

Investing in Modern Transportation

Benefits for Massachusetts

January 2019

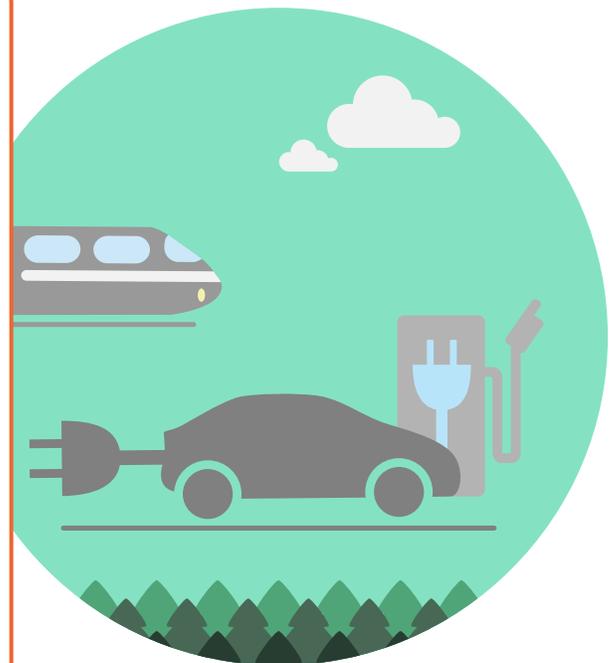
The Need for Transportation Investment

Massachusetts' transportation system is due for an upgrade. The Commonwealth's network of roads, public transit, ports, and walking and biking corridors ranks 42nd in the nation.¹ In terms of average commute time, Massachusetts ranks 47th.² Outdated infrastructure, congested roads, and polluted air are a drag on the economy. Massachusetts' residents and businesses deserve transportation options that will help them thrive, and the Commonwealth can achieve that goal by focusing on the following actions:

Update and Expand Infrastructure: The state's transportation infrastructure and transit options need substantial investment to create a safe, modern, and resilient system.

Reduce Transportation Pollution: Transportation is the largest source of greenhouse gases (GHGs) in the Commonwealth, and locally harmful tailpipe emissions are damaging to public health. Reducing transportation pollution is necessary to meet Massachusetts' climate commitments and to improve local air quality.

Improve Access and Equity: Transportation options must be expanded and improved in communities that remain underserved and overburdened by the current system, delivering cleaner air and more affordable, accessible options where they are needed most.



¹ *Transportation Rankings*, US News and World Report, 2018.

² *Ibid.*



The Cap-and-Invest Model

On December 18, 2018, Governor Baker joined eight other states and Washington, D.C. to announce that together they would create a regional program to cap transportation emissions and use allowance proceeds to invest in “low-carbon and more resilient transportation infrastructure.”³ This announcement followed a recommendation from Massachusetts’ Commission on the Future of Transportation that the Commonwealth should lead the creation of such a program.⁴

As noted in the multi-state announcement and the Commission report, modernizing and decarbonizing the transportation sector will require a suite of complementary policies. Valuing carbon emissions, potentially through a cap-and-invest program, would work in tandem with other policies by generating proceeds for reinvestment in transportation improvements. These improvements would allow the system to better serve the public while creating new jobs and attracting businesses to the state.

Massachusetts has experience with cap-and-invest policy through the Regional Greenhouse Gas Initiative (“RGGI”). Launched in 2009, RGGI puts a price on carbon emissions from power plants, and states use the proceeds to invest in renewable energy and energy efficiency. The region has benefited significantly since the program began:

- CO2 emissions from the region’s power plants have dropped by 51%;⁵
- RGGI has created \$4 billion in economic growth;⁶ and
- RGGI-funded investments have created over 44,000 job-years.⁷

Massachusetts was a founding state of this regional cap-and-invest program, and through December of 2018 the state has received \$512 million in RGGI proceeds for reinvestment in energy efficiency and clean energy projects.⁸ As of 2014, **RGGI expenditures added \$243 million to Massachusetts’ economy, created 2,718 job-years, and RGGI-driven reductions in pollution accounted for as much as \$798 million in avoided health costs.**⁹

A similar regional cap-and-invest program applied to transportation emissions,¹⁰ like the one Massachusetts and other states have announced they will create, could fund transportation improvements, reduce pollution, improve public health, expand transportation access in underserved communities, and stimulate the economy. A cap-and-invest policy for the transportation sector has already been implemented in California and Quebec, where carbon revenues are helping participating jurisdictions electrify transportation to cut emissions¹¹ and deliver new means of mobility in transit deserts.¹²

To better understand the opportunity for Massachusetts to improve transportation and reduce pollution through a cap-and-invest program, Acadia Center analyzed the proceeds that could be generated by applying this type of program to Massachusetts’ transportation sector. To do this, transportation sector emissions were projected through 2030, and a starting carbon price of \$15/ton was considered with a 7% escalation rate.¹³ Investment options for these funds and the economic benefits they could generate were then estimated using economic data from studies of transportation investments in the Northeast and the country.

³ *Transportation & Climate Initiative Statement*, December 18, 2018.

⁴ Commission on the Future of Transportation in the Commonwealth, December 14, 2018: “*Choices for Stewardship: Recommendations to Meet the Transportation Future*”

⁵ Emissions data from RGGI, Inc.

⁶ Analysis Group, “*The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States: Review of RGGI’s Third Three-Year Compliance Period (2015-2017)*”

⁷ Ibid.

⁸ See: <https://www.rggi.org/auctions/auction-results>.

⁹ Analysis Group’s series “*The Economic Impacts of the Regional Greenhouse Gas Initiative on Northeast and Mid-Atlantic States*” and ABT Associates “*Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative*”

¹⁰ Georgetown Climate Center, “*Reducing Transportation Emissions in the Northeast and Mid-Atlantic: Fuel System Considerations*”

¹¹ Quebec Ministry of Transportation, “*Transportation Electrification 2015-2030 & Carbon Market in Québec*”

¹² California Air Resources Board, “*California Climate Investments: Using Cap-and-Trade Auction Proceeds*”

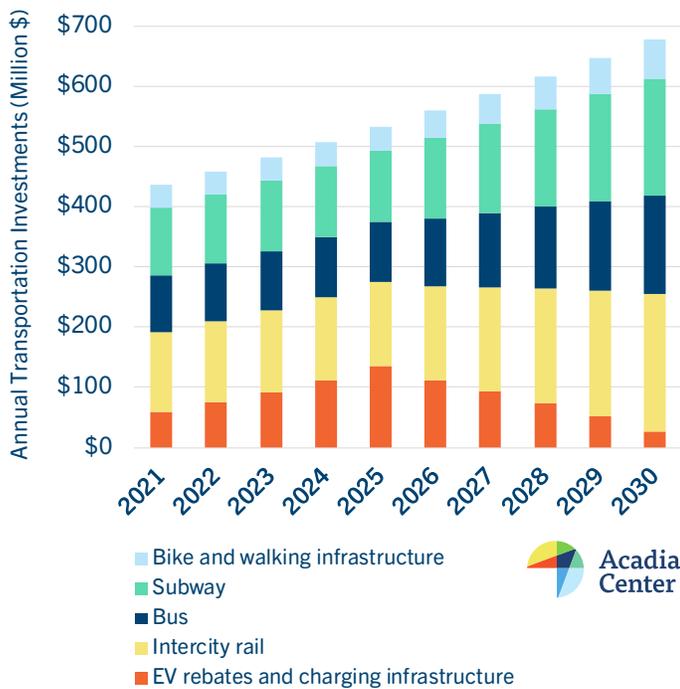
¹³ Emissions through 2030 are based on Acadia Center’s *EnergyVision 2030* business-as-usual scenario, which includes existing EPA/DOT fuel efficiency standards for medium and heavy-duty vehicles, as well as the existing Corporate Average Fuel Economy standards through 2025. Modeling details are available in the *Technical Appendix*. A 4% reduction in transportation emissions by 2030 is applied to this business-as-usual scenario to account for the reductions generated by the cap-and-invest program. This level of reduction is aligned with Georgetown Climate Center’s estimate for market based policies in the *Technical Appendix Emission Reduction Strategy Analysis* from “*Reducing Greenhouse Gas Emissions from Transportation: Opportunities in the Northeast and Mid-Atlantic*.” Georgetown’s analysis also estimates a carbon price for market-based transportation climate policy between \$5-\$30/ton CO2.



Clean Transportation Investment Strategies

By capping emissions and auctioning allowances, **the state could generate about \$5.5 billion in proceeds between 2021 and 2030.**¹⁴ To provide an example of how this revenue could be used, Acadia Center examined a sample portfolio of several measures that improve transportation and reduce GHGs (Figure 1). This portfolio has many benefits. For example, electrifying passenger vehicles and buses will improve air quality and reduce operating costs for vehicle owners and taxpayers. Expanding rail, bus transit, and walking and biking paths will reduce travel in single-occupancy vehicles, relieve congestion, and deliver better mobility options to more people.

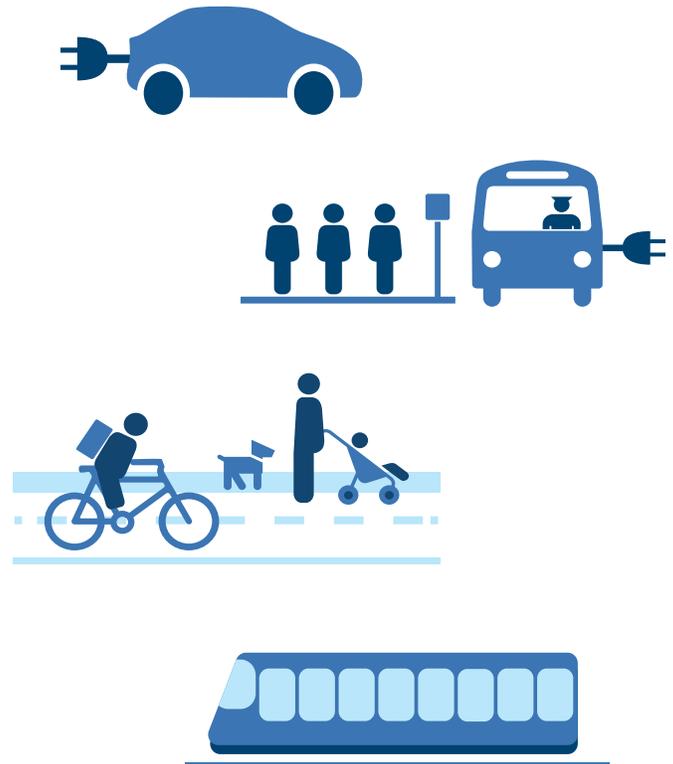
Figure 1: Sample Investment Portfolio for Massachusetts' Proceeds from Transportation Cap-and-Invest Program



This portfolio, however, is only provided as a point of reference, not a policy recommendation or an exhaustive list. Development of an equitable reinvestment strategy must include input from impacted stakeholders and frontline communities, with an emphasis on funding projects that benefit disadvantaged communities.

By 2030, the funding outlined in Figure 1 could help the state invest in:

- About 240,000 EVs and their associated charging infrastructure by 2025 to transform the EV market and help the state meet its commitment under the Multi-State Zero-Emission Vehicle Memorandum of Understanding. By 2030, these incentives will help the state electrify 17% of the passenger vehicle fleet, aligned with Acadia Center’s EnergyVision 2030 recommendation for reducing GHG emissions 45% by 2030;¹⁵
- About 1,200 electric buses and their charging infrastructure to expand service and replace aging and polluting diesel vehicles;¹⁶
- Expansion and enhancement of the MBTA’s Red, Orange, Blue, and Green Lines to better serve more customers;
- Over 1,500 miles of new walking and biking trails and infrastructure throughout the state;¹⁷
- Expansion and enhancement of commuter rail throughout Massachusetts.



¹⁴ Georgetown Climate Center’s 2017 whitepaper “Reducing Transportation Emissions in the Northeast and Mid-Atlantic: Fuel System Considerations” describes implementation options for a cap-and-invest policy.

¹⁵ See <http://2030.acadiacenter.org>. This number of EV rebates considers rebate levels of \$2000 for battery EVs (excluding luxury models), \$1000 for plug-in hybrid EVs, and a \$5000 income-eligible rebate. It also considers a \$2000 incentive for L2 EV chargers and \$20,000 for DC fast chargers. The National Renewable Energy Lab estimates that 338,200 workplace and public L2 and L1 chargers will be needed per million EVs; this analysis considers 80% of these charges will be L2. NREL also estimates the need for 470 DCFCs per million EVs. See: <https://www.nrel.gov/docs/fy17osti/66980.pdf>.

¹⁶ Considering a cost of \$750,000 per bus, \$350,000 per 6-port fast-charger, and \$250,000 per charger installation. See: <http://fortune.com/2017/09/19/electric-cars-buses-proterra/> and https://cafcp.org/sites/default/files/5_CARB-ACT-Cost-Model-Discussions_CaFCP-Bus-Team-Meeting-Aug2016.pdf

¹⁷ Considering a cost of \$280,000 per mile based on: <https://www.ncdot.gov/bikeped/walkbikenc/pictures/EconomyImpact-Analysis.pdf>.



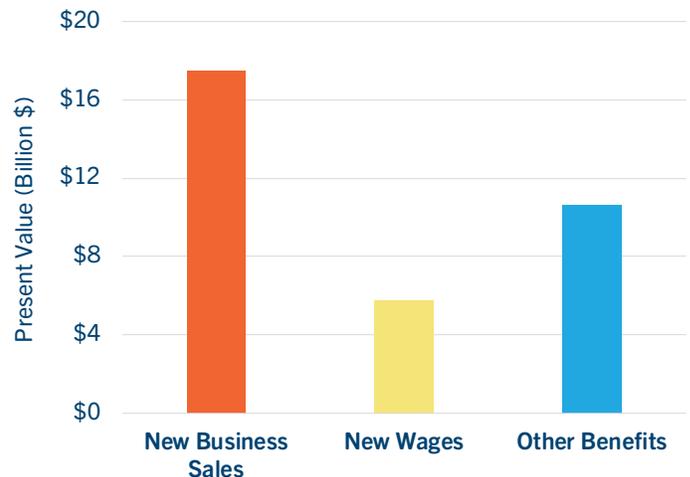
Economic Benefits from Clean Transportation Investment

By examining the benefits of similar transportation expenditures in the Northeast and the U.S.,¹⁸ Acadia Center has estimated some of the economic activity and other monetary benefits the investment portfolio in Figure 1 could generate (Figure 2). These economy-wide benefits are directly and indirectly generated by the transportation improvements described above and include:

- Creation of over 52,000 long-term jobs (i.e., not project-related construction jobs);
- \$5.7 billion of new wages,¹⁹ primarily as a result of newly created jobs;
- \$17.5 billion of new business sales, resulting from project-related spending, spending of new wages in the local economy, and spending of cost-savings generated by reduced transportation expenses;
- Nearly \$10.7 billion in other benefits, including fewer hours spent in traffic and improved health outcomes, as well as about \$134 million in savings from avoided costs of GHG emissions.²⁰

These benefits will vary based on the final investment portfolio developed with stakeholder input; however, this analysis shows the scale of the opportunity for Massachusetts. By reinvesting proceeds thoughtfully, Massachusetts can accelerate progress to a more modern, equitable, and low-carbon transportation system.

Figure 2: Present Value of Economic Activity and Other Benefits Generated by Investing Carbon Proceeds



Note that New Wages is a subset of New Business Sales, so the two categories cannot be added.



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¹⁸ See Economic Analysis Reports for: the New Haven Rail Line Expansion in CT; the MA South Station High Speed Intercity Rail Expansion; the NH Capital Corridor Rail Expansion; the RI South County Commuter Rail Expansion; Bus Rapid Transit in Madison, WI; Rural and Small Urban Transit Systems in ND; Bus Expansion for Greenville Transit Authority in SC; the Cincinnati Modern Streetcar; the Downtown Los Angeles Streetcar, Biking and Pedestrian Trails in NC; and NREL's National Economic Value Assessment of Plug-In Electric Vehicles.

¹⁹ Note that new wages are a subset of new business sales and these two categories cannot be added.

²⁰ See: EPA's [Social Cost of Carbon methodology](#).

Acadia Center is a research and advocacy organization committed to advancing the clean energy future. Acadia Center is at the forefront of efforts to build clean, low carbon economies that benefit all consumers. Its approach is characterized by reliable information, comprehensive advocacy, and problem solving through innovation and collaboration.

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