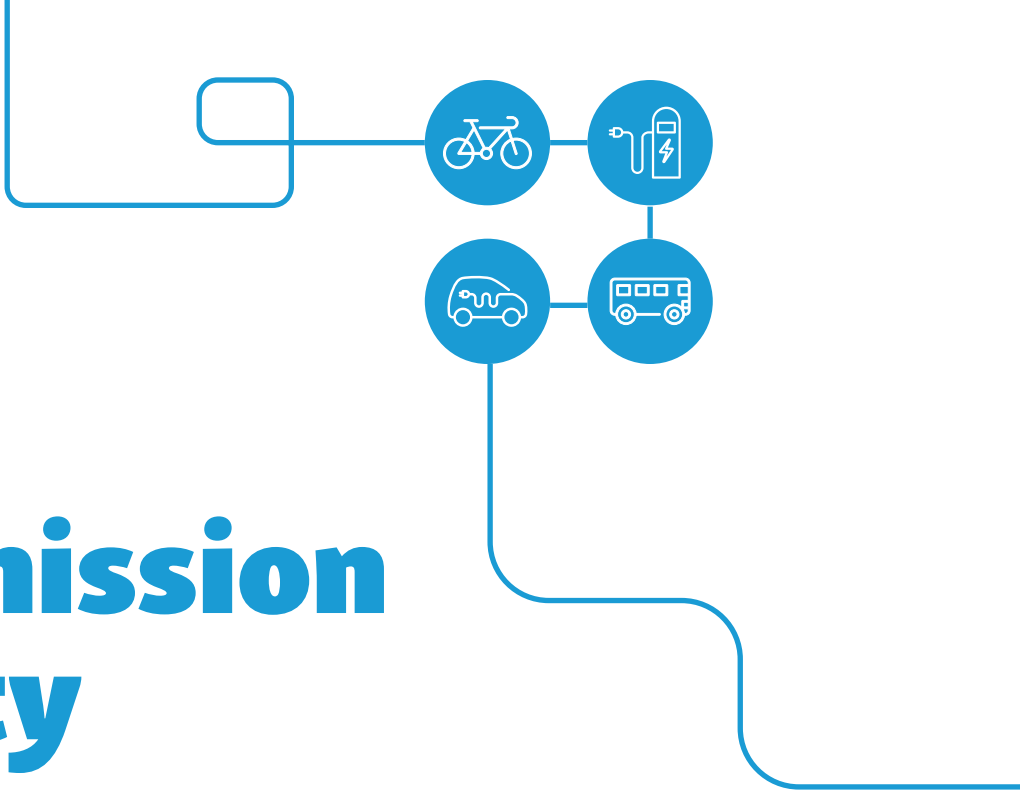




# Zero Emission Mobility

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# MAPC's Municipal Net Zero Playbook

*A strategic guide for municipal action to reduce community-wide greenhouse gas emissions to net zero by 2050*

MAPC's [Municipal Net Zero Playbook](#) ("the Playbook") provides guidance and tools to equip cities and towns with the resources to tackle their climate goals in an efficient and equitable manner. The Playbook is an interdisciplinary tool for municipal planners, energy/sustainability staff, and community members that seeks to empower cities and towns to implement net zero actions within their communities. These resources will help local net zero action implementers understand their role in advancing greenhouse gas (GHG) emissions reductions, adopting local policies, and accelerating state-level policy changes.

Explore all of MAPC's resources on Net Zero Planning: <https://www.mapc.org/net-zero/>



## How to Use the Playbook START HERE

MAPC developed two guiding frameworks to help communities navigate the Net Zero approach as they start on, or ramp up, their Net Zero journeys. Cities and towns can use these frameworks to inform community engagement, plan development, and strategy prioritization as they seek to customize their local Net Zero Action Plans.

### Framework for Action

Learn how to navigate the Net Zero planning process and evaluate priority actions for a local net zero plan.

### Framework for Equity

Learn how to develop Net Zero Plans that assess and acknowledge existing inequities and work to uplift and provide direct benefits to underserved communities.



## Zero Emissions Mobility

Tackle GHG emissions reductions from how people get around a community.



## Net Zero Buildings

Make buildings highly efficient and optimize clean energy for electricity, heating, and cooling.



## Clean Energy Supply

Transition to 100 percent renewable sources of energy across a community.



## Climate-Smart Zoning and Permitting

Take a strategic approach to local zoning and permitting updates.



## WHAT'S NEXT?

As our work with communities expands, we plan to continue to add and update chapters to the Playbook that touch on emerging best practices.

## CHOOSE YOUR OWN ADVENTURE

Drawing on our years of experience working with cities and towns on clean energy and climate, MAPC has compiled information on the best practices and actions municipalities can implement in their plans to advance toward Net Zero. You can start with the Chapter you are most interesting in tackling, or review each in depth.

The Playbook provides a starting point for each priority action, with links to resources, at MAPC and beyond, that offer more detailed guidance on implementation.



*In order to guide our communities to net zero emissions by 2050, we need to transition the ways that we get around our communities to connect with our jobs, friends, family, and fun.*



**For the state of Massachusetts and many of its cities and towns, greenhouse gas emissions from transportation make up over a third (over 40% for the state in 2017) of total emissions.<sup>1</sup>** Reducing these transportation related greenhouse gas emissions will require us to transition to zero emission mobility options like walking, biking, electrified public transportation, or electrified passenger vehicles. Supporting residents in making the climate-smart choice for how they get around means making these options easier, more affordable, and more convenient than the current status quo for mobility across the region.

The following strategies on **Zero Emission Mobility** provide your community with recommended actions that draw on best practices and innovations from across the Commonwealth of Massachusetts and the country to:



## Support walking, biking, and public transportation options



## Advance zero emission vehicle infrastructure



## Encourage use of zero emission vehicles







## Lead by example in the municipal fleet




The Playbook provides a selection of priority actions to advance each of these strategies in your community. Each action's urgency factor of 2025, 2030, or 2050 provides a recommended year by which to fully implement the action. For each action, the Playbook outlines the **action type, urgency, timeframe to implement, local and national examples, scale of impact, type of expense, lead implementer and key partners, and performance indicators**. Where available, we have also identified funding opportunities and tools to measure action impacts.

# Playbook Indicators

## Timeframe to Implement

-  Short-term (Less than one year)
-  Intermediate (1 to 5 years)
-  Long-term (5 years or more)
-  Ongoing

## Type of Expense

-  Staff
-  Capital
-  Operations

## Benefits and Impacts

The listed benefits and impacts are in addition to reductions in greenhouse gas emissions.

-  Equity
-  Economic
-  Health
-  Environmental
-  Energy
-  Calculating Tool

# Playbook Terms

**Type** Actions are sorted into the categories of advocacy, financing, plan, policy, program, or outreach.

**Urgency** Each action is assigned an urgency factor of 2025, 2030, or 2050, providing a recommended year by which to fully implement the action.

**Feasibility** A sampling of local, national, or international examples is provided to illustrate on-the-ground implementation. Some actions we have assessed to be impactful have not yet been demonstrated in other communities - these actions are identified as leadership opportunities.

**Lead Implementer** Each action includes a suggested municipal staff person or department responsible for leading the execution of the action and any decision-making involved. This will differ from community to community.

**Key Partner(s)** We identified partners within the municipality and the broader community who will be critical to successful implementation of the action.

**Scale of Impact** Actions have been identified as either an enabling action, hard to measure and high impact, or measurable and high impact. A high impact action is based on whether or not there is a direct connection with emissions reductions within a priority sector. Enabling actions may not have a direct connection to emissions reductions, but they are essential to put in place early on to support greater emissions reductions over time.

**Performance Indicators** Each action includes suggested metrics to track success and impact during implementation of the action.





**Strategy:**  
**Support walking,  
biking, and public  
transportation options.**

**Action A**

pg 8

**Action B**

pg 11

**Action C**

pg 14

**Action D**

pg 17



## Action A:

**Advocate for community and regional transit needs. Prioritize bus improvement and electrification of the regional transit system.**



Type  
Advocacy

Timeframe to Implement  
Ongoing



Urgency

**By 2050**



Scale of Impact  
Enabling action



Type of Expense  
Staff time

### Performance Indicators

- Number of written comments and in-person attendance at related meetings
- Incorporation of municipality-specific improvements in the regional transit service provided
- Increased transit ridership

### Feasibility

Local examples – **Cambridge and Watertown, MA<sup>1</sup>** successfully advocated for a priority bus project. Local implementation would benefit from coordination with neighboring municipalities on mutual transit needs.

### Lead Implementer

Transportation Department

### Key Partners

Municipal Chief Executive Officer, Select Board or City Council, Planning Department, regional transit authorities, community advocacy groups

### Benefits and Impacts

**Environmental** - Reduced number of single occupancy vehicle trips  
**Equity** - Increased service for more commuters in the municipality



### Calculating Tool

Map My Emissions Tool allows you to compare GHG emissions associated with different modes of transportation. <https://mapmyemissions.com/home>





## Advocate for community and regional transit needs.

- Identify priority areas to increase access to community transit service and ridership. Communities can assess routes with high ridership and high delays using the MBTA's [Back on Track Performance Dashboard](#)<sup>2</sup>.
- Advocate for local bus and railway service priorities and fleet electrification during upcoming planning processes with your regional transit authority (RTA) and MassDOT.
- Reallocate roadway space to prioritize bus traffic. Partner with RTAs, MAPC, and other stakeholders. Both advocacy and local improvements should advance elements of bus rapid transit (BRT). Study parking use on high ridership corridors and consider removing parking to create a dedicated bus lane.

BRT can include changes like signal priority for buses, allowing buses to jump the traffic queue, and dedicated bus lanes. BRT offers more pleasant rides with reduced commute times, which can increase bus ridership and access and decrease personal vehicle trips.



## Equity Considerations

Access to efficient and reliable public transportation in the region is systemically worse for people of color as a result of spatial segregation and a history of unjust transportation planning policies. As municipalities seek to improve community access to transit service through their net zero plans, the voices and needs of people of color must be central throughout the engagement, planning, and decision-making processes to acknowledge past and current injustices and build greater access to opportunity.

Additionally, investments that improve access to public transit can impact housing affordability within the surrounding area. Consider implementation in tandem with strategies for equitable transit-oriented development (eTOD) as described in the Playbook's **Climate-Smart Zoning and Permitting Chapter**.



### Immediate Next Step

Coordinate with community partners to identify the priority list of service improvements that will increase frequency and reliability of service to underserved areas and provide access in transit service deserts (areas with no access to buses or subways).

**Explore MAPC's BRT projects with Arlington, Boston, Everett, and Somerville:** <https://www.mapc.org/transportation/>



## Action B:

**Develop a bike and pedestrian plan. Incorporate and implement measures to support and appropriately regulate deployment of micromobility and electrified options in the plan.**

Type  
Plan



Timeframe to Implement  
Long-term (5 years or more)



Urgency  
**By 2025**



Scale of Impact  
Enabling action

### Performance Indicators

- Number of improvement projects completed
- Local mode share of biking and walking (tracked for different demographics)
- Number of bike and pedestrian injuries and fatalities annually (normalized by number of trips)

### Feasibility

Local examples –  
[Cambridge, MA, Bicycle Plan](#)<sup>3</sup>;  
[MAPC's Trailmap](#)<sup>4</sup>

### Lead Implementer

Planning Department



Type of Expense  
Staff time

### Key Partners

Transportation Department



### Benefits and Impacts

**Environmental** - Reduced air pollution from vehicle trips displaced by bike/walk trips

**Health** - Cardiovascular benefits from active modes of transportation



**Calculating Tool** - Omnicalculator  
Car vs. Bike Calculator <https://www.omnicalculator.com/ecology/car-vs-bike>



## Develop a bike and pedestrian plan.

Developing a bicycle and pedestrian plan can help identify gaps in the transportation network and inform how best to prioritize near- and longer-term projects.

- Analyze mode share patterns and evaluate bicycle and pedestrian infrastructure needs to include in the plan.
- Make recommendations on best practices to improve bicycle and pedestrian safety and connectivity on major regional corridors and local routes with high access to important destinations (workplaces, retail, recreation, public services, etc.).

Plans can be done on a local level, among several communities that have strong bicycle and pedestrian connections, and even at the state level. You can learn more about statewide planning efforts in the [Massachusetts Pedestrian Transportation Plan<sup>5</sup>](#) and the [Massachusetts Bicycle Transportation Plan<sup>6</sup>](#).





## Equity Considerations

The geographic distribution of investments in bicycle and pedestrian infrastructure is tied to equitable access to zero emission modes of transportation as a safe and convenient mobility option. Communities should support the development of a bicycle and pedestrian plan with a robust community engagement component that meets vulnerable populations (e.g., people of color, limited English-language speaking households, low-income households, older adults, and children) within the community where they are and provides these vulnerable groups with a role in the decision-making process to guide investment in infrastructure.



### Immediate Next Step

Start to identify priority routes with high potential utility for cyclists and pedestrians using MAPC's [Local Access tool](#).<sup>2</sup>

**Explore MAPC's bicycle and pedestrian planning work:** <https://www.mapc.org/resource-library/pedestrian-and-bicycle-planning-network/>



## Action C

**Adopt a Complete Streets policy. Commit to implementing projects to improve safety and convenience for residents who choose to bike, walk, or take public transportation, prioritizing children, older adults, and people with disabilities.**



Type  
Policy

Timeframe to Implement  
Intermediate (1 to 5 years)



Urgency  
**By 2025**

### Feasibility

Local examples – [Complete Streets Program in Maynard, MA](#); [Metro Boston Blue Bikes Service](#)

### Lead Implementer

Select Board or City Council

### Key Partners

Department of Public Works,  
Planning Department,  
Transportation Department

### Performance Indicators

- Local mode share of biking and walking (tracked for different demographics)
- Number of bike and pedestrian injuries and fatalities annually



Scale of Impact  
Hard to measure/  
high impact



Type of Expense  
Staff time



### Benefits and Impacts

**Health** – Cardiovascular benefits from active modes of transportation

**Environmental** – Reduced air pollution from vehicle trips displaced by bike/walk trips





## Adopt a Complete Streets policy.

Robust pedestrian, bicycle, and green infrastructure throughout a community's street network is critical to making carbon-free choices the most appealing and feasible option for residents.

- Commit to comprehensive safety and accessibility improvements for users of all ages and abilities within a Complete Streets policy and prioritization plan.
- Invest in bike share programs. Bike share expands access to cycling by providing bicycles to rent for short trips. Bike share can serve commuters as a first mile, last mile connection to transit, residents running errands, and tourists exploring the community.
- Expand landline trails and greenways. See MAPC's [Landline Trail and Greenway Plan](#)<sup>10</sup>.
- Plan for future investments to support micromobility options, such as electric bikes and scooters.



### Equity Considerations

Achieving net zero means making zero emission modes of transportation a safe and convenient option for all. Municipalities should provide equitable access to these modes through thoughtful and informed geographic distribution of investments in bicycle and pedestrian infrastructure. The pricing and type of equipment that is made available through bike share or other micromobility options may also limit the share of the population that feels safe and confident using these zero emission ways of getting around. The type of incentives and supporting equipment (helmets, bikes with electric assist, seated-scooters) should be guided by input from priority populations to improve accessibility.

## Funding Opportunity: MassDOT's Complete Streets Funding Program

Complete Streets allow for safe and accessible travel by all modes for users of all ages and abilities. In 2014, the MassDOT Complete Streets Funding Program was created, which allows for communities to access funds to support Complete Streets projects. The MassDOT program involves three tiers of participation. First, communities must attend a training on Complete Streets and adopt a local Complete Streets policy. Next, municipalities must develop a prioritization plan, which identifies and ranks potential Complete Streets projects. Finally, cities and towns can apply for up to \$400,000 in funding to support projects identified in the prioritization plan. Eligible projects include those that improve traffic and safety and bicycle, transit, and pedestrian facilities. A Complete Street Plan can enable streetscapes that reprioritize the road to include protected bike lines, widened and improved sidewalks with curb extensions, and ADA complaint curb ramps. As of June 2020, the Complete Streets program had provided funds for 148 construction projects in the Commonwealth.

For more information about the benefits of Complete Streets and to view some examples, [Smart Growth America's National Complete Streets Coalition](#)<sup>11</sup> has several resources. Additionally, [MassDOT's Complete Streets Funding Guidance](#)<sup>12</sup> document has more information about each program tier and what kind of projects may be eligible for funding.



### Immediate Next Step

Develop a local Complete Streets policy and prioritization plan for investments that aligns with your community's net zero goals. If your community has an existing Complete Streets policy and prioritization plan, consider revisions that directly connect to your net zero goals and address micromobility options that may not have previously been incorporated.

**Explore MAPC's work with communities on Complete Streets:** <https://www.mapc.org/transportation/>



**P**  
*Type*  
Policy

*Timeframe to Implement*  
Intermediate (1 to 5 years)



*Urgency*

**By 2025**

*Feasibility*

Local and national examples – [2019 Climate Action Plan Update in Boston, MA<sup>13</sup>](#); [Smart Pricing Pilot in San Francisco, CA<sup>14</sup>](#); [MAPC’s Perfect Fit Parking Study<sup>15</sup>](#)

*Lead Implementer*  
Planning Board



*Key Partners*  
Planning Department,  
Transportation Department

**Action D:**

**Adopt climate-smart parking policies. Seek to maximize efficient use of spaces and reduce use of single occupancy vehicles.**

*Performance Indicators*

- Fewer parking spaces put in and garages built
- Parking spaces eliminated/converted to other uses
- Percentage of trips taken by residents in single occupancy vehicles

*Scale of Impact*  
Hard to measure/  
high impact



*Type of Expense*  
Staff time



**Benefits and Impacts**

**Environmental** – Reduced vehicle travel can improve local air quality

## Adopt climate-smart parking policies.

There are a wide range of data-driven strategies that municipalities can employ to encourage more efficient allocation of parking resources.

- Conduct a parking study to better understand how parking is currently utilized and inform how parking policies can best meet demand. These studies often reduce the perceived need for more parking.
- Modify or eliminate off-street residential parking requirements for new construction and establish parking maximums within half a mile of transit stops.
- Consider complementary policies such as shared-parking, landscape reserves, variable pricing for downtown parking, and incentives for car sharing and electric vehicle charging stations.

Parking plays an integral role in influencing vehicle congestion, determining travel behavior, and shaping land use patterns. Not only is parking very expensive to construct, but in many circumstances, more parking actually contributes to increased vehicular congestion.



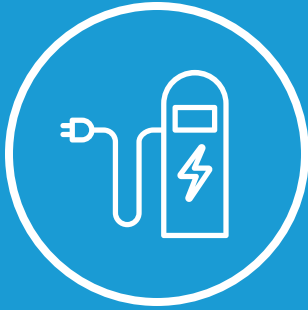
## Equity Considerations

More parking means more driving taking place, which leads to greater traffic congestion, air pollution, and greenhouse gas emissions. When considering residential parking requirements, remember that the more resources dedicated to building out unnecessary parking will, in turn, mean fewer resources likely available for other amenities. This can be particularly problematic when it comes to affordable housing where scarce financial resources are going toward parking rather than the build out of much-needed housing units.

### Immediate Next Step

Determine whether there is a certain location (e.g., downtown) or a specific kind of parking (e.g., off-street residential) that presents a parking challenge for your community in order to determine the most suitable data collection strategy for a local parking study.

**Explore MAPC's Sustainable Transportation Parking Toolkit:** <https://www.mapc.org/resource-library/sustainable-transportation-parking-toolkit/>



# Strategy:

## Advance zero emission vehicle infrastructure.

**Action E**

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**Action F**

pg 23

**Action G**

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## Action E:

Expand public charging stations. Consider siting at libraries, multi-service centers, garages, parking lots, fire/police stations, and other publicly accessible facilities.



Type  
Program

Timeframe to Implement  
Intermediate (1 to 5 years)

Urgency

**By 2025**



Scale of Impact  
Hard to measure/  
high impact



Type of Expense  
Capital and operations



### Benefits and Impacts

**Environmental** - Reduced air pollution because electric vehicles have zero tailpipe emissions

**Economic** - Greater price stability of electricity in comparison to imported gasoline, lower total cost of vehicle ownership for drivers as EVs require less maintenance over time

### Performance Indicators

- Number of installed public EV charging stations and rate of utilization at each station
- Number of EVs registered in community



### Feasibility

Local examples – **Newton and Brookline, MA, installation of Greenspot e-mobility Hubs<sup>16</sup>**; **Medway, MA**, purchased charging stations through MAPC's Green Mobility Group Purchasing Program<sup>17</sup>



Explore a federal map of existing charging stations: <https://afdc.energy.gov/stations/#/find/nearest>

### Lead Implementer

Department of Public Works

### Key Partners

Facilities Department, electric utility, EV charging station vendors



## Expand public charging stations.

A shift to electric vehicle (EV) technology is slated to play a significant role in reducing GHG emissions in the transportation sector. Currently, EVs are the most widely available zero emission vehicle option on the market.

- Invest in public EV charging stations in high traffic areas that support longer parking durations (e.g., libraries, schools, downtown garages and lots), so that residents, workers, and visitors are able to charge their vehicles away from home.
- Save time, and money, by purchasing off of the [statewide contract](#)<sup>18</sup> for advanced vehicle technologies, which offers public entities a simple option to purchase turnkey EV charging services. In 2016, MAPC partnered with the Massachusetts Operational Services Division and the Massachusetts Department of Energy Resources to develop this statewide contract.
- Adopt sustainable pricing and parking policies to support management of public charging stations as utilization increases. Municipalities can use smart charging management software settings to defray excess costs, such as electricity use by vehicles that remain plugged in after reaching a full charge.



### Equity Considerations

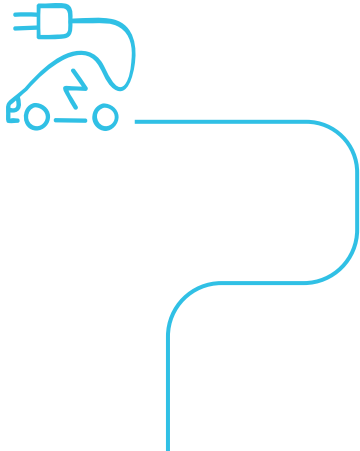
Many of the early adopters of electric vehicles in Massachusetts have been predominantly male, affluent, and highly-educated.<sup>19</sup> There are two primary considerations that should guide municipal investments in public charging stations: strategic geographic placement of charging stations and programs to reduce economic barriers to EV adoption. The deployment of charging stations needs to be paired with promotion of available incentives, creation of additional funding support, and potentially, car sharing models, as is recommended in [Action H](#).



## Immediate Next Step

Select sites for your next phase of EV charging stations and appropriate station types for the site use cases.

**Learn more about what to consider when installing an EV charging station by downloading MAPC's [Roadmap to Install EV Charging Stations](#).**<sup>20</sup>



## Funding Opportunities: Incentives and Grants for EV Charging Stations



In Massachusetts, there are several available funding sources to support the installation of publicly accessible charging stations in your community. Both of the largest investor-owned utilities, [National Grid](#)<sup>21</sup> and [Eversource](#)<sup>22</sup>, offer incentives through their Make-Ready Programs. Make-Ready programs cover the installation costs associated with charging stations up to the point of connection with the station itself. In Environmental Justice communities, both utilities will cover 100 percent of the costs associated with the charging station itself.

Additionally, there are state sources of grant funding that public and private entities can utilize to support expansion of charging stations in their communities. The Massachusetts Department of Environmental Protection (MassDEP) provides incentives for charging stations through the [Massachusetts Electric Vehicle Incentive Program \(MassEVIP\)](#)<sup>23</sup>. This program includes funding for Public Fleets, Workplace Charging, and Public Access Charging. There may be additional grant opportunities made available to public and private entities through the [Volkswagen Settlement Environmental Mitigation Trust Fund](#)<sup>24</sup> that is managed by MassDEP.





## Action F:

**Adopt EV charging site guidance. Specify requirements for stations, signage, and wayfinding for both on- and off-street parking, alongside regulations and enforcement policies for EV parking spaces.**



Type  
Policy

Urgency

**By 2025**

Timeframe to Implement

Short-term

(Less than one year)

Feasibility

Local and national examples –  
**Guidance for Installing EV Charging**  
**- Boston, MA<sup>25</sup>; Siting and Design**  
**Guidelines - NYSERDA<sup>26</sup>**

Lead Implementer

Department of Public Works

Key Partners

Planning Board, Planning  
Department, Transportation  
Department

Performance Indicators

- Number of parking violations issued
- Number of wayfinding signs deployed
- Rate of utilization at public charging stations

Scale of Impact  
Enabling action

Type of Expense  
Staff time

**Benefits and Impacts**

**Environmental** – Reduced air pollution because electric vehicles have zero tailpipe emissions

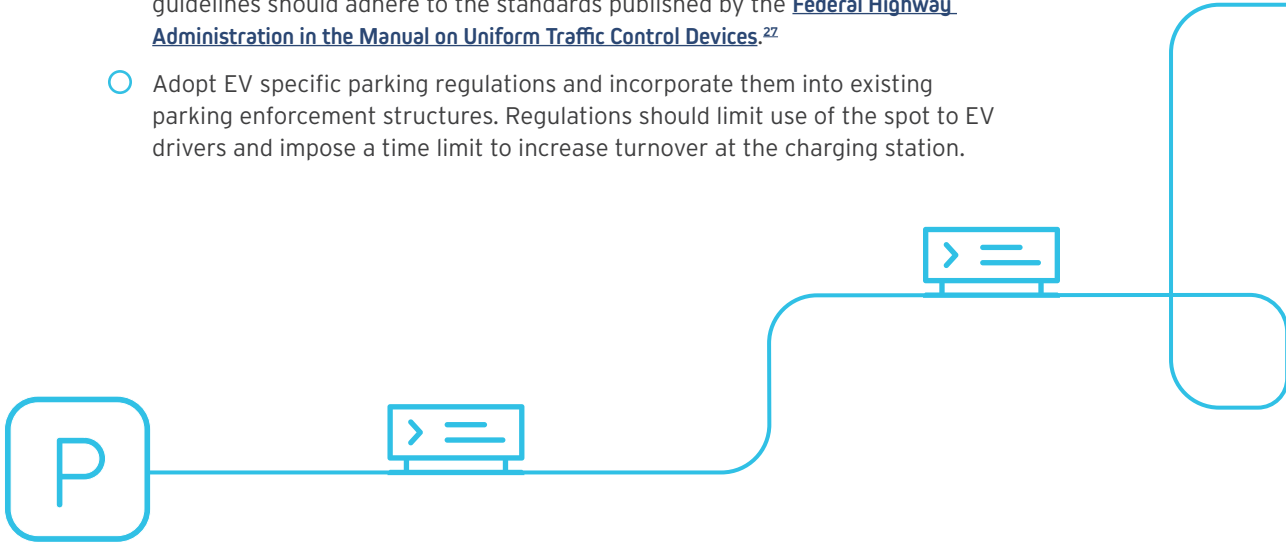
**Economic** – Greater price stability of electricity in comparison to imported gasoline, lower total cost of vehicle ownership for drivers as EVs require less maintenance over time



## Adopt EV charging site guidance.

Consistent wayfinding and visible signage support existing EV drivers in locating charging stations and send a signal to other drivers that an EV may be a viable alternative by reducing range anxiety.

- Adopt design requirements with consistent guidance on parking space stencils and signage design for wayfinding and parking space use restrictions. Sign guidelines should adhere to the standards published by the [Federal Highway Administration in the Manual on Uniform Traffic Control Devices](#).<sup>27</sup>
- Adopt EV specific parking regulations and incorporate them into existing parking enforcement structures. Regulations should limit use of the spot to EV drivers and impose a time limit to increase turnover at the charging station.





## Equity Considerations

Many of the early adopters of electric vehicles in Massachusetts have been predominantly male, affluent, and highly-educated. For these reasons, policies that directly benefit or prioritize EV drivers over other drivers may be perceived as benefitting only those segments of the community with access to electric vehicles. This is why parking policies to support and advance EVs should be paired with initiatives to reduce barriers to accessing EVs for low-income households (see actions supporting the [Encourage use of zero emission vehicles](#) strategy starting on page 27). Additionally, plans for and requirements around EV charging station installation should include provisions for ADA compliant spaces with access to charging stations.



### Immediate Next Step

Assess existing signage and parking policies in place at the locations where charging stations are planned to be installed. Agree upon goals and outcomes for signage and regulations at public charging station parking spaces. The [Installation Guide for Electric Vehicle Supply Equipment](#)<sup>28</sup> published by the Massachusetts Department of Energy Resources is a good starting point.





Type  
Advocacy

### Action G:

**Advocate for utility rate design changes. Support time of use rates for EV charging and demand response incentives for vehicle to grid integration.**



Timeframe to Implement  
Ongoing



Urgency

**By 2030**



Scale of Impact  
Enabling action



Type of Expense  
Staff time



#### Performance Indicators

- Number of written and oral testimonies submitted
- Positive regulatory changes for EV charging stations

#### Feasibility

National examples – [Best Practices in Electric Vehicle Rate Design study by Synapse in NY and PA](#)<sup>23</sup>

*This action would benefit from coordination with neighboring communities and regional and state entities to amplify the message.*

#### Lead Implementer

Municipal Chief Executive Officer

#### Key Partners

Select Board or City Council, Planning Department, Sustainability Department and/or Committee

#### Benefits and Impacts

**Economic** – Reduced cost impact of EV charging  
**Energy** – Grid resiliency benefits tied to electric vehicles being used as storage





## Advocate for utility rate design changes.

- Advocate during electric utility rate cases for time-of-use pricing for residential and commercial customers with EV charging stations installed. This includes changes to customer demand charges to appropriately account for the demand of DC fast charging stations and level II stations with low rates of utilization.
- Incorporate municipal procurement requirements for electric vehicles and charging infrastructure that support two-way communication between the vehicle and the electric grid (also known as Vehicle to Grid or V2G).

Electric utilities need to have rate design in place for both residential and commercial customers that supports the unique use cases and benefits of EV charging stations. Effective regulation can incentivize charging at the most efficient times of day (i.e., time varying rates) and enable utility deployment of the energy stored in EV batteries, particularly for large vehicle fleets like school bus fleets, during times of high demand for electricity to stabilize the electric grid. Shifting use away from peak hours provides additional mitigation benefits by reducing reliance on dirty power plants.





## Equity Considerations

Changes to utility rate structures have the potential to adversely impact low-income customers. In Massachusetts, low-income households (at or below 60% Area Median Income) experience an average energy cost burden three times higher than the statewide average energy cost burden.<sup>30</sup> Municipalities should advocate for changes to utility rates that do not negatively impact or exclude low-income customers and that expand and improve the incentives for low-income customers provided through utility EV programs.



### Immediate Next Step

Work together with other municipalities and advocates to identify opportunities to encourage reforms to utility rate design that support and advance EVs through the Department of Public Utilities.

**Explore MAPC's work with communities on EV and charging station procurement:** <https://www.mapc.org/our-work/expertise/clean-energy/clean-vehicle-projects/>





# Strategy: Encourage use of zero emission vehicles.

## **Action H**

pg 30

## **Action I**

pg 33

## **Action J**

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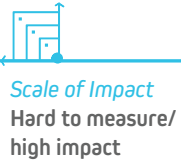




**Action H:**  
**Implement an EV car sharing program. Consider developing an income-tiered program in partnership with community organizations and affordable housing developments.**



Urgency  
**By 2030**



- Performance Indicators
- Number of participants in the EV carshare program or users of the shuttle service
  - Miles driven electric through the EV carshare or shuttle service

Feasibility  
 Local and national examples – [BlueLA](#)<sup>31</sup> low-income car sharing; [NewMo](#)<sup>32</sup> on-demand shuttle serving elderly/low-income residents; [Good2Go Worcester EV Carsharing](#)<sup>33</sup> (launching)

Lead Implementer  
 Planning Department

Key Partners  
 Transportation Department, Housing Authority, developer, car share provider

Type of Expense  
 Capital, operations, and staff time

**Benefits and Impacts**

**Environmental** – Reduced air pollution because electric vehicles have zero tailpipe emissions

**Economic** – Reduced or eliminated financial burden of vehicle ownership and increased access to employment and educational opportunities

**Health** – Reduced exposure to tailpipe exhaust and pollution

**Equity** – Increased access to clean, low-cost transportation options for seniors & low-income residents



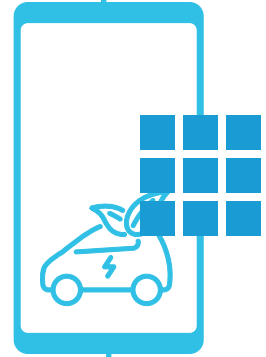




## Implement an EV car sharing program.

Car ownership is not, and should not have to be, the only way for residents to electrify their mobility needs. The implementation of an EV car sharing or shuttle service is one approach to providing mobility services that aligns with, and works toward, achieving net zero.

- Engage with community organizations, as potential site hosts, and residents, as potential users, in the design of your local EV car sharing program or shuttle service. It is important to know who the users will be and what their transportation needs are in order to provide a well-utilized service.
- Identify the upfront funding needs to support capital and operational costs of the EV car sharing program or shuttle service. For an EV car share program, determine the appropriate program scale (i.e., number of cars, trips, and unique users) at the selected site necessary to sustain services over time through revenue raised via ridership.
- Procure the vehicles, charging stations, and service providers necessary to implement the program. Consider approaches to regional deployment in partnership with neighboring communities and coordination with regional planning agencies, like MAPC, or other regional entities.





## Equity Considerations

In advance of program implementation, municipalities should carry out community engagement to identify resident transportation needs to inform the program direction and design. This process may uncover mobility options that are better suited to meet resident needs within a particular neighborhood that take a different approach while achieving the same goal of increasing access to zero emission mobility options. Subsequent engagement should take place to get community feedback on a straw proposal for program design as well as engagement during and after program implementation. See **Action E** for details on the equity considerations related to electric vehicles.



## Immediate Next Step

Identify potential community partners in neighborhoods that would benefit the most from EV car sharing or a shuttle service. Coordinate outreach to assess needs and develop a proposal of services.





Type  
Outreach

### Action I:

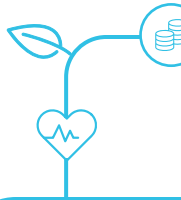
**Promote local education and awareness of EVs. This includes educational programs, marketing, and incentives with a focus on providing opportunities that make EVs more affordable for residents.**

Timeframe to Implement  
Short-term  
(Less than one year)



Urgency

**By 2025**



#### Benefits and Impacts

**Economic** – Greater price stability of electricity in comparison to imported gasoline

**Environmental** – Reduced air pollution because electric vehicles have zero tailpipe emissions

**Health** – Reduced exposure to tailpipe exhaust and pollution for drivers and passengers, and those living in the communities where travel is taking place

#### Type of Expense

Staff time, one-time material costs

#### Feasibility

Local and national examples – [Mass Drive Clean outreach campaign](#)<sup>34</sup>, [Drive Electric Vermont educational resources](#)<sup>35</sup>, [DOE Clean Cities state coalition chapters](#)<sup>36</sup>



#### Scale of Impact

Hard to measure/  
high impact

#### Lead Implementer

Sustainability Department and/or Committee

#### Performance Indicators

- Number of registered electric vehicles in the community



#### Key Partners

Mass Drive Clean, vehicle manufacturers and dealerships, community organizations



## Promote local education and awareness of EVs.

At first glance, the transition to zero emission vehicles may seem to rest squarely in consumer choices and behavioral changes of a community's residents. Larger market forces, federal and state incentives, and local education and awareness building play an important role in nudging residents toward choices that align with getting to net zero.

- Develop a suite of municipal outreach services that could include electric vehicle ride and drive events or extended test drive periods with dealerships.
- Partner with vehicle manufacturers, local dealerships, large employers, and business districts to provide discounts on electric vehicles for residents and businesses.

## Equity Considerations

Municipalities can reduce barriers for households with limited fluency in English by translating any educational and outreach materials to native languages. The same message may not resonate universally when seeking to initiate behavior change. Working in partnership with trusted community organizations can provide local perspective on what types of educational and marketing messages may resonate most effectively with a particular community. Similarly, for any public engagement opportunities, municipalities should consider who is likely to be able to attend based on day of the week, time of day, and location and how those aspects of the event could be adjusted to provide greater access to vulnerable populations.



## Immediate Next Step

Identify priority audiences to engage through outreach and where existing or new communications channels need to be established. Create an annual plan for engagement that includes strategies to reach the priority audiences throughout the year and methods to build relationships with local dealerships and support the promotion of EV models.

## EV Education and Awareness Best Practices

**Provide in-person experiences.** Giving people direct and extended experience driving an electric vehicle can reduce misperceptions individuals may have about switching to an electric vehicle. A common approach to increase consumers' exposure to electric vehicles is through Ride and Drive events that bring together EV dealers and provide the opportunity for individuals to test drive vehicles. The Portland Greater Council of Governments in Maine took this a step further with their [Electric Vehicle Lending Program](#), which provides individuals with the opportunity to borrow an EV for up to a week.<sup>37</sup> This extended exposure allows individuals to see how an EV fits into their day-to-day lifestyle.

**Build local partnerships.** Partnerships with local dealerships are key to raising awareness, but they can also unlock potential financial incentives to encourage EV adoption. In 2015, Boulder County, Adams County, and the City and County of Denver, CO, came together to pilot a [group purchasing program for solar panels and electric vehicles](#).<sup>38</sup> The program made time-limited discounts on solar panels and electric vehicles available to the counties' residents. In Boulder County alone, the Nissan dealership saw an increase in sales of over four times their normal sales for the Nissan LEAF as a result of the program. A similar approach to group buying has been successful locally through the [Drive Green program](#).<sup>39</sup> run by the Green Energy Consumers Alliance in New England.

**Promote EV literacy.** The more people know about EVs, the more likely they may be to consider an EV for their next vehicle. Austin Energy, an electric utility in Texas, is pairing the deployment of EV charging stations at Austin public schools with an EV educational curriculum through its [EVs for Schools program](#).<sup>40</sup> This approach is one way to increase EV literacy in school-aged children, the potential next generation of EV drivers, and their parents when students bring this information home.



**Action J:**  
**Engage with transportation network companies. Develop partnerships to encourage increased adoption of EVs.**

Type  
 Program

Timeframe to Implement  
 Intermediate (1 to 5 years)



Urgency  
**By 2025**

*Performance Indicators*

- Number of TNC drivers in the municipality driving EVs
- Total TNC EV miles driven in the municipality

Type of Expense  
 Staff time



Scale of Impact

Hard to measure/high impact



Feasibility  
 National examples – Uber EV Champions Initiative<sup>41</sup>; Luft Green Mode and Express Drive<sup>42</sup>

*Lead Implementer*

Transportation Department

*Key Partners*

Transportation network companies (TNCs), dealerships, Planning Department

**Benefits and Impacts**

**Health** – Reduced exposure to tailpipe exhaust and pollution for drivers and passengers, and those living in the communities where travel is taking place

**Environmental** – Reduced air pollution because electric vehicles have zero tailpipe emissions

**Economic** – Greater price stability of electricity in comparison to imported gasoline



## Engage with transportation network companies.

According to the Department of Public Utilities (DPU), transportation network companies (TNCs), like Uber or Lyft, provided 81.3 million rides in Massachusetts in 2018, approximately 25% more rides than in 2017.<sup>43</sup> If this trend continues, the resulting emissions will be an important source to tackle in getting to net zero.

- Get a baseline understanding of TNC ridership in your community and determine whether or not this action would have a high emissions impact. The [Department of Public Utilities](#)<sup>44</sup> provides information about how people in your community use TNC services, such as how many rides began in a community and where they ended.
- Reach out to TNCs that service your community about opportunities to educate both drivers and passengers on the benefits EVs and implement programs to incentivize the use of EVs.
- Develop public-private partnerships with TNCs to advance EV use by riders and drivers. Any partnership agreement with TNCs should include terms for data sharing to support effective impact measurement.

Outside Massachusetts, TNCs have implemented pilots to support driver and rider awareness and adoption of EVs. For example, Uber has worked with Los Angeles, CA, to provide drivers with notifications about the benefits of EVs and available state rebates and local utility incentives. Uber has also worked with San Diego, CA, to provide EV drivers with an additional dollar per ride over the normal fare.





## Immediate Next Step

Examine available data from MAPC and the DPU to understand the characteristics of ride-hailing across the region and the scale of impact this emerging trend has in your community. Use this data to determine whether or not to pursue partnerships with TNCs as an essential strategy within your plan for achieving net zero.

**Explore MAPC's Fare Choices report and TNC data:**  
<https://www.mapc.org/farechoices/>

## Equity Considerations

While additional data collection is needed to fully understand the demographics of ride-hailing riders and drivers, a survey conducted by MAPC in 2017 found that a larger proportion of respondents were low-to-middle income. Further data should be collected to understand the specific impacts that changes in the ride-hailing industry may have on vulnerable populations.





**Action K**

pg 40

**Action L**

pg 43

# Strategy:

# Lead by example in the municipal fleet



Type  
Program

Timeframe to Implement  
Short term (Less than one year)

Urgency  
**By 2025**



Feasibility  
Local examples – Cambridge, MA - Green Fleet Policy<sup>45</sup>, Brookline, MA - Fleet Electrification Policy<sup>46</sup>

**Action K:**  
**Adopt a zero emission municipal fleet policy. Commit to a complete transition by no later than 2030 for all vehicle uses with viable zero emission makes and models.**

- Performance Indicators
- Percentage of the total municipal fleet made up of zero emission vehicles
  - Pounds of greenhouse gas emissions reduced within the municipal fleet

Lead Implementer  
Select Board or City Council

Key Partners  
Department of Public Works, School Department, Finance Department, Fleet Management staff

Scale of Impact  
Enabling action



Type of Expense  
Staff time

**Benefits and Impacts**

**Health** – Reduced exposure to tailpipe exhaust and pollution for drivers and passengers, and those living in the communities where travel is taking place

**Economic** - Greater price stability of electricity in comparison to imported gasoline.

**Environmental** – Reduced air pollution because electric vehicles have zero tailpipe emissions

**Calculating Tool:** Argonne National Laboratory's AFLEET tool [https://greet.es.anl.gov/afleet\\_tool](https://greet.es.anl.gov/afleet_tool)



## Adopt a zero emission fleet policy.

- Develop a municipal fleet policy that sets zero emissions standards, or as low as possible if zero is not currently feasible, for new acquisitions and leased vehicles. Communities designated through the Massachusetts Department of Energy Resources Green Communities program should consider updating their existing fuel efficient vehicle policy. If applicable, municipalities should centralize the vehicle purchase approval process within the municipality to ensure that all departments are adhering to the new emissions standards.
- Commit to regularly updating the municipal fleet policy to require zero emission vehicles or better (e.g., exploring where to make vehicles net positive through utilization of Vehicle to Grid) whenever available and operationally feasible. This should be done every two to three years to account for rapid improvements in vehicle technology.
- Consider undertaking a fleet assessment to identify near-term opportunities for vehicle replacements with commercially-ready EV models and calculate fuel and operations cost savings and emissions reduction potential.

### Equity Considerations

While municipal lead by example actions may seem at first glance to be internally focused, they can provide an opportunity for municipalities to advance equity by leading a visible and transparent process throughout project implementation. This could look like providing opportunities for community feedback on the proposed policy while it is in development, communication and feedback throughout deployment of zero emission vehicles, and participation in revisions to the policy.

## Using Argonne National Laboratory's AFLEET Tool

AFLEET, or the Alternative Fuel Life-Cycle Environmental and Economic Transportation Tool, was developed by the Argonne National Laboratory to support the U.S. Department of Energy's Clean Cities Program. AFLEET allows users to investigate the environmental and economic costs and benefits of switching to alternative fuel vehicles. AFLEET supports calculation of simple paybacks, total cost of ownership, on-road fleet footprints, off-road fleet footprints, electric vehicle charging benefits, and idle reduction benefits. These calculations rely on a set of basic user inputs such as vehicle type, fuel type, number of vehicles, mileage fuel economy, purchase price, and geographic location.

The most recent version of AFLEET (2019) supports calculations for passenger cars and trucks, light commercial trucks, school and transit buses, refuse trucks, single unit short-haul trucks, and combination short-haul and long-haul trucks. AFLEET and the accompanying user guide can be accessed at: [https://greet.es.anl.gov/afleet\\_tool](https://greet.es.anl.gov/afleet_tool)

AFLEET will support municipalities in estimating the potential financial and GHG emissions costs and benefits of transitioning different segments of their fleets to alternative fuels. It does not provide robust support on assessing which vehicles are good candidates for electrification based on the specific drive cycles. This type of fleet assessment can be performed using GPS-based data collected from the vehicles under consideration for replacement with an electric option. A lower budget alternative is to have in depth conversations with the municipal fleet manager and drivers to understand how their current vehicles are used and whether they meet criteria that would make the vehicles a good candidate for near-term electrification.



### Immediate Next Step

Inventory all municipally-owned vehicles and identify existing vehicle purchasing processes to inform the development of a zero emission fleet policy. If you are a Green Community, amend your fuel efficient vehicle policy and revisit existing vehicle purchasing processes.

**Explore MAPC's work on clean vehicle procurement:** <https://www.mapc.org/our-work/expertise/clean-energy/clean-vehicle-projects/>



## Action I:

**Procure electric school and shuttle buses. Commit to develop a plan by 2025 and undergo full electrification of municipally-controlled school and shuttle bus fleets by 2030.**



Type  
Financing

Timeframe to Implement  
Long term (5 years or more)



Urgency

**By 2030**

Feasibility

Local and national examples – [Beverly Electric School Bus pilot](#)<sup>47</sup>; [Dominion Energy school bus deployment](#)<sup>48</sup>



Scale of Impact  
Measurable/high impact



Type of Expense  
Capital and operations



### Performance Indicators

- Percentage of the total bus fleet made up of zero emission buses
- Pounds of greenhouse gas emissions reduced within the municipal fleet

Lead Implementer  
School Department

Key Partners  
Finance Department,  
Transportation Department, bus  
drivers, teachers, and parents

### Benefits and Impacts

**Health** - Reduced exposure for students riding the buses

**Economic** - Operational savings in comparison to diesel school buses and revenue opportunity through vehicle to grid incentives

**Energy** - Potential for utilization of renewable energy generation to supply the buses.

**Environmental** - Improved local air quality



## Procure electric school and shuttle buses.

Electric school and shuttle buses produce the co-benefits of reduced air pollutant exposure for students/passengers and increased resiliency of the electric grid. Electric buses run on large batteries capable of storing energy when not in operation, which can be a majority of the day and night for some school buses. These batteries have the potential to be charged by renewable energy sources during the day and discharged to address demand on the electric grid later in the day.

- Pair deployment of electric school buses and/or local community shuttle buses with participation in utility demand response programs (e.g., [MassSave Connected Solutions demand response program<sup>49</sup>](#)) as a revenue stream.
- Evaluate available financing approaches to reduce the high upfront costs of electric buses. There are emerging solutions that provide long term contracts to take additional operating revenue sources, like those generated by participating in demand response programs, into consideration.
- Work with neighboring municipalities to explore the potential for collective procurement of electric buses, which can provide additional cost and time saving benefits. Municipalities that lease their buses should consider structuring Request for Proposal (RFP) language and leasing arrangements to procure electric buses.
- For school buses, consider using the electric buses as an educational tool for students and parents on the community's transition to net zero. Austin Independent School District and Austin Energy partnered to [provide an EV curriculum<sup>50</sup>](#) to students alongside electric bus deployment.





## Equity Considerations

Similar to **Action K**, the transition of school and transit buses offers a unique opportunity to center the voices of those impacted by changes to these particular fleets to guide project implementation. In developing procurement practices to support the implementation of this action, municipalities should consider the prioritization of minority and women owned businesses that may be operating in these industries.



## Immediate Next Step

Start by collecting key data to assess the suitability of the school bus and/or local shuttle bus fleets for replacement with electric models. For school buses, engage the School Department and procurement staff early on to understand the existing ownership structure, purchasing practices, vehicle age, and service routes. For any local shuttle buses, identify which department owns and/or operates the shuttle service and work with staff to assess purchasing practices, vehicle age, hours of operation, and service routes. This data will help determine an appropriate schedule for near and long-term bus replacement with electric models.

# End Notes

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3 2020 Bike Plan Update, Cambridge, MA, <https://www.cambridgema.gov/CDD/Projects/Transportation/2020bikeplanupdate>

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8 Complete Streets Program page, Town of Maynard, <https://www.townofmaynard-ma.gov/projects/complete-streets/>

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