MUNICIPAL FLEET ELECTRIFICATION

Municipal EV Readiness Toolkit

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Contents

Introduction

Maine's transportation sector accounts for 49% of the state's greenhouse gas (GHG) emissions. The state's climate action plan, *Maine Won't Wait*, outlines key strategies to reduce GHG emissions including putting 150,000 light-duty battery electric and plug-in hybrid vehicles on the road in Maine by 2030.

Municipalities can set an example by incorporating EVs into their own municipal fleets and disseminating information about EVs through stakeholder and public outreach.

The strategy to a successful transition of your municipal fleet can be broken down into three high-level actions:

1. Create an effective planning strategy and update local policies to support fleet electrification.
2. Pinpoint the proper state, federal and manufacturing funding incentives and keep a well-tracked budget.
3. Install the proper EV infrastructure to meet the fleet's needs.

This guide will help municipalities navigate the transition to an electric fleet by walking through these actions.

Planning for Municipal EVs

Municipal fleets are a logical choice to transition to EVs due to the predictable duty cycles and a shorter distance traveled of around 200 miles per charge in a single day. With the proper infrastructure installed, these EVs can recharge overnight in the municipal lot and be ready again by morning. The combination of manufacturer and state-funded rebates can make leasing or purchasing new EVs much more affordable.

Existing Goals

Federal and state goals around EV adoption and emissions reductions can help shape your fleet electrification goals. Defining your vision and objectives around emissions reduction, cost savings, and climate goals will make it easier to determine your next steps in planning.

Resources for federal goals surrounding transportation decarbonization include The Department of Transportation and The US National Blueprint for Transportation Decarbonization. Your state or region may also have goals listed in comprehensive plans, or climate action plans like Maine Won't Wait.

Supporting Policies

To support the transition to electrification of our fleets, state and local governments can develop new policies to prioritize the procurement of EVs and support the development of EV infrastructure.

Legislation prioritizing EVs includes:

- Concord, MA: The Town of Concord Select Board approved a policy to govern the replacement and purchase of all non-exempt municipal vehicles with "the most sustainable vehicle option" and prioritizing battery electric vehicles first.
- Cambridge, MA: The city implemented a new "Clean Fleet Policy" to transition to a fossil-fuel free municipal fleet and reach net-zero emissions by 2050.
- Biddeford, ME: Biddeford's comprehensive plan includes the transition to electric transit through Biddeford Saco Old Orchard Beach Transit, with a plan to have a zero-emission fleet by 2045.

Fleet managers are responsible for defining the fleet's policies and procedures. To remain effective, fleet policies must be routinely updated and shared with municipal leaders. If feasible, updating the fleet purchasing policy to prioritize electric vehicles is considered a best practice for fleet electrification.

Baseline Fleet Evaluation

Fleet evaluations can help you understand your fleet needs and determine which vehicles should be prioritized when it comes to replacement. This is an essential step for optimizing fleet management, reducing dependency on fossil fuels, and smoothly transitioning a fleet to electric.

Another best practice would be combining a baseline fleet evaluation with these suggestions from The Federal Energy Management Program (FEMP) around sustainable fleet management:

1. *Right-sizing fleets and vehicles to missions*
   Right sizing a fleet is used to identify older and inefficient vehicles and replace them with more efficient alternative fuel options, in this case, electric vehicles. Right sizing the fleet will determine optimum fleet inventory, eliminate any unnecessary vehicles, increase overall fuel efficiency and reduce the fleet's vehicle miles traveled (VMT).
   The Alternative Fuels Data Center has a guide on best practices for right sizing a fleet.

2. *Reducing vehicle miles traveled (VMT) and idling*
   There are several tactics that may be used to reduce the fleet of vehicle miles traveled and increase travel efficiency:
   a) Eliminate vehicle trips: Connecting virtually has never been easier. Avoid unnecessary in-person meetings and instead offer virtual options for meetings.
   b) Agency carpooling or agency shuttles: Not everything can be done virtually. When you have to attend an in-person meeting, consider offering to carpool with co-workers or taking a shuttle to your destination.
   c) Public transportation: If an electric fleet vehicle is not available, consider taking public transit to meetings or conferences.

3. *Increasing fleet fuel efficiency*
   Fleets can drastically increase fuel efficiency by swapping their vehicles to battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs)

4. *Optimizing cost-effective alternative fuel use*
   Battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) are suitable for many of Maines municipal fleets and should be prioritized as we build out the states electric vehicle charging network.

Fleet Comparison Tools and Resources

Fleet Procurement Analysis Tool

This tool compares procurement ownership structures, vehicle types, and scenarios in a side-by-side on a cost-per-mile basis and provides an analysis of cash flows and location-specific lifecycle emissions.

Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) tool

The AFLEET tool estimates petroleum use, greenhouse gas emissions, air pollution emissions, and cost of ownership of light-duty and heavy-duty vehicles.

Future Automotive Systems Technology Simulator (FAST Sim)

FAST Sim simulates fuel and energy consumption to evaluate vehicle performance under a range of driving conditions. In less than 5 minutes, users can perform efficiency and cost comparisons of vehicle powertrains.

Stakeholder Engagement

Through the increase in adoption of electric vehicles, stakeholder engagement has emerged as a critical component of successful project development and implementation. Effective stakeholder engagement identifies and responds to the needs and concerns of all individuals and groups who may be affected by a project. It is essential for building trust, resolving conflicts, and ensuring the long-term success of EV adoption.

Identifying Key Stakeholders

Stakeholders involved in municipal fleet electrification will vary depending on your goals. For municipalities with explicit fleet electrification goals in their plans, engagement may be limited to involving municipal staff and facility or fleet managers. Without a defined plan, municipalities may include committee members or the general public for input as well.

Consider the vehicles' purpose and who they will serve; vehicles used for transit services will be used differently than those used for emergency response. When replacing a whole fleet, replacement priority should take into account who will be impacted by the changes.

Potential stakeholders may include:

- Local government department heads
- Facility or fleet managers
- Municipal staff
- Utility providers
- General public

Best Practices

Effective stakeholder engagement requires open and consistent communication. Key strategies for effective engagement include:

Build Trust
Starting with transparent and open conversations is essential for stakeholder involvement. It's important to lay out the scope of your project and list any limitations early on so that everyone involved understands what they can expect from you and your organization. Providing any updates on your project in a timely manner will also help build credibility.

Communicate Effectively
People you collaborate with will come from all backgrounds. Be sure to use clear and concise language to avoid confusion or misinterpretation. Providing multiple channels for engagement and feedback can invite stakeholders to be more involved in the process and result in a more impactful project. Consider engaging not only in-person, but also online through emails, newsletters, and even social media.

Address Concerns
If there are concerns around your project, or if conflict arises, take time to understand the issues and address them. Responding promptly and transparently to concerns is key to helping the project move along smoothly. Develop a way to address issues and implement solutions to maintain trust and ensure your project remains beneficial for your stakeholders.

Stakeholder Engagement Resources

Best Practices for Meaningful Community Engagement
Groundwork USA created a guide full of tips on how to engage historically underrepresented groups and activities to keep engagement accessible for all audiences.

Promising Practices for Meaningful Public Involvement in Transportation Decision-Making
The US Department of Transportation lists how to address critical gaps in representation, how to build public involvement and measure success. This also includes an appendix with techniques for meaningful involvement with stakeholders.

Financing a Fleet

When purchasing a new EV, there may be a variety of funding sources available to help offset the overall cost of the vehicle. Rebates are typically offered directly through the car manufacturer or Efficiency Maine Trust. This section lays out purchasing strategies and resources available for purchasing EVs and EV infrastructure.

Cooperative and Bulk Purchasing Strategies

Cooperative purchasing may be a good option if your municipality has strong partners within the state. It's a strategy used to negotiate the procurement of EVs at a lower cost for the purchasing parties. Cooperative purchasing can be aided through sites like Sourcewell.

Bulk purchasing is a concept where a municipality uses their bulk purchasing power to negotiate pricing for services and then offers this special pricing to residents. Efficiency Maine created a toolkit for Collective Purchase Initiatives.

State Funding Incentives

Electric Vehicles

When purchasing a new EV there are often a variety of funding sources available to help offset the overall cost of the vehicle in the form of point-of-sale rebates. State rebates will typically be offered directly through Efficiency Maine Trust.

Charging Infrastructure

Some of the biggest capital costs involved with fleet electrification are purchasing the electric vehicle charging station(s), hiring contractors to install them and any associated maintenance and upgrade costs. There are two major sources of charging infrastructure incentives for Mainers.

- Efficiency Maine consistently updates their available EV charging station incentives with current rebate and grant information.
- Utilities also may offer rebates to offset construction costs associated with electric vehicle infrastructure like transformers, electric panels, conduit, and switchgear.

Federal Funding Incentives

Federal funding incentives are typically distributed in the form of a tax credit or tax incentive. Buyers will see any tax EV benefits when filing their annual taxes through the IRS.

- The US Department of Energy has a full list of EV tax incentives for every car manufacturer currently available.
- The Low or No Emission competitive program provides funding to state and local governmental authorities for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities.

Maintaining the Fleet

Vehicle Maintenance

PHEVs and HEVs have similar maintenance needs to conventional vehicles due to having internal combustion engines. Fully electric vehicles have no combustion engine, and regenerative braking systems can help brakes last longer, so BEVs generally require less maintenance than conventional vehicles. BEVs also have fewer fluids that require regular maintenance, and fewer moving parts relative to conventional fuel engines.

Like conventional internal combustion engines, the advanced batteries in EVs are designed for extended life but will wear out eventually. According to the Alternative Fuels Data Center, many manufacturers offer 8-year/100,000-mile warranties for their EV batteries. Batteries needing replacement outside of warranty are expected to be a significant expense predicted to decline as technology improves.

Municipal Electric Vehicle Charging Stations

To ensure a smooth and efficient transition to an EV fleet, municipalities must ensure the proper infrastructure is being installed to meet charging demands. Municipal lots are a great locations to install EV infrastructure which could benefit the municipal fleet and be open to the public to support further EV adoption in the area.

Historically, public charging has been well-supported by financial incentives and poses an opportunity for some revenue with high use. One of the greatest obstacles for public charging, however, is the existing power infrastructure needed to support electricity demands. Using a networked or "smart charger" can help optimize energy consumption and save on energy costs. Information about implementing charging stations and associated costs can be found in the *Siting, Funding, and Procurement* guide.

Charger Ownership Models

In a survey done by the Greater Portland Council of Governments (GPCOG), 35% of respondents who drive EVs shared that they were dissatisfied with charging. One of the biggest barriers to charging was malfunctioning equipment. Public fleets can consider training staff to manage charging equipment or contract with an external company with charger expertise. Ownership models include:

Third-Party Private Ownership

This is the most common model, making up the most charging stations in the US. Operation can be run by a subscription or membership-based charging service like Chargepoint. This model may continue incentivizing placing chargers with high EV ownership. Keep your goals in mind and be sure to consider who is benefiting from your station, and if that supports increasing EV accessibility and adoption.

Local Government Ownership

Municipal lots and buildings are often in frequently used spaces, like town centers, and can be an obvious choice for public chargers. In this model the revenue would go straight to the government entity, but they would also be responsible for maintenance and costs.

Public-Private Partnership

Public-Private Partnerships (P3s) are contracted agreements to support funding and maintaining EV charging stations. The public sector provides support through regulations, policy, and funding incentives, while the private sector provide operational knowledge and innovation. The Department of Transportation published P3 case studies providing overviews of Georgia, Ohio, and Oregon's EVSE projects with P3 initiatives.

The US Department of Transportation expanded on partnership opportunities in Charging Forward:

Statewide and Multistate Partners
These partners include planning organizations, state environmental, energy, and transportation agencies, and multistate initiatives with EVs. These organizations can identify key stakeholders, provide funding, and technical assistance.

Tribes and Tribal Organizations
Tribal organizations working on transportation initiatives can assist with identifying stakeholders working to improve infrastructure, provide technical assistance, and offer potential funding.

Local and Regional Planning Partners
This can include organizations like GPCOG and Maine Clean Communities. Partners may help entities start an EVSE project and align projects with broader transportation planning efforts and available funding.

Electric Utilities
Utilities like Central Maine Power can provide technical advice on connecting EVSE to the electric grid and have potential as long-term partners by taking part in ownership of EVSE installation.

Charging Networks
These can own, operate, and maintain charging stations as well as provide technical expertise.

EV Safety

In the United States, all commercially available vehicles are required to meet the Federal Motor Vehicle Safety Standards. BEVs, PHEVs, and HEVs have high-voltage electrical systems and must meet standards that subject batteries to various conditions including overcharge, vibration, extreme temperatures, short circuit, humidity, fire, collision, and water immersion.

Manufacturers are required to design these light-duty vehicles with safety features that can deactivate or isolate the electrical system when a collision or short circuit is detected. In the event of an accident, all-electric vehicles tend to have a lower center of gravity than conventional vehicles, making them more stable and less likely to roll over.

Emergency Response and Training

Many manufacturers publish emergency response guides for their vehicles, the National Fire Protection Association maintains a collection of these guides that are free to download. First responders and fleet managers are highly encouraged to reference these guides and training and information resources available.

References for specific emergencies can be found here:

- Submerged EVs
- Fire service quick reference guide

Training resources are listed here:

- Science of Fire and Explosion Hazards from Lithium-Ion Batteries
- Firefighter EV Training
- Law Enforcement EV Safety Training
- EMS EV Safety Training
- EV Safety: Tow and Salvage