

January 26, 2018

Secretary Matthew Beaton  
Energy and Environmental Affairs  
100 Cambridge St., Suite 900  
Boston, MA 02114

Secretary Stephanie Pollack  
Department of Transportation  
10 Park Plaza, Suite 4160  
Boston, MA 02116

**Re: GWSA IAC Members - 2018 Transportation Listening Session Comments**

Dear Secretary Beaton and Secretary Pollack:

The undersigned member organizations of the Global Warming Solutions Act Implementation Advisory Committee (GWSA IAC) thank the Executive Office of Energy and Environmental Affairs (EOEEA) and the Department of Transportation (MassDOT) for extending the opportunity for stakeholder comment in the Transportation Listening Sessions effort launched this fall. The undersigned GWSA IAC member organizations submit these joint comments for consideration by your collective agencies and departments. We wish to acknowledge the significant collaboration and input provided by stakeholders that are not currently members of the IAC. This collaboration has helped strengthen the recommendations and insights put forward by the IAC signers, and we would like to thank Acadia Center for their help in coordination and drafting, as well as Natural Resources Defense Council, Sierra Club, and Transportation for Massachusetts for their input.<sup>1</sup> We are encouraged to see broadening consensus and alignment across the ecosystem of clean transportation stakeholders in Massachusetts and across the region, and we thank these partners for their engagement.

Our organizations look forward to further engagement and collaboration with EOEEA and MassDOT as state efforts surrounding transportation continue and ramp up in 2018. Thank you again for your consideration of these comments.

Sincerely,

A Better City  
Conservation Law Foundation  
Environmental Entrepreneurs  
Environmental League of Massachusetts  
Mass Audubon  
Metropolitan Area Planning Council  
Northeast Clean Energy Council  
The Nature Conservancy  
Union of Concerned Scientists

Cc: [gwsa@massmail.state.ma.us](mailto:gwsa@massmail.state.ma.us)

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<sup>1</sup> We note that the body of the recommendations in this letter from IAC signers is nearly identical to the separate set of comments that will be submitted by a broader set of stakeholders, including the above-mentioned groups and other organizations. We further note that some of the IAC signers of this letter will also be signing on to the additional set of broader stakeholder comments.

Thank you for this opportunity to provide comments on the transportation and climate issues facing Massachusetts. Our organizations appreciate the leadership that Massachusetts has shown by hosting listening sessions across the state, and we support your efforts to reduce emissions in our transportation system.

These comments address three categories of issues:

- Regional cap-and-invest policy for transportation;
- Mode shift, smart growth, and land use; and
- ZEV policy recommendations.

## **Executive Summary**

Over the past decade, under both Republican and Democratic administrations, Massachusetts has helped lead the nation towards clean and renewable energy. Under the Global Warming Solutions Act, Massachusetts established the strongest legally binding limits on global warming pollution in the country. Massachusetts leadership helped establish the first regional limits on pollution from power plants through the Regional Greenhouse Gas Initiative (RGGI). We have the most energy efficient economy in the country, saving consumers millions on our energy bills. We have nearly ended the use of coal, we have created over 100,000 clean energy jobs, and last year Massachusetts made an investment in offshore wind that will make us a national leader in that technology.

As the Baker-Polito Administration has recognized, it is now time to address carbon emissions from the transportation sector. Our cars and trucks, rather than our power plants, are now the largest source of pollution in the state of Massachusetts, and transportation is the one area of our economy where emissions today are actually higher than they were in 1990. Beyond emissions, our transportation system faces many other critical challenges, including underfunded public transportation services, insufficient affordable housing near transit, and poor transportation services for low income communities. We will outline some of the major challenges facing transportation in the state in Part I of this comment.

One way we could address many of these challenges is through a cap-and-invest policy similar to the Regional Greenhouse Gas Initiative (RGGI). RGGI is a policy with a proven track record of success in reducing emissions while creating jobs and saving consumers money. If Massachusetts joins with our neighbors in the Northeast to create a similar program covering transportation emissions, that program could raise billions of dollars for Massachusetts and other states in the region, in addition to reducing emissions, which could enable us to significantly scale up our investments in clean transportation. Part II of this comment looks specifically at a regional cap-and-invest program.

Broadly speaking, to reduce emissions in the transportation sector we need to provide people with reliable alternatives to driving and provide the people who must drive with the cleanest and most efficient vehicles possible. We need a public transportation system that businesses and workers can rely on to connect people to jobs and opportunities. We need to be able to provide enough affordable housing near transit to retain talented young professionals and protect low-income residents from displacement and gentrification. And, as recent storms have demonstrated, we need to protect our transportation system from the impacts of a changing climate, which will take additional resources and strategies. In Part III of this comment, we outline some of the core steps needed to build communities where transit, walking and biking are viable choices.

Finally, to achieve our long-term greenhouse gas (GHG) reduction targets we need to convert much of our vehicle fleet to zero-emission vehicle (ZEV) technologies, such as electric vehicles (EVs). EVs are an exciting technology capable of delivering superior automotive performance and significant consumer savings without tailpipe emissions. Thanks to our relatively clean grid, in Massachusetts EVs can get the emissions equivalent of a 100-mpg gasoline vehicle. But making this technology work for low- and moderate-income residents will require the state to scale up our investments in infrastructure and purchase incentives. Maximizing the potential benefits of vehicle electrification will also require smart thinking on rate design to encourage efficient charging. We discuss some of these policies in Part IV.

Our transportation system faces significant challenges, but also enormous opportunities. If we make the right investments now, it could benefit Massachusetts residents in many ways, including more jobs, less money spent on gasoline, a more reliable transit system, cleaner air and improved public health, and greater access for all of our residents to economic opportunities. We hope that the Administration moves forward with a bold plan for a cleaner, better transportation system for Massachusetts.

## **I. Challenges to Address**

Transportation accounts for the largest share of carbon dioxide (CO<sub>2</sub>) emissions in Massachusetts,<sup>2</sup> the region, and the country. Like its neighbors in the Northeast and Mid-Atlantic, Massachusetts will be unable to meet 2030 and 2050 economy-wide greenhouse gas (GHG) emissions reduction requirements without making substantial progress in the transportation sector. If well designed, measures to reduce carbon emissions should also lead to reductions in other harmful air pollutants, such as soot and smog, which are linked to premature deaths, asthma, heart attacks, and other negative health impacts.

In addition to helping Massachusetts meet its emissions challenges, improvements to the transportation system are long overdue. Aging roadways and public transit inadequately serve the Commonwealth's residents and businesses, while the existing system fails to provide mobility options for large portions of the population. Limited affordable housing in neighborhoods close to transit pushes residents towards car-dependent suburbs and exurbs, increasing congestion, transportation costs, and emissions.

Massachusetts must deploy a suite of complementary policies to address these challenges. There is no silver bullet to transform the transportation system, but Massachusetts can greatly increase the prospects for success through a coordinated approach that encourages action at the local, state and regional level. By implementing complementary and efficient policies, Massachusetts can better position itself and its communities to achieve an equitable and clean transportation system. This coordinated action can moreover enable an alignment of modeling and measurement tools for emissions accounting, tracking, and projections. Current accounting measures for transportation-related GHG emissions provide insufficient visibility into where policies are having an effect within Massachusetts, let alone across states, and to what degree. By adopting detailed models that are aligned across local, state, and regional levels, we can not only streamline efforts, but also better understand the interplay of policies needed to achieve Massachusetts' vision for the transportation system of the future.

Vehicle emission standards, including the national standards doubling fuel efficiency by 2025 and the Zero-Emission Vehicle regulation adopted by Massachusetts and other northeastern states, will be critical to reducing emissions from cars and trucks. Numerous interrelated policies are needed to

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<sup>2</sup> <http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/ma-ghg-emission-trends/>.

improve the efficiency of land use decisions, by encouraging equitable smart growth, transit-oriented development, compact, mixed-use, and mixed income neighborhoods, and improved zoning. Similarly, increased investments and policies to shift vehicle miles travelled away from single-driver vehicles to walking, biking, transit, and other alternatives can reduce emissions and congestion. For vehicle travel that cannot be shifted to other modes, the electrification of the transportation sector is a critical decarbonization strategy that requires coordination among state agencies, non-governmental organizations (NGOs), regional entities, vehicle manufacturers, electric utilities, electric vehicle charging providers, and other stakeholders. Finally, Massachusetts must not lose sight of the substantial opportunity for innovation in this space, and the Commonwealth should look to support programs for early stage clean transportation innovation, such as pilots/demonstration-projects for new transportation technologies, business models, and services.

## **II. Regional Cap and Invest for Transportation**

As we seek to ensure that carbon pollution from the transportation sector is reduced as needed to protect the climate, a declining cap on emissions is necessary. The cap can additionally help fund other policies such as clean vehicle sales and performance standards, efficient land use planning, and charging infrastructure investments so that clean transportation technology is deployed widely and equitably. While Massachusetts could enact a state-level transportation emissions cap, a regional cap, combined with complementary state-level policies, would improve the efficiency of such a program. As 2018 arrives, momentum is building for Massachusetts and its peers in the Northeast and Mid-Atlantic to collaborate in pursuit of a regional program.

In November 2017, Massachusetts along with Connecticut, Delaware, Maryland, New York, Rhode Island, Vermont and the District of Columbia [announced](#) that they will be “engaging communities and businesses in conversations that explore the opportunities and benefits that could be achieved from coordinated state action.” Regional action and alignment is helpful for the companies leading the low-carbon transition, both for small businesses dependent on regional commerce and large businesses building regional market strategies. Companies and entities providing low-carbon solutions do so across state lines, and they benefit from consistent price signals for their potential customers and market counterparts in neighboring jurisdictions. Moreover, working together with other states brings economic heft and political durability to new policies. The combined GDP of the jurisdictions involved in the November announcement is \$2.8 trillion – comparable to the United Kingdom, the fifth largest economy in the world.<sup>3</sup>

### **A Proven Model Exists**

States in the Northeast and Mid-Atlantic have already demonstrated success with regional, market-based climate policy through the Regional Greenhouse Gas Initiative (RGGI). Since RGGI’s inception in 2009, the participating states have reduced power plant GHG emissions [40 percent](#)<sup>4</sup> and generated over \$2.9 billion in net economic benefits.<sup>5</sup> Similar cap-and-invest programs have also been implemented in

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<sup>3</sup> Acadia Center analysis of data from the International Monetary Fund and the U.S. Bureau of Economic Analysis.

<sup>4</sup> See: [http://acadiacenter.org/wp-content/uploads/2017/06/AC\\_RGGI\\_on\\_the\\_World\\_Stage\\_20170626.pdf](http://acadiacenter.org/wp-content/uploads/2017/06/AC_RGGI_on_the_World_Stage_20170626.pdf).

<sup>5</sup> This figure is based on the combined findings from two separate reports from the Analysis Group, the first of which covered impacts from 2009 through the first half of 2011, the second report covering 2012 to 2014. As a result, the combined benefits included above only account for five and a half years of revenue reinvestment, rather than the full six years from 2009 to 2014, and do not include benefits from later years. Reports at: [http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis\\_group\\_rggi\\_report\\_july\\_2015.pdf](http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_july_2015.pdf) and [http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/economic\\_impact\\_rggi\\_report.pdf](http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/economic_impact_rggi_report.pdf).

California to reduce greenhouse gas emissions across the economy, as well as in Ontario, Quebec, and 36 countries across the world.<sup>6</sup> In the electricity sector, a price on carbon through RGGI, complemented by the strategic investment of resulting program allowance revenues as well as state Renewable Portfolio Standards and numerous other policies, have enabled new technologies to overcome the challenges of getting to scale. This, in turn, has produced cost-effective clean energy growth and overall economic benefits. A similar combination of complementary, adaptable policies and strategic investment of revenues is needed to launch a transformation of the transportation sector and ensure a broad distribution of benefits.

We encourage Massachusetts to lead and to help coordinate the Northeast and Mid-Atlantic states to establish a regional cap-and-invest program for transportation fuels that will enable necessary investments and reduce emissions.

### **Economic Growth and Job Creation**

Tackling transportation emissions with a cap-and-invest approach would generate substantial benefits for the region. [Analysis](#) for the Transportation and Climate Initiative (TCI) found that carbon revenues invested in Northeast and Mid-Atlantic states to reduce vehicle GHG emissions would create more than 100,000 new jobs in the region and put more than \$14.4 billion into families' pockets in 2030 alone. Clean transportation investments would also save hundreds of lives by reducing local air pollution and would eliminate nearly \$1 billion in transportation maintenance costs. With transportation revenue failing to keep pace with the Commonwealth's needs, emissions pricing reinvested in the transportation system provides an important means of supporting needed transportation system investments.

### **Equitable Benefits**

Massachusetts should invest in transportation solutions that meet local needs, improve transportation efficiency and resiliency, and spread benefits equitably. In particular, solutions must bolster health outcomes for low-income communities, communities of color, and other vulnerable populations that face disproportionate burdens from transportation-related pollution. Access to clean, safe, reliable, and affordable transportation options must be improved for underserved urban and rural populations, and revenue must be used to mitigate any undue burdens born by low-income households now and in the future. Investment in transportation solutions provides an opportunity to support better health outcomes, robust public transit and living wage jobs for residents in historically marginalized communities.

## **III. Mode shift, Smart Growth, and Land Use**

Smarter land use and investment in cleaner, more equitable transportation options like public transportation, biking, and walking are other major strategies that we strongly support to reduce emissions from transportation in Massachusetts and across the region. Massachusetts should deploy a suite of complementary policies to address these challenges and improve the efficiency of land use decisions, including policies such as smart growth, transit-oriented development (TOD), and improved zoning. While no state agency has direct control over land use, the state can influence municipal land development through financial incentives, economic development practices, and infrastructure investments that encourage low-carbon smart-growth practices. Moreover, the state can encourage

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<sup>6</sup> World Bank Group, State and Trends of Carbon Pricing 2016. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/25160/9781464810015.pdf?sequence=7&isAllowed=y>.

TOD projects, which are critical to the region because they encourage smart growth and provide improved transportation options for a larger number of riders. To complement the MBTA's recently adopted TOD guidelines, the state should pass legislation to update zoning laws so that cities and towns can better plan for denser and less carbon-intensive smart development. Land use policies, for instance, that require multifamily and inclusionary zoning work well to promote TOD. Continued and increased funding for Complete Streets and strategies that reduce the over-abundance of parking near transit additionally support compact development.

The state can further help to reduce emissions via natural climate solutions by encouraging the conservation, enhancement, and restoration of the natural carbon stocks and cycles in ecosystems through smart transportation and land use choices. The GreenDOT program includes smart measures, such as a 2 to 1 ratio of replanting trees when removed for construction of roadways. Additionally, the deployment of pervious pavers, rain gardens, and other low-impact development strategies not only decrease flooding and urban heat island impacts, but also reduce storm-water pollution from impervious surfaces, thereby improving water quality and the health of aquatic systems, such as salt marshes, that stock and cycle carbon. Massachusetts should moreover support existing – and consider other – applications of the sustainable development principles in the Greenhouse Gas Policy of the Massachusetts Environmental Policy Act.

Equally critical, investments to shift miles travelled away from individual cars to walking, biking, and transit reduce emissions and lower congestion for remaining drivers. Since population and job growth continue to grow fastest within the urban core municipalities served most heavily by the MBTA, we must increase the capacity of the existing transit system and expand MBTA service, particularly the bus system, through strategies such as Bus Rapid Transit (BRT). Compared to single-occupant vehicles, buses emit on average about one-tenth the amount of carbon dioxide, and are a lower-cost investment than other forms of public transit. The Commonwealth should redouble efforts to invest in maintaining and adding capacity to the MBTA and our regional transit authorities (RTAs), and investments in active transportation infrastructure should continue to increase. Moreover, not only are walkable and bikeable communities highly desirable places to live, but also people drive 5 to 15 percent less in communities with good walking and biking conditions than those in more car-dependent areas. Smart pricing strategies, including congestion pricing, Vehicle Miles Traveled (VMT) fees, appropriate pricing for parking, a gas tax indexed to inflation, and comprehensive open-road tolling, can increase funding to support investments in the transportation system, including pedestrian-friendly streetscapes, dedicated bike lanes, and BRT.

On the cutting edge, autonomous vehicles (AVs) must be properly regulated, including mandatory data reporting that is more detailed, comprehensive, and routine than currently required of Transportation Network Companies (TNCs). AVs must be incentivized or required to be zero-emissions. Additionally, the roll-out of AVs must be joined with complementary policies so that emissions levels, traffic, safety, and public health are all improved by technology advances, and sprawl is not exacerbated.

A strong focus on policies and funding that support mode-shift and smarter land-use will complement the policy recommendations in the sections to follow. And importantly, proceeds from the regional cap-and-invest program outlined in section II can make these investments possible.

#### IV. ZEV Policy Recommendations

Achieving the dramatic reductions in transportation emissions required by the Global Warming Solutions Act will require the near-complete transformation of our vehicle fleet, from cars, trucks and buses that run on oil to zero-emission technologies such as electric vehicles. Studies have demonstrated that the transition to electric vehicles is critical to achieving deep decarbonization of transportation<sup>7</sup> and is one of the most cost-effective<sup>8</sup> strategies to reduce carbon emissions. When plugged into the New England grid, today's EVs get the emissions equivalent of a 100+ mpg conventional vehicle.<sup>9</sup>

The potential electrification of transportation represents a transformational shift that promises a host of cross-cutting public benefits. Electric vehicles can benefit drivers by sharply reducing fuel and maintenance costs,<sup>10</sup> benefit the regional economy by keeping dollars that are currently spent on imported petroleum products in the local economy, and reduce air pollution from the current transportation sector by eliminating tailpipe emissions. With proper design and management, transportation electrification can ultimately benefit all Massachusetts residents, not just the owners of zero emission vehicles (ZEV). Studies have shown that ZEV adoption can reduce costs for all electric utility customers while benefiting the grid and providing a range of societal and environmental benefits.<sup>11,12</sup>

Massachusetts has recognized the important role of electric vehicles in the climate and energy future of the state in several policies and regional commitments. In 2013, Massachusetts signed a Memorandum of Understanding with 7 other states and committed to a goal of putting 300,000 ZEVs on the road by 2025.<sup>13</sup> Massachusetts participates in the Zero-Emission Vehicle Program, which requires automakers in Massachusetts to sell an increasing number of such vehicles in the state. While there are currently about 12,000 EVs registered in the Commonwealth,<sup>14</sup> it should be noted that EV sales in Massachusetts increased by 68 percent between 2015 and 2016. Sales in December 2016 were double those of December 2015. Massachusetts has already adopted important policies and implemented programs integral to the growth of electric vehicle adoption in the Commonwealth. The incentives and other programs adopted by Massachusetts, in addition to improving technology and lower battery costs, continue to make EVs more appealing to consumers.

However, existing efforts are not sufficient to ensure the Commonwealth achieves its goals for electrification and carbon reduction. While EV sales are growing, they still represent a small share of the overall vehicle market, and we are still far away from hitting our 300,000 vehicle goal in 2025. Several important institutional and market barriers currently prevent ZEVs from reaching the large-scale deployment levels that will drive the broad public benefits outlined above. First, *the purchase price of vehicles*: while ZEV costs are declining rapidly and a few less expensive options are available in the market today, on average the purchase price of a ZEV remains more expensive than that of a

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<sup>7</sup> For example, E3: <http://unsdsn.org/wp-content/uploads/2014/09/US-Deep-Decarbonization-Report.pdf>; NRDC:

<https://www.nrdc.org/media/2015/150917>;

<sup>8</sup> <http://www.synapse-energy.com/project/rggi-2030-roadmap-40-percent-emission-reductions-rggi-states>

<sup>9</sup> <http://blog.ucsusa.org/dave-reichmuth/new-numbers-are-in-and-evs-are-cleaner-than-ever>

<sup>10</sup> <https://www.ucsusa.org/clean-vehicles/electric-vehicles/ev-fuel-savings#.WjhG8FWnGUk>

<sup>11</sup> <http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic>

<sup>12</sup> <https://www.ethree.com/tools/electric-vehicle-grid-impacts-model/>

<sup>13</sup> <http://www.nescaum.org/documents/zev-mou-8-governors-signed-20131024.pdf/>

<sup>14</sup> <https://autoalliance.org/energy-environment/zev-sales-dashboard/>

comparable internal combustion engine (ICE) vehicle. There is ample evidence that providing incentives that help close the cost gap can accelerate ZEV sales. Second, *insufficient charging infrastructure*: drivers must have confidence that they can conveniently charge their vehicle to meet their typical travel needs. While the increasing availability of long-range electric vehicles is helping address this issue, range for EVs remains lower than for ICE vehicles. Additionally, charging infrastructure to facilitate long-distance travel, as well as robust charging options for drivers that lack access to home charging, is required quickly. Finally, *insufficient knowledge of consumers and automobile dealers*: although sales are growing rapidly, most consumers still do not know that electric vehicles are a viable option or whether they are a good candidate to switch. Automobile dealers do not necessarily have staff who are well trained to discuss and sell electric vehicles and may be reluctant to sell EVs due to lack of familiarity with the vehicles or because they make more money on repairs for conventional vehicles.<sup>15</sup>

With these realities in mind, state policymaking bodies continue to have a critical role to play in facilitating the efficient deployment of the associated charging infrastructure and ensuring that all segments of the population are adequately served as EVs move into the mainstream.

In the following section, we outline four categories of priority recommendations for continued progress on ZEV adoption.

### **1. Incentivize ZEV adoption and access**

#### **A. Expand EV incentive programs, including statewide low-income rebate**

The high upfront cost of electric vehicles remains a major obstacle to mass electrification, particularly for low- and moderate-income residents. Further, one of the most important policies reducing costs for consumers, the federal EV tax credit, will begin to phase out in 2018. Massachusetts should build on its existing programs, such as the MOR-EV program with additional incentives that will provide greater funding and support. In particular, Massachusetts should move swiftly to initiate a statewide low-income rebate program for purchases and leases of new and used ZEVs, building on the low-income pilot program recently initiated by Massachusetts with larger rebates supported by greater funding. California has programs that provide greater incentives when a low-income resident trades in an old high-emission vehicle for an electric vehicle, funded by the state's cap-and-invest program, and is expanding financing options for low-income residents as well.

#### **B. Adopt EV car-sharing and other options to promote access in underserved communities**

Other jurisdictions have implemented other programs, beyond rebates, to expand access to ZEVs in underserved communities. Several cities in California have committed to EV car-sharing pilot programs, funded through that state's cap-and-invest program.<sup>16, 17</sup> Similarly, Chattanooga, Tennessee has started an EV car sharing service.<sup>18</sup> These programs provide examples to draw from, but other innovative ideas should be considered as well.

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<sup>15</sup> [Cite]

<sup>16</sup> Los Angeles's program provides 100 EVs for low-income neighborhoods. See:

<https://la.curbed.com/2016/12/21/14046080/electric-carsharing-los-angeles-bluecalifornia>.

<sup>17</sup> Sacramento's "Community CarShare" program provides residents of public housing complexes with free access to eight EVs. See: <http://ourcarshare.org/>.

<sup>18</sup> [https://insideclimatenews.org/news/07122017/car-rental-sharing-electric-vehicles-zipcar-evs-uber-lyft-green-commuter?mc\\_cid=448598aee8&mc\\_eid=8d4f6d3cc6](https://insideclimatenews.org/news/07122017/car-rental-sharing-electric-vehicles-zipcar-evs-uber-lyft-green-commuter?mc_cid=448598aee8&mc_eid=8d4f6d3cc6)



### C. Add dealer incentives to rebate programs

We strongly support incentives for automobile dealerships and sales staff as a means of accelerating sales of ZEVs. Dealerships have historically been reluctant to push ZEVs: informed and motivated dealerships and salespeople are key to increasing ZEV adoption. These incentives would pair well with potential dealership training and recognition programs. Massachusetts should emulate the actions taken by Vermont and Connecticut<sup>19</sup> to offer dealerships and sales staff incentives for selling ZEVs. In fact, State Representative Thomas Golden has filed a bill, H.3742, that would mandate a \$400 dealer incentive for each electric vehicle sold or leased.

### D. Incentivize electrification of RTAs and state and municipal fleets

State policymakers should exert their influence to accelerate the electrification of the MBTA and other Regional Transit Authorities (RTA). Analysis using Argonne National Laboratory's AFLEET model for the Boston area shows that despite the greater upfront cost of electric buses today compared with diesel and compressed natural gas (CNG), total cost of ownership for electric buses is already lower than for the more polluting alternatives (\$1,200,912 for an electric bus as compared with \$1,406,857 for a new diesel bus, and \$1,338,517 for a CNG bus),<sup>20</sup> driven in large part by dramatically lower maintenance, repair, and fuel costs of electric buses. Moreover, when total lifetime costs are considered, investments in electric buses reduce more air pollution per dollar than investments in new diesel or CNG buses.<sup>21</sup>

The VW settlement provides a significant source of funding to accelerate electrification of RTAs and state and municipal fleets. Eighty-five percent of available VW settlement funds could be directed to electrify state transit systems by incentivizing the purchase of new electric buses or repowering diesel buses to be electric, and subsidizing the supporting charging infrastructure. Several investment models are possible. Settlement funds could be used to establish a revolving, no-interest loan program for local governments with limited resources. Local agencies could pay back loans over time as they realize the full lifecycle cost savings of EV ownership. Massachusetts could also explore incentive programs for this market segment. For example, California's Heavy-duty Vehicle Incentive Program (HVIP), funded by California's cap-and-invest program, provides funding of \$95,000 for electric buses, or \$110,000 for buses operating in low-income neighborhoods. We encourage targeting deployment of electric buses in underserved and environmental justice communities to improve air quality.

## **2. Increase charging infrastructure deployment and lower cost of future installations**

### A. Make it easier for consumers to charge their vehicles at or near their home.

The real-world experience to date of EV drivers has confirmed that the majority of EV charging will take place at home. Potential strategies for providing all Massachusetts residents with convenient charging at or near their home include rebates or tax incentives for the purchase of home charging stations, or more specifically for home charging stations that are efficient or have load management capabilities. A greater challenge will be providing home charging access to residents who do not have their own garage or

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<sup>19</sup> <http://www.courant.com/business/hc-connecticut-rebate-electric-cars-0520-20150519-story.html>.

<sup>20</sup> Argonne National Laboratory's AFLEET Model (2017) (fuel and electricity costs adjusted for Boston, MA).

<sup>21</sup> For nitrogen oxides, a harmful air pollutant and primary precursor of ground-level ozone (smog), electric buses reduce 0.0081 lb NOx/\$; new diesel buses reduce 0.0059 lb NOx/\$; and CNG buses reduce 0.0072 lb NOx/\$.

otherwise have routine access to a dedicated parking spot with convenient electric service, which includes most residents in urban areas. The Commonwealth should identify home charging solutions for such residents, including expanded overnight parking in municipal lots, charging stations at multi-unit dwellings, and on-street charging stations.<sup>22</sup>

- B. Dedicate the allowed 15 percent of funds from VW settlement towards light-duty charging stations

Appendix D of the Partial Settlement Agreement with VW authorizes beneficiary states to spend up to 15 percent of their Environmental Mitigation Trust funds—in Massachusetts’ case, more than \$11 million—on the acquisition, installation, operation and maintenance of new light-duty zero emission vehicle supply equipment and infrastructure.<sup>23</sup> We urge Massachusetts to dedicate the maximum allowable funds to procuring and installing electric vehicle charging infrastructure to accelerate electric vehicle deployment in the Commonwealth.

Expenditure of these funds should be complementary to existing federal, state, and local ZEV initiatives, such as the MOR-EV rebate program, the EVIP program,<sup>24</sup> and the nascent low-income EV pilot program, and should be carefully coordinated with other investments in electric vehicle charging infrastructure.<sup>25</sup> With these investments, the Commonwealth should look to build out a robust, cohesive network of fast chargers along highways and at strategic intra-city locations to enable long-distance travel and convenient charging, particularly for so-called “garage orphans.”

- C. Advance ZEV-ready provisions in the building code

Massachusetts policymakers should mandate ZEV readiness in the base building code. In commercial and industrial settings with parking, this should include pre-wiring a set percentage of workplace and public parking spaces for ZEV charging and chargers themselves. A ZEV-ready mandate for all new construction will reduce the cost of electric vehicle charging station deployment. Inclusion of these sensible measures in the building energy code was explicitly authorized in Ch. 448 of the Acts of 2016.

- D. Continue incentive programs for workplace, municipal, state agency, and higher education charging

The Massachusetts Electric Vehicle Incentive Program (MassEVIP), run by the Massachusetts Department of Energy Resources, has been a successful, multi-faceted program. One portion of MassEVIP has been dedicated to expanding workplace charging, but has now run out of funding for several regions. In addition, MassEVIP: Fleets, a program aimed at helping cities and towns, state agencies, and state colleges and universities purchase EVs and install charging stations, has been fully subscribed and has no additional funding. These programs should be funded, potentially through the VW settlement or other available sources of funding.

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<sup>22</sup> [http://wxystudio.com/uploads/1700017/1441308185862/GarageOrphanReport\\_v2.1\\_08182015.pdf](http://wxystudio.com/uploads/1700017/1441308185862/GarageOrphanReport_v2.1_08182015.pdf)

<sup>23</sup> See First Partial Consent Decree, App. D-2, ¶ 9.

<sup>24</sup> <https://www.mass.gov/how-to/massevip-fleets>

<sup>25</sup> These investments include Electrify America’s planned expenditure of Appendix C funds for charging infrastructure in the Boston area, Eversource’s recently approved plan to spend \$45 million on a make-ready charging infrastructure program in its service territory, and, if it is approved by the Department of Public Utilities, National Grid’s plan to spend approximately \$25 million on a charging infrastructure program in its service territory.

### 3. Utility framework to increase adoption and maximize benefits

Utilities and third parties have important roles to play in promoting the adoption of ZEVs and the development of charging infrastructure. Utility activities will affect the economics of ZEV ownership and the availability of charging infrastructure in a myriad of ways, including distribution system planning, rate design, charging station build-out and data access. In addition, given their regular communication with households and businesses, electric utilities may be well positioned to engage in certain customer outreach and education about the benefits of electricity as a transportation fuel, EV-related rate offerings, and existing state programs and state and federal incentives for EV ownership.

- A. Improve rate design, including time-of-use rates and demand charge reform, and support managed charging and demand response

Electricity rate design has a substantial influence on the behavioral decisions that shape EV adoption, and the importance of good rate design cannot be overstated. Properly designed rates send price signals to customers motivating them to charge their vehicles when there is less stress on the system during off-peak periods, and well-designed rates can avoid circuit overloads and unnecessary investment while also improving the utilization of existing assets.

Electric utilities should move swiftly to implement EV-friendly time-varying rates (TVR), both for ZEV customers and parcels/buildings hosting charging infrastructure. Well-designed time-of-use (TOU) rates should be pursued in the near term, moving eventually towards more granular TVR with increasingly dynamic pricing elements as needed to optimize vehicle charging integration with the grid and renewable power. Instituting TOU rates for EV charging will encourage customers to charge their vehicles during off-peak hours, when electricity costs are often significantly cheaper than at other points in the day. Allowing customers to access low cost electricity is a smart way to reduce the total cost of ownership of electric vehicles and to enhance their relative attractiveness to conventional internal combustion engines in an economically efficient manner. Conversely, demand charges, which charge customers on a kilowatt (kW) basis, are one particularly challenging rate design for EVs, especially in higher speed charging applications. We urge that any EV charging tariff implemented by utilities not include a demand charge, and regulators should undertake reform of existing demand charge structures that serve as a barrier to EV adoption.

- B. Improved distribution system planning to account for increased load and optimal locations for charging

Since electric utilities have a central role in carefully planning for any major changes in the grid, Massachusetts policymakers and third-party EVSE providers should work closely with electric utilities on charging station deployment to maximize the benefits that EVs provide to the grid. This coordination should aim to ensure successful integration of the additional loads from EV charging and optimization of existing and new infrastructure, including through identifying preferred sites for EVSE. As a facilitator, the utility will treat EV charging like other potential load, providing nondiscriminatory electric service when and where requested. And, in a grid management role, the utility will need to manage the charging operation to better integrate charging with grid capabilities and grid needs, and ensure realization of the broad public and ratepayer benefits associated with transportation electrification.

As transportation electrification increases, utilities will have to adapt their traditional distribution system planning roles to target the facilitation of “smart charging” for EVs to ensure efficient use of grid resources, including demand response, one-way controlled charging, and eventually vehicle-to-grid (V2G) operations. Early smart charging support will entail studying and managing the engineering effects that ZEVs will have on utility systems, including the different requirements and capabilities posed by each type of charging station. Left uncontrolled, EV charging risks producing longer and higher demand peaks that could create the need for upgrades to distribution infrastructure, raise electricity supply and delivery costs, and cause unnecessary emissions.

#### C. Addressing barriers to EV charging infrastructure development

As the Department of Public Utilities (D.P.U. Order 13-182-A) and the Massachusetts General Court have recognized, there can be a limited but constructive role for utilities to play in accelerating deployment of EV charging infrastructure that is supportive of the competitive charging market. The DPU recently approved a proposal by Eversource that will reduce the cost to site hosts of installing EV chargers in locations designed to foster EV ownership, and National Grid has proposed a similar EV charging infrastructure program. We hope that this utility participation will help to eliminate the underlying market barriers and facilitate the development of an expanded competitive market for charging infrastructure, while simultaneously ensuring service provision in areas across the Commonwealth that are underserved by the nascent market, including underserved communities and neighborhoods and low-income and multi-unit dwellings. In such instances, utilities may play a reasonable role to address the elevated barriers to private market intervention and provide access where it is urgently needed.

### 4. Public education and outreach

Educating customers is necessary to complement other policies and programs to promote ZEV adoption and address behavioral issues like “range anxiety.” One recent report found that a remarkable 60 percent of survey respondents do not even consider electric vehicles when purchasing a vehicle.<sup>26</sup>

#### A. Continue MASS DRIVE CLEAN outreach program

MASS DRIVE CLEAN is an innovative education and outreach program that hosts electric vehicle test drive events across the Commonwealth, helping familiarize Massachusetts residents with EVs as viable options. Continuation of this program, and ideally increases in the number of events across the Commonwealth, will be a key part of expanding ZEV purchases in coming years.

#### B. Education and outreach for utility programs

Significant consumer education around rate design for EV charging, EV demand response, and other future utility programs will also be critical for customer adoption. In order for consumers to adjust their behavior to time-varying rates, they first need to understand the benefits of doing so. Customers will also need tools and access to timely and geographically appropriate information that they can use to respond to price signals. In certain instances, utilities may be particularly well positioned to leverage existing channels of customer outreach to implement ZEV-education initiatives.

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<sup>26</sup> <http://www.altvil.com/events/press-release-new-altman-vilandrie-company-survey-lack-of-awareness-high-costs-may-short-out-electric-vehicle-adoption/>, <https://electrek.co/2017/01/03/electric-vehicle-adoption-awareness/>

## **V. Conclusion**

As we strive to meet our GWSA targets, we encourage Massachusetts to take advantage of the many innovations and benefits that will come with a cleaner, more diversified transportation sector. One central component to that transition should be the establishment of a regional cap-and invest program, similar to the successful RGGI model. To make a regional program a reality, Massachusetts must continue to lead the way, both through efforts within the Commonwealth and through coordinated activities with regional partners. Beyond cap-and-invest, as Massachusetts works to implement state-level programs and policies to promote cleaner transportation, it should also work to establish regional programs and policies that will complement and support Massachusetts initiatives. Cleaner transportation will make Massachusetts residents healthier, the economy stronger, and the transportation system more equitable; we should act quickly to realize these goals.

Thank you for providing this opportunity for stakeholder input. Our organizations look forward to further engagement with your agencies through the GWSA IAC and other platforms to achieve these important outcomes.