibits new programs that help switch from fossil fuel consumption to new clean and efficient electric end-uses, such as electric vehicles.

- **Utilities should have incentives to promote a shift to clean distributed resources like electric vehicles.** The primary source of profit for regulated electric utilities is a rate of return on capital investments. This gives utilities little reason to implement policies that avoid these investments. Utilities should be given both financial and nonfinancial incentives to increase the uptake of electric vehicles and seek out resources that would lower customer costs. This could include strategies to help rate-payers avoid paying for expensive distribution and transmission upgrades, for example. Not only does this approach allow ratepayers to benefit, it also makes utilities a partner in these efforts.

- **Utilities should be notified of electric vehicle purchases.** Registration of electric vehicles should be routinely referred to electric utilities, with appropriate privacy protections, to allow for proper grid planning and outreach for rates and programs specific to electric vehicles.

National Drive Electric Week event in Huntsville, AL, September 2014.
PHOTO COURTESY OF TENNESSEE VALLEY EV DRIVERS.

Policies Can Help Ensure That Charging Stations Are Widely Available, Consumer-Friendly, and Distributed Equitably

Reforms in a variety of other policy areas can promote the widespread availability of charging stations, allow easy access by the general public, and minimize unnecessary installation costs.

- **Burdensome utility regulations shouldn't apply.** Charging station owners and operators should be exempt from regulation as a public utility, and many states, including Maine, Maryland, Massachusetts and New York, have already taken this approach. In addition, weights and measures authorities should apply reasonable consumer protections, such as the requirements developed by the National Institute of Standards and Technology at the US Department of Commerce.[34]

- **Consumer-friendly policies can ensure access to the public.** Signage should clearly identify charging locations and prices, and interoperability of charging infrastructure should be strongly encouraged. In addition, publicly accessible charging stations should not require memberships or subscription fees, must allow payment by credit card or mobile technology, and should be included in public databases.[35]

- **Building codes and permitting policies should be reformed to minimize long-run costs and encourage installations.** If the necessary electrical capacity and wiring is included when the building is constructed, the cost of installing charging can be greatly decreased. In addition, reasonable requirements for EV-ready wiring for parking lots and garages should be included in planning processes and regulations, and permitting processes should be streamlined to encourage installations. Finally, unreasonable requirements on charging stations at multi-family developments should be forbidden.

- **Targeted incentives and programs should be implemented for high-priority charging categories and hard-to-reach market segments.** Additional incentives and programs should be designed as needed to ensure that all communities have access to vehicle charging and other public policy needs are met.

State and Local Governments Should Lead by Example as Fleet Owners, Workplaces, and Parking Managers

States, counties, cities, and towns have a variety of opportunities to lead by example to promote vehicle electrification. A 2015 International Council on Clean Transportation report shows, for example, that when US cities put in place key policies, they have EV adoption rates of 2–7 times higher than the national average.[36]

- **Governments as fleet owners.** Governmental bodies should change their procurement policies to ensure full consideration of electric vehicles for suitable uses. They should also develop and adopt best practices to maximize electric miles driven. In addition, states should have fleet-wide fuel economy requirements and rules that a minimum percentage of purchased and leased vehicles, such as 25 percent, should be plug-in by 2025.

    - *Many states have policies encouraging agencies to purchase more fuel-efficient fleets, but considerably fewer states mandate that a specific percentage of their fleets be electric. Connecticut, Maryland, and New York, for example, offer public fleet vouchers or funding mechanisms to purchase electric vehicles, while Massachusetts mandates that at least 50 percent of new public fleet vehicles be powered by hybrid-electric or alternative fuel vehicles by 2018.*[37]

- **Governments as workplaces.** Governments are major employers and should provide their employees with workplace charging stations and education on the benefits of electric vehicles.

    - *A number of public entities have become partners of the US Department of Energy's Workplace Charging Challenge. These include public utility commissions; public universities such as the University of Connecticut, the University of Massachusetts Lowell, and the University of Maryland Baltimore; cities such as Atlanta and Sacramento; counties; and the states of Oregon and Illinois.*[38]

- **Governments as parking managers.** Governments can install charging stations and designate preferential parking spots for EVs in publicly accessible lots and other public parking areas. Similarly, they could reduce or waive parking fees for plug-in vehicles. Additionally, communities can encourage EV car-sharing to give people first-hand experience driving an EV. Government agencies can help reduce the cost to private car-sharing companies of offering such a service by paying for designated parking spaces.

    - *The cities of Philadelphia, Pennsylvania, and Berkeley, California, allow residents to apply for EV-only parking signs if they install curbside chargers in front of their houses. This effectively guarantees city residents an open parking space in front of their house.*[39] *The city of Los Angeles, is launching an EV car-sharing program that is making the cars more accessible to residents in low-income neighborhoods.*[40]

Auto Companies and Dealers Can Accelerate EV Sales – and States Can Help

Automakers and dealers both play an important role in how rapidly consumers are switching to EVs. Corporate sustainability goals and federal light-duty vehicle-emissions standards, as well as zero-emission vehicle regulations in ten states, have encouraged automakers to offer more than twenty plug-in models in the US. However, it's important to note that automakers have chosen not to sell some of the most attractive EVs outside California. Instead, they manufacture only enough to meet that state's requirement that large automakers offer a certain number of ZEVs for sale. These "compliance cars" include Fiat 500e and Chevy Spark EV.

Automakers and dealers are missing out on a ripe opportunity to capture new business. According to a University of California, Davis, study from 2014, EVs attract customers new to the brand at a significantly higher rate than conventional vehicles do.[41] However, EV buyers are often frustrated with their experience at dealerships, where they find EVs unavailable and dealer staff not knowledgeable about the products. In fact, UC Davis found that only 21 percent of EV buyers said they would "definitely" purchase from the same dealer again, as compared to 35 percent of conventional vehicle buyers.

- **Automakers and dealerships should make EVs more available in more states and at more dealership lots.**
- **Automakers and dealerships should advertise EVs.**
- **Automakers and dealerships should train staff about EV technology.**
- **Dealerships should place EVs prominently and creatively on the lot.**
- **State agencies should partner with and incentivize dealerships to sell more plug-in cars.**

While companies such as Nissan, General Motors, and Tesla Motors lead in monthly EV sales figures, all companies would be selling more EVs if automakers, dealers, and government agencies took or accelerated specific actions. For example, consumers looking for plug-in models often visit dealerships and find no plug-in models on the lot.[42] Both automakers and dealers need to increase plug-in car inventory. If dealerships do sell EVs, they often place them at the back of the lot. The dealerships that are most successful at selling EVs are those that place EVs and charging stations prominently at the front of the lot. Some even get creative and place HOV lane stickers (in states that offer these for solo EV drivers) on the cars and/or signs about rebates to remind consumers of the types of incentives EVs will afford them.

Also, automakers spend a lot of money on nationwide print, online and television advertising. Dealerships advertise in local and regional radio, television, and print outlets. If automakers and dealerships increased their advertising efforts for plug-in models and showed off the cars at community events, consumers would be more aware of and eager to buy EVs.

While in some ways EVs are just regular cars, in other ways they are a new technology. Many shoppers report knowing more about EVs than the dealers they consult. In a 2014 investigation, Consumer Reports dispatched 19 mystery shoppers to 85 dealers across four states, and they found many dealers knew little about the EVs they sold. In some cases, dealers outright discouraged EV purchases.[43] Consumers appreciate knowing how and where the cars refuel, how fueling costs are significantly lower than for conventional cars, which rebates and incentives apply to them, etc. Promoting incentives like the federal tax credit (up to $7,500 per car) and certain state rebates (up to $3,000 per car) could be huge selling points to customers. Corporate automakers make some information and training available to dealerships about plug-in cars, but they could accelerate these efforts significantly. Dealers, too, could increase their own training efforts, including identifying key seasoned staff members and training them to become their EV experts.

State agencies should partner with and incentivize dealerships to sell more plug-in cars by offering monetary or promotional rewards, coordinating incentives and discounts, and educating dealers about state EV programs and policies.

AUTO DEALER BEST PRACTICES FOR SELLING EVs

According to University of California, Davis research, auto dealer best practices for successfully selling EVs include:

- Using an EV as their daily vehicle—the fastest way for sales people to learn about and become enthusiastic about EVs.
- Outreach to local community groups and businesses for test-drive events at workplaces and other highly populated locations.
- Participating in online EV user forums to answer questions and steer traffic to the dealership.
- Maintaining a selection of 10–15 EVs during peak demand. These cars should be in good condition, cleaned, and charged. Information about incentives should be positioned prominently.
- Featuring EVs alongside chargers (solar, if possible) to associate EVs with buyer values such as concerns for oil independence and environmental protection.

Sources: Callentes, Gustavo, ed. "New Vehicle Dealerships and Plug-in Vehicles: Workshop Summary & Insights." University of California, Davis, Policy Institute for Energy, Environment, and the Economy. University of California, Davis, 2015. Web.

Dealership Recognition and Incentives

- Connecticut, Massachusetts, and Vermont state government have given awards to dealerships that sold high numbers of EVs.[44]
- Massachusetts maintains a website that indicates which auto dealerships are selling the most plug-in cars in the state.[45]
- Connecticut CHEAPR program provides rebates up to $3,000 to customers at the point of sale, and dealers receive an incentive payment worth 10 percent of the consumer rebate.[46]
- In 2014, Vermont provided a cash incentive at select dealerships worth $500 for customers and $200 to dealers.[47]
- Consumers who purchase a Ford plug-in vehicle and who contract with select SunPower installers on home solar get a discount on the solar installation. In addition, the dealer receives a commission and the Sierra Club receives a donation.[48]

Widespread Education Builds Public Awareness and Enthusiasm

Most people in the US have heard little about EVs and don't understand the differences among conventional cars, hybrids, plug-in hybrids, fully electric cars, and hydrogen fuel-cell cars. Public education is essential and needs to come from many sources. The vast majority of car buyers are still lacking the basic knowledge they need in order to even consider purchasing an EV, even though those who drive EVs love them. According to Consumer Reports, in 2014 the Tesla Model S was the best-loved car – of any car, not just electric – with 98 percent of owners saying they would buy one again; the more affordable Chevrolet Volt was the best-loved compact.[49] Most people are unaware of these accolades. Automakers bear a large responsibility for advertising the benefits of their vehicles to consumers, but government agencies, utilities, nongovernmental organizations, and others must play an important role as well.

Organize Fun and Educational Events, Including Ride-and-Drives

A 2010 survey of 900 Southern California Edison residential customers who intended to purchase or lease a new vehicle in the next five years found that "the vehicle acquisition decision is influenced more by what co-workers, friends, and neighbors drive than by dealers or promotional materials."[50]

- Since 2010, the Sierra Club, Plug In America, and the Electric Auto Association, together with many other local partners, have organized National Drive Electric Week events to educate the public about the benefits of EVs. Government agencies organize many of the events, which may include test drives, informational booths, and press conferences. The events that are most successful at drawing the masses and generating media attention are held in high foot traffic areas and include a fun element, such as music, as well as government or corporate leaders announcing a new EV program or policy. Part of the draw of the events is that they are held in public, not at car dealerships.[51]

- Government agencies and organizations like Plug In America also put on other educational EV events at workplaces, on college campuses, and at conferences throughout the year.[52]

Former MA Department of Environmental Protection Commissioner David Cash *(left)* and Somerville, MA, Mayor Joseph Curtatone *(right)* at a 2014 National Drive Electric Week event, September 2014.
PHOTO COURTESY OF GINA COPLON-NEWFIELD.

Promote Workplace Charging

When employers install charging stations, it helps reduce several barriers to electric vehicles by providing employees, vendors, and customers with a daily, visual reminder that EVs exist. A survey by the US Department of Energy (DOE) found that people are 20 times more likely to drive a plug-in vehicle if they have access to charging infrastructure at work.[53] Installing charging equipment also provides the more tangible benefit of enabling employees without access to home charging to be EV owners. In addition, the installation and availability of EV charging equipment can be a hook for local or trade media stories, and employees can learn about EVs via employee educational programs, such as lunchtime seminars.

The Department of Energy's EV Everywhere Workplace Charging Challenge provides technical support as well as recognition to companies, municipalities, universities, and others that take basic steps to offer workplace charging to employees. To date, more than 220 organizations and companies across the country, including a couple states, have joined the challenge. Other states should demonstrate leadership by joining this program and ensuring access to charging equipment for state employees. States could also establish their own technical assistance and recognition programs.

- The Vermont Clean Cities Coalition is conducting outreach for the DOE Workplace Charging Challenge and will provide a $525 incentive to businesses that install a level 1 or level 2 charger by April 15, 2016.[54]

- Drive Electric Vermont serves as an ambassador for the DOE Workplace Charging Challenge and has organized workplace events dubbed "Drive the Dream Vermont. The Green Parking Council in New Haven, Connecticut, is another ambassador from the Northeast and mid-Atlantic region.[55]

- Massachusetts covers 50 percent (up to $25,000) of hardware costs to employers installing level 1 and level 2 charging stations. To date more than 200 workplaces, including businesses, universities, and industrial parks, have been approved for grants.[56]

Create a Strong Website

Some northeast and mid-Atlantic states have informative and easy-to-navigate websites about the benefits of EVs and the steps to purchase one. The Multi-State ZEV Task Force, established in 2013, has a useful website full of actions and recommendations for the participating eight states.[57] A key recommendation in the Multi-State ZEV Action Plan is to "create a ... web-based 'ZEV landing page' to provide consumers and dealers with up-to-date information on ZEVs that are available in each state and links to state and automobile manufacturer websites."[58] A shared ZEV landing page would be very useful, but only if governments and others successfully drive high levels of web traffic to that site. While ZEV Action Plan leaders pursue that effort, state agencies should also customize and advertise state-specific web content for their residents.

- DriveElectricVT.com is an excellent model of a website created through a public-private partnership.[59]

- The Massachusetts Offers Rebates for Electric Vehicles program has a user-friendly website, MOR-EV.org. [60]

- The Sierra Club has created an interactive online Electric Vehicle Guide that has information about all plug-in models on the market, how much people will save in fuel costs and emissions in their region of the country, and what government and utility incentives are available in their state. It also includes Pick A Plug-In, a quiz to help people figure out which EV, if any, is right for their lifestyle.[61]

- The Union of Concerned Scientists has created a very useful report titled State of Charge, which indicates the regions of the country that are "good, better, and best" for switching to electric vehicles when it comes to reducing carbon emissions.[62]

Create Compelling EV Ads and Outreach

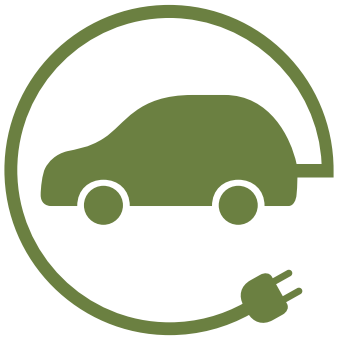
Some automakers have put out creative advertisements for their plug-in models. However, the vast majority of car commercials we see are for gas-guzzling pickup trucks, sport utility vehicles, and conventional sedans and sports cars. Automakers and dealers should invest more in ads for EVs that will reach a large audience.

A switch to electric vehicles will lead to cleaner air and lower carbon emissions—public goods that benefit all Americans. At government-owned buildings and other locations, the agencies should require EV parking spaces and signs. This would both advertise EVs and incentivize employees and other frequent visitors to use EVs. Finally, government agencies and utility companies—both of whom have access to and interact regularly with nearly all consumer and business households—should create public service announcements and mailings about the benefits and incentives regarding EVs.

- A BMW advertisement for its i3 model during the 2015 Superbowl featured former *Today Show* hosts and generated more than 18 million views on YouTube, in addition to the millions who saw the original television ad. [63]
- Cadillac, Ford, and Kia have also put out creative television or web ads.[64]
- Southern California Edison has commercials that advertise its EV services.[65]
- Drive Electric Vermont featured US Olympic snowboarder Ross Powers in an EV advertisement. The organization also gave a clear and compelling explanation for why people should purchase EVs in a YouTube video titled "It's Time to Plug In, Vermont!"[66]

Conclusion: An Opportunity for Leadership

A major switch to plug-in electric vehicles will enable the northeast and mid-Atlantic states to increase energy independence as well as slash air pollution and climate change emissions. Leaders with government, utilities, auto companies, and auto dealers all have tremendous opportunities to design bold, creative, and effective policies and programs that will accelerate growth in the EV market. The programs and policies described in this report offer leaders powerful examples and opportunities to improve and scale up. Now is the time for audacious and rapid action, leadership, vision, creativity, and collaboration that will hasten the transition to a clean energy future.



[1] Acadia Center analysis, using US Environmental Protection Agency's State Inventory and Projection Tool. *Environmental Protection Agency. United States.* Web.

[2] Acadia Center analysis, based on data from US Energy Information Administration, *fueleconomy.gov, CRG, and Bureau of Transportation.*

[3] "State Zero-Emission Vehicle Programs." *California Environmental Protection Agency Air Resources Board.* State of California. Web. 21 Aug. 2015.

[4] ZEV Program Implementation Task Force. *Multi-State ZEV Action Plan.* NESCAUM, 2014. Web.

[5] Casey, Tina. "10,000 EV Drivers Can't Be Wrong...But They Can Be Different (CleanTechnica Exclusive Interview)." *CleanTechnica.* Sustainable Enterprises Media, Inc., 09 Aug. 2015. Web.

[6] In the *Multi-State ZEV Action Plan*, NESCAUM produced a graph showing the rate of growth required for each state to meet its allocation of the 3.3 million ZEVs target for 2025. The yearly targets included here were calculated using the rate of growth reflected in the NESCAUM graph. See note 4.

[7] The methodology for calculating the EV deployment trajectory for non-MOU states was modeled after the methodology used to determine the targets for the MOU states. The MOU states' goals were determined using the number of 2012 new vehicle registrations in the respective states. The 3.3 million ZEVs goal is equal to 98 percent of total 2012 new vehicle registrations for the participating MOU states. Each state's portion of the 3.3 million vehicle target is calculated based on what percentage of total 2012 new vehicle registrations came from that particular state (e.g., Connecticut's 2012 new vehicle registrations account for approximately 4.67 percent of the total 2012 new vehicle registrations for all the MOU states).

[8] Coplon-Newfield, Gina. "How Many Electric Cars Do We Need to Save the Planet?" *TheHuffingtonPost.com.* The Huffington Post, 18 Feb. 2015. Web.

[9] Rushow, Jenny. "CLF Holds Successful Massachusetts Electric Vehicle Roundtable with Patrick Administration." *Conservation Law Foundation.* Conservation Law Foundation, 20 Mar. 2013. Web.

[10] Vermont Climate Cabinet. *Vermont Zero Emission Vehicle Action Plan.* Montpelier: Vermont Agency of Natural Resources, 2014. Web.

[11] "The Electric Vehicle Study 2010." *Zpryme Smart Grid Insights.* N.p., 25 Dec. 2010. Web. 18 Feb. 2015.

[12] Zalubowski, David. "Discounts of Nearly $10,000 Boosting Sales of GM's Chevy Volt." *The Dallas Morning News*. The Associated Press, 22 Sept. 2012. Web. 19 Feb. 2015.

Elmer, Stephen. "Electric Cars See Sales Spike on Price Cuts, Incentives." *AutoGuide.com*. Verticle Scope Inc., 03 July 2013. Web. 19 Feb. 2015.

[13] National Research Council of the National Academies. *Overcoming Barriers to Deployment of Plug-in Electric Vehicles.* Washington: National Academies Press, 2015. Web.

[14] "IRS Form 8936, Qualified Plug-in Electric Drive Motor Vehicle Credit." *Internal Revenue Service*. United States. Web.

[15] Jin, Lingzhi, Stephanie Searle, and Nic Lutsey. "Evaluation of State-Level U.S. Electric Vehicle Incentives." *International Council on Clean Transportation*. The International Council on Clean Transportation, Oct. 2014. Web.

In Oregon, for example, other factors, such as socioeconomic demographics and advocacy efforts, have resulted in higher EV sales without incentives.

[16] Dowling, Brian. "Connecticut Offers Cash To Buyers, Sellers Of Electric Vehicles." *Courant.com*. Hartford Courant. Web. 19 May 2015.

"Connecticut Hydrogen and Electric Automobile Purchase Rebate." Connecticut Department of Energy & Environmental Protection. State of Connecticut. Web. 29 July 2015.

[17] "Massachusetts Offers Rebates for Electric Vehicles." *MOR-EV.org*. Center for Sustainable Energy. Web. 29 July 2015.

"Massachusetts Offers Rebates for Electric Vehicles (MOR-EV) Terms and Conditions." *MOR-EV.org*. Center for Sustainable Energy. Web.

[18] "Alternative Fuel Vehicles Rebate Program." Pennsylvania Department of Environmental Protection. Commonwealth of Pennsylvania. Web. 29 July 2015.

[19] "Vermont Electric Vehicle Incentives." *Drive Electric Vermont.* Vermont Energy Investment Corporation. Web. 29 July 2015.

[20] "Excise Tax Credit Request For Plug-In Electric Vehicle." *Maryland Department of Transportation Motor Vehicle Administration.* State of Maryland. Web.

Ibid.

[21] "Sales Tax Exemption Zero Emission Vehicles. N.J.S.A. 54:32B-8.55." *State of New Jersey Department of the Treasury.* State of New Jersey. Web.

[22] "2013 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California roadways by 2025." *Office of Governor Edmund G. Brown Jr.* State of California. Web. 19 Feb. 2015.

See note 14.

[23] "Electric Vehicle Supply Equipment Rebate Program." *Maryland Energy Administration*. State of Maryland. Web. 20 Feb. 2015.

[24] "Alternative Fuels and Electric Vehicle Recharging Property Credit (for Tax Years Beginning on or after January 1, 2013)." *New York State Department of Taxation and Finance.* State of New York. Web. 29 July 2015.

[25] "Car Inspection in Connecticut." *DMV.org.* DMV.org. Web. 29 July 2015.

"Green Driver Incentives in Connecticut." *DMV.org.* DMV.org. Web. 29 July 2015.

[26] "Proposed Updates, EV Charging Station Criteria and Grant Application." *Vermont Department of Housing and Community Development*. State of Vermont. Web.

[27] Applies to Long Island Expressway only. "New York's Clean Pass Program." *New York State Department of Transportation.* New York State Department of Transportation. Web. 29 July 2015.

"High Occupancy Vehicle (HOV) Permit Issuance for Plug-in Electric Vehicles." *Maryland Department of Transportation Motor Vehicle Administration.* State of Maryland. Web. 29 July 2015.

[28] State of California. SB-1275. "Vehicle Retirement and Replacement: Charge Ahead California Initiative." 21 September 2014. Web.

[29] Ibid.

See note 27.

[30] "Making the Cleanest Cars Affordable." *California Environmental Protection Agency Air Resources Board.* California Environmental Protection Agency. Web.

[31] State of California. SB-1275. "Vehicle Retirement and Replacement: Charge Ahead California Initiative." 21 September 2014. Web.

[32] "Reforming the Energy Vision." *New York State of Opportunity.* New York Public Service Commission. Web. 28 September 2015.

[33] "In the Driver's Seat: How Utilities and Consumers Can Benefit From The Shift to Electric Vehicles." *Vermont Energy Investment Corporation and RAP*. Regulatory Assistance Project. Web.

[34] "U.S. National Work Group on Measuring Systems for Electric Vehicle Fueling and Submetering." *Physical Measurement Laboratory.* National Institute of Standards and Technology. Web. 28 September 2015.

[35] One example is *California's EV Charging Stations Open Access Act, SB-454*. State of California, 28 September 2013. Web.

[36] Lutsey, Nic. "Electric Vehicles Rising, in Select US Cities." *From the Blogs.* International Council on Clean Transportation. Web.

[37] "State Laws and Incentives." *Alternative Fuels Data Center.* US Department of Energy, Energy Efficiency & Renewable Energy. Web. 26 Aug. 2015.

[38] "Workplace Charging Challenge: Partners." *Energy.gov.* US Department of Energy, Energy Efficiency & Renewable Energy. Web.

[39] Maykuth, Andrew. "Electric Vehicles Can Get Special Phila. Parking Space." *Philly.com*. Philadelphia Media Network, 07 May 2015. Web.

[40] Coplon-Newfield, Gina. "Los Angeles Pioneers Electric Car-Sharing for Low-Income Residents." *TheHuffingtonPost.com*. The Huffington Post, 13 Aug. 2015. Web.

[41] Cahill, Eric, Jamie Davies-Shawhyde, and Thomas S. Turrentine. "New Car Dealers and Retail Innovation in California's Plug-In Electric Vehicle Market." Working Paper UCD-ITS-WP-14-04: 9. *Institute of Transportation Studies, University of California,* Davis. University of California, Davis, 2014. Web.

[42] Evarts, Eric. "Dealers Not Always Plugged in about Electric Cars." *ConsumerReports.org.* Consumers Union, 22 Apr. 2014. Web.

[43] Ibid.

[44] "Dealer Recognition." *Multi-State ZEV Task Force*. NESCAUM. Web.

[45]"MOR-EV Program Statistics." *Massachusetts Offers Rebates for Electric Vehicles.* Center for Sustainable Energy. Web.

[46] "Connecticut Hydrogen and Electric Automobile Purchase Rebate." *Connecticut Department of Energy and Environmental Protection.* State of Connecticut. Web.

Dowling, Brian. "Connecticut Offers Cash To Buyers, Sellers Of Electric Vehicles." *Courant.com.* Hartford Courant, 19 May 2015. Web.

[47] "Electric Vehicle Incentives." *VLITE.org.* VLITE, 07 Aug. 2014. Web.

[48] "SunPower." *Sunpowercorp.com.* Sun Power Corporation. Web.

[49] Consumer Reports. "Most and Least Loved Cars." *Nbcdfw.com*. NBC 5 Dallas-Fort Worth, 2 Dec. 2014. Web. 20 Feb. 2015.

[50] "Characterizing Consumers' Interest in and Infrastructure Expectations for Electric Vehicles: Research Design and Survey Results." *EPRI.com*. Electric Power Research Institute, 19 May 2010. Web.

[51]Coplon-Newfield, Gina. "California Governor Jerry Brown Among Tens of Thousands Who Celebrated National Drive Electric Week in 152 Cities." *TheHuffingtonPost.com*. The Huffington Post, 24 Sept. 2014. Web.

"National Drive Electric Week 2015." *DriveElectricWeek.org.* Plug In America, Sierra Club and Electric Auto Association. Web.

[52]"Plug In @ Work." *PlugInAmerica.org.* Plug In America. Web.

[53] "Survey Says: Workplace Charging Is Growing in Popularity and Impact." *Energy.gov.* US Department of Energy, Energy Efficiency & Renewable Energy, 18 Nov. 2014. Web.

[54] "Terms & Conditions for the Vermont Clean Cities Coalition (VTCCC) Electric Vehicle Charger (EVSE) Incentive Program." *Vermont Clean Cities Coalition.* Vermont Clean Cities Coalition. Web.

[55] "Workplace Charging Challenge: Ambassadors." *Energy.gov.* US Department of Energy. Web.

"Drive the Dream Vermont." *Drive Electric Vermont.* Vermont Energy Investment Corporation. Web.

[56]"Massachusetts Electric Vehicle Incentive Program (MassEVIP): Workplace Charging." *Energy and Environmental Affairs.* Commonwealth of Massachusetts. Web. 25 Aug. 2015.

[57] "Multi-State ZEV Task Force." *ZEV Task Force.* NESCAUM. Web.

[58] See note 1.

[59] "It's Time. Plug In, Vermont." *Drive Electric Vermont.* Vermont Energy Investment Corporation. Web.

[60]"Massachusetts Offers Rebates for Electric Vehicles." *MOR-EV.org.* Center for Sustainable Energy. Web. 10 Sept. 2015.

[61] "Electric Vehicle Guide." *Sierra Club.* Sierra Club. Web.

"Pick A Plug-In." Sierra Club. Sierra Club. Web.

[62] Anair, Don. "How Do EVs Compare with Gas-Powered Vehicles? Better Every Year...." *The Equation.* Union of Concerned Scientists, 16 Sept. 2014. Web. 10 Sept. 2015.

[63] "BMW i3—'Newfangled Idea.'" *YouTube.com.* YouTube. Web.

[64] "Cadillac ELR Coupe 2014 Commercial." *YouTube.com.* YouTube. Web.

"Upside: Anything is Possible." *YouTube.com.* YouTube. Web.

"2015 Kia Soul EV Hamster Commercial Featuring 'Animals' by Maroon 5 MTV—VMAs." *YouTube.com*. YouTube. Web.

[65]"Charged Up for Electric Cars." *YouTube.com.* YouTube. Web.

"Unplugged." YouTube.com. YouTube. Web.

[66] "Drive Electric VT: Ross Powers Plugs In to Electric Vehicles." YouTube.com. YouTube. Web.

"Drive Electric VT: It's Time to Plug in, Vermont!" *YouTube.com.* YouTube

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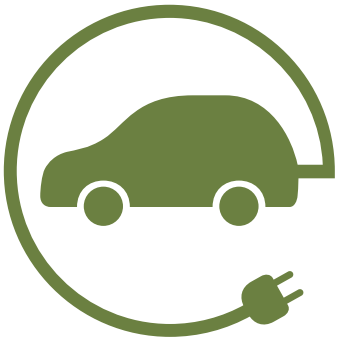

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