Public Fleet Electrification: A Key to Furthering Global EV Adoption

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Summary

Electrification of public-sector fleet vehicles is a crucial strategy for advancing electric vehicle markets, particularly at the local level. Most vehicles in municipal fleets are highly visible within communities, drive predictable routes, and have high annual mileage, making them excellent applications for electrification. To support data-driven decision-making during the fleet electrification process, the Electrification Coalition has developed a robust library of customizable resources, including sample policies, tools that calculate vehicles' total cost of ownership, and aggregated electric vehicle purchasing. These resources have helped cities meet and exceed their fleet electrification goals.

Keywords: Electric Vehicle, Fleet, Policy, Charging, Case-study

1 Introduction

Electrification of municipal fleet vehicles advances the electric vehicle (EV) market and showcases local governments as leaders within their communities and the broader ecosystem. According to the U.S. Bureau of Transportation Statistics, there are 1,168,000 government fleet automobiles [1]. This represents a large opportunity to reduce emissions and is more than double the number of business fleet automobiles. To move the needle in this sector, the Electrification Coalition (EC), a non-partisan, nonprofit organization focused on accelerating the adoption of EVs, has created three tools to support cities as they electrify their fleets. By addressing policy, fleet data analysis, and procurement challenges, the EC has accelerated fleet adoption in U.S. cities and identified lessons that can be applied in municipalities across the globe.

The EC is advancing electric mobility beyond early adopters and driving economies of scale by developing and implementing a broad set of strategies. These strategies include policy development, advocacy campaigns, consumer education, fleet electrification, cultivation of bipartisan support, community electrification planning, EV supply chain development, and coalition building.

As a unique thought leader in the EV space, the EC brings together the needed education, project implementation, and analytical approaches to achieve greater EV adoption. The EC is comprised of technology and policy experts with decades of experience at all levels of EV advocacy and program execution, and our organization continuously delivers results that advance the market. Our team has a demonstrated track record of success at the local, state, and national levels in the creation of sustainable programs and business models.

2   Policy Toolkit

With a growing number of cities committing to zero-emission goals, curbing emissions is at the forefront of many policy agendas. However, achieving zero emissions can be challenging, and many municipalities have difficulty knowing where to start. Enacting policy at the local level creates systemic change that will last beyond a given administration and survive staff turnover. The EC published *Electrifying Transportation in Municipalities* [2], a toolkit for cities that outlines the top policies that advance electrification. The toolkit covers 15 key policies that pertain to fleets, freight, charging infrastructure, and consumers, and it rates each policy based on equity benefits, emissions reductions, health benefits, difficulty of passage, and cost of implementation (Table 1). The resource also includes considerable real-world examples, in the United States and other nations.

Electrifying Transportation in Municipalities, published in August of 2021, conveys much of its impact through key statistics that illuminate the benefits of electrification. With the framing that cities produce 70% of greenhouse gas emissions [3], the toolkit analyzes the benefits of electrification as it relates to climate, public health and social equity, economic development, and national and energy security specifically within cities. The image below shows the overview and categories of the 15 policies that are key to reducing emissions.

Table 1: Key policy summary

Table 1. Summary of key policies to pursue at the city level

Benefits & impact key: High (green) / Medium (yellow) / Potential Negative (red)
Difficulty & cost key: Low (green) / Medium (yellow) / High (red)

Category	Summary of key city policies	Direct GHG reduction	Health	Equity benefits	Jobs	Market impact	Difficulty to pass	Current cost to implement
Charging infrastructure	1. Infrastructure deployment	Medium	High	High	High	High	Medium	High
	2. EV-ready buildings & businesses	Medium	Medium	High	High	Medium	Medium	High
	3. Equitable charging	Medium	Medium	High	High	Medium	Medium	Medium
	4. Streamlined charging approval (permits)	Medium	Medium	Medium	Medium	Medium	High	Medium
Multi-sector	5. Zero emission (ZE) areas, diesel bans, or similar	High	High	High	Medium	High	Potential Negative	Medium
	6. Road tolls and CO₂-focused congestion pricing	High	High	Potential Negative	Medium	Medium	Medium	Medium
	7. Funding for electric vehicles and charging	High	High	High	Medium	High	Medium	High
Freight	8. Zero emission freight/delivery zones/curb access	High	High	High	High	High	Medium	Medium
	9. Zero emission ports and inland hubs/ warehouse districts	High	High	High	High	High	Potential Negative	High
Fleets (buses, light-duty)	10. Zero emission bus requirements & rollout	High	High	High	Medium	Medium	Medium	High
	11. Fleet EV funding and business models	Medium	Medium	Medium	Medium	High	High	High
	12. Light-duty city fleet requirements	High	Medium	Medium	High	High	High	Medium
	13. EV procurement and use policies (all classes)	High	Medium	Medium	Medium	Medium	High	Medium
Consumer	14. ZE mobility service provider/taxi deployment	Medium	Medium	High	Medium	High	Medium	Medium
	15. City programs for faster uptake (bulk purchase agreements & dealer & education campaigns) (action)	Medium	Medium	High	Medium	Medium	Medium	Medium

The assessments for each category are qualitative and quantitative. The rankings are expert-informed (EV industry, local governments, and advocates) and based on: 1) Transport CO₂ abatement modeling at state levels (e.g., freight emissions and passenger emissions are similar, freight is increasing, and bus emissions are a smaller part of emissions), 2) Health impacts are affected significantly by diesel emissions (particulate matter) that come primarily from trucks and buses, 3) Equity benefits and concerns cover potential economic burdens (e.g., road toll equity concerns unless designed to address), 4) Local jobs from charging infrastructure (based on studies in the US and Europe) and also the potential jobs to implement the policy, 5) Expert survey input on policy efficacy and market impact, 6) Difficulty to pass estimated from past evaluations and the policy stringency, 7) Costs to implement the policy (e.g., higher costs for policies that have more public engagement, policy design, potential pilots, enforcement, or to purchase vehicles and infrastructure).

Cities have demonstrated a tremendous capacity for leadership. They can enact effective policies for aggressive action at the local level and increase political pressure for policy action at higher levels. Cities' important capacity to champion electrification is matched with individual city leader's successful and bold efforts to electrify. In

2018, the top 50 most populous U.S. cities had EV market shares of 2.7%, nearly three times the nationwide average of 1.0% [4]. Many U.S. cities had significantly higher EV uptake rates in 2018 and 2019 than the United States as a whole. The toolkit is filled with examples of cities that are successfully using policy levers to meet the objectives of aggressive carbon neutrality plans that emphasize operational efficiencies.

2.1 Policy Toolkit: Fleets and Freight

Many cities, towns, and counties are adopting policies that require their vehicle fleets to be up to 100% electric by 2030. The fleets section of the toolkit details policies that ensure the procurement, maintenance, and adoption of EVs is efficient and smooth. This section takes a deep dive into electrifying buses and light-duty vehicles, for which many electric models are now available. For example, the number of light-duty battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV) models is expected to increase from 55 to 81 models between 2019 and 2022 and to more than 100 models by 2025 [5].

The policy toolkit recommends that local agencies enact EV-first procurement policies. Such policies require that each new vehicle purchase be an EV unless a waiver is obtained based on high cost, lack of a suitable electric model, or other substantive reasons. Adopting EV-first procurement policies ensures that cities must think through each purchase and justify why a gas vehicle is needed. In addition to promising progress, adopting EV-first procurement plans can be built to expand in scope as time passes and more EVs enter the market. Charlotte, NC, was a leader in developing this policy in 2020. Since then, many other cities have adopted EV-first policies using Charlotte as a model.

In addition to the aforementioned fleet policies, *Electrifying Transportation in Municipalities* highlights many other innovative policies that advance electrification. Namely, the toolkit suggests requirements that all new construction be built to accommodate EV charging equipment. In addition to the equity benefits that come with wiring buildings for EVs, the adoption of EV-ready building codes introduces quality jobs. The toolkit notes that jurisdictions can adopt EV-ready building codes and provides successful examples from Atlanta, GA, and Fayetteville, AR. The policy toolkit also details equitable charging infrastructure for multi-family housing. By addressing a spectrum of needs, the EV industry can plan for and build out an effective and equitable charging network. To simplify and make installation more efficient, the toolkit details how communities can streamline installation and permitting processes.

2.2 Policy Success Stories

Electrifying Transportation in Municipalities features stories of success from across the United States where the EC has supported policy wins.

2.2.1 San Antonio, Texas

The City of San Antonio has made great strides towards achieving its goal of converting its entire light-duty fleet to more fuel-efficient vehicles by 2025. This goal places an emphasis on electric options and has so far spurred the purchase of 30 EVs. The City sought to maintain its momentum toward fleet electrification through its vehicle fleet and one of the most effective ways to do this is to integrate the procurement of EVs into the cities fleet procurement policy. Working closely with the EC, City staff delivered an updated EV-first fleet procurement policy to City leadership for approval at the end of 2021. The official language, which includes a tiered vehicle selection process similar to the one used in Charlotte's policy, was approved in March 2022. The policy prioritizes EV procurement in a manner responsive to current market availability, and it places an emphasis on cost savings and proper vehicle and application selection. Since approval of the updated EV-First procurement policy, the City of San Antonio has placed orders for 10 additional EVs. These vehicles will replace existing conventional vehicles that have met the city's replacement criteria.

2.2.2 Clearwater, Florida

The City of Clearwater, FL began its electrification journey in 2020 with a commitment to purchase one electric vehicle. Working closely with the EC, City sustainability staff and fleet staff worked to develop a policy to prioritize EV transition in a way that uses data analytics and maximizes cost savings. With guidance and best practice examples from the EC, sustainability staff developed a green fleet policy that prioritizes EV purchases. The Clearwater City Council approved the policy in August 2021, making the standard operating procedure EV procurement. Since adopting the new fleet procurement policy, the City has begun the process of identifying strategic locations across the City to install EV charging stations to support the electrification of the fleet. The City of Clearwater is also in the process of evaluating vehicle lease options through the Climate Mayors EV Purchasing Collaborative to gain access to the federal EV tax credit.

2.2.3　Orlando, Florida

In 2021, the City of Orlando, FL passed the City's EV Readiness Ordinance, despite initial pushback from development community. The EC coordinated engagement among stakeholders, partners, and city council members, which led to a better understanding of the policy and its benefits. The EC supported the City's permit office in incorporating the new ordinance onto its website, making it immensely easier for charging site hosts to understand which permits must be obtained and which regulations need to be followed for installation. This type of accessibility action allows for greater option across a community is a best practice.

3　DRVE Tool

Data-driven decisions are vital to building support for electrification within a city. The EC launched the Dashboard for Rapid Vehicle Electrification (DRVE) Tool in 2021 to allow fleet managers to explore and compare fleet electrification scenarios [6]. Fleets can use the DRVE Tool to calculate the financial impacts of fuel price fluctuations, charging infrastructure, vehicle selection, and other variables. The tool compares conventional and electric vehicle procurement options side-by-side on a cost-per-mile basis and provides an analysis of vehicles' total cost of ownership and location-specific life cycle emissions. It analyzes thousands of scenarios specific to actual fleet inventories, resulting in an assessment of an entire vehicle fleet at once. The DRVE Tool gives cities a free, easy-to-use way to decode pathways to fleet electrification in minutes.

Traditional fleet analysis is costly and time consuming, often serving as a barrier to a transition to EVs. The DRVE Tool accelerates the process by eschewing one-on-one vehicle comparisons for a rapid analysis of the entire fleet. Without data-driven decision-making tools, fleets can continue to put off electrification and rely on oil and emit carbon. Namely, the tool can provide the total cost of ownership comparison and benefits for an entire fleet rather than singular vehicles.

3.1　DRVE Tool Process

The EC's DRVE Tool has proven to be tremendously popular with fleet managers since its release in 2021. To use the tool, they upload just three data points:

1. VIN numbers of existing vehicles in the fleet
2. Annual vehicle miles traveled
3. Service life of the vehicle

The DRVE tool then instantly displays a comparison of the total cost of ownership of electric vehicles and the fleet's existing conventional vehicles, accounting for fuel and electricity prices that reflect the current market (Figure 1). The tool's market forecasting feature allows users to conduct the analysis based on projected future vehicle costs and analyze an entire fleet and the general likelihood of achieving cost parity with existing fleets.
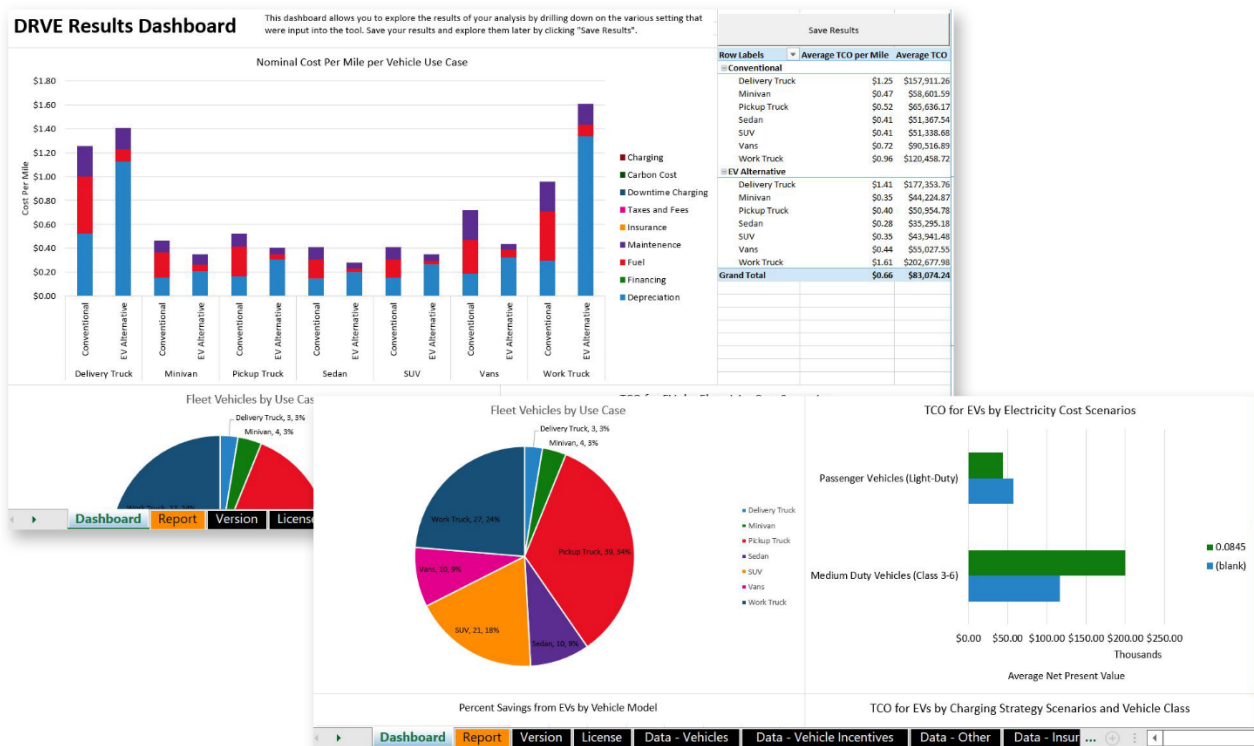
Figure 1: DRVE Tool results display

One of the advantages of the DRVE Tool is that it can be used iteratively — users can run an analysis to obtain cost and emissions data for the business-as-usual scenario (i.e., procuring new conventional vehicles when existing ones come due for replacement), and then produce data subsets for alternative scenarios with various hypothetical EV procurement choices, EV adoption timelines, fuel prices, and electricity prices. With cost savings at the forefront of the results, fleets can easily identify and visualize opportunities to replace conventional vehicles with EVs at no additional total cost to the fleet. The methodical data that the tool provides allows users to visualize and understand multiple purchasing options and adoption timelines. Users can refine their results by providing custom inputs on local fuel prices, electricity prices, procurement schedules, EV charging equipment installation investments, and maintenance costs. By showing cost-savings, decision-makers can understand the increased benefits of converting a fleet to EVs.

3.1.2   Successful DRVE Tool Applications

Since the launch of the DRVE Tool, a great many public-sector fleets of various sizes have used it to develop or refine their plans for electrification. City energy staff in Columbia, MO, have incorporated DRVE Tool analysis into their EV-First procurement policy to inform future vehicle procurement decisions. The new policy aims to speed EV adoption by prioritizing EV procurements with the greatest total-cost-of-ownership benefits. The State of Maryland Department of General Services used the DRVE Tool to identify 38 light-duty-vehicle fleet applications to electrify in 2022.

The North Carolina Department of Administration used DRVE Tool analysis to make its case for acquisition of 40 light-duty EVs this year. Initial projections point to a 25% reduction in maintenance and fuel costs for these 40 units. Fuel and maintenance savings will be reinvested into charging infrastructure installations at state-owned facilities. The fleet team is working to electrify 100% of its light-duty fleet vehicles by the end of the decade.

4 Aggregated Purchasing

The Climate Mayors Electric Vehicle Purchasing Collaborative (the Collaborative) is a partnership between Climate Mayors and Sourcewell that provides streamlined EV and charging equipment acquisition for public-sector fleets in the United States and Canada. The Collaborative's offerings include EV charging stations, light-duty vehicles, electric school buses, medium-and heavy-duty EVs, and electric fleet equipment (e.g., street sweepers) from a wide variety of manufacturers. The Collaborative also connects fleets with leasing options that can capture the U.S. federal tax credit for EVs, which is otherwise a challenge for tax-exempt public agencies. By aggregating demand from hundreds of fleets, the Collaborative leverages members' combined purchasing power to negotiate favorable pricing on vehicles and equipment. This has the added benefit of eliminating the staff time associated with a request for proposal process and/or price negotiations that organizations may otherwise undertake for procurement. More than 300 local governments currently participate in the Collaborative.

4.1 Background

In response to the United States' withdrawal from the Paris Climate Agreement, a coalition of more than 400 American cities representing over 70 million Americans came together in 2017 to form Climate Mayors. The City of Los Angeles, in collaboration with 30 other cities, issued a Request for Information (RFI) on clean transportation that catalyzed the formation of the Climate Mayors EV Purchasing Collaborative, which launched in September 2018 in partnership with the EC and Sourcewell.

Officials at the City of Los Angeles sought to aggregate the collective demand for EVs among fleets across the country, with an emphasis on municipal fleets. Today, the Collaborative works directly with Climate Mayors and other public-sector fleets to champion EV purchasing and charging infrastructure development by public-sector organizations. As of March 2022, offerings through the Collaborative include most light-duty EVs, four electric school bus vendors, two street sweeper vendors, and nine charging station vendors; the catalogue of available vehicle models continues to expand almost monthly. In addition to providing streamlined procurement and price discounts, the Collaborative offers training, resources, and analytical support to create a one-stop shop for public purchasing.

4.2 Roles

Cities are incubators of innovative strategies to reduce transportation emissions, and strong leadership has yielded tangible results. Collaborative participants have demonstrated substantial success by taking advantage of the technical assistance and purchasing solutions the program offers. Climate Mayors leadership was instrumental in establishing initial momentum for the Collaborative, demonstrating the power of subnational governance. As of March 2022, 345 public-sector fleets had committed to purchase 5,625 EVs as a part of the Collaborative.

The EC provides operational support for the Collaborative and technical support for fleet electrification for participating organizations. EC staff employ the DRVE Tool, sample policies, and personalized guidance on vehicle selection during customized consultation to individual fleets.

Sourcewell serves as the project's procurement partner. The organization provides competitively bid contracts and pricing for EV models and EV charging equipment. Its role as the project's procurement partner allows the Collaborative to provide competitive prices across the country to many states that haven't traditionally had access to EVs. Sourcewell also streamlines the procurement process through central RFPs that are highly competitive due to the power of aggregation.

4.3 Impacts of the Collaborative

Since 2018, the Collaborative has grown from 20 cities and counties to almost 350 fleets. Vehicles purchased through the Collaborative have averted 1.5 million gallons of gasoline use and 25 million tons of carbon dioxide emissions [7]. The program reduces the time and effort required for cities and other public-sector organizations to purchase vehicles and has accelerated access to the newest and most exciting EV models. Several cities are using the Collaborative to incorporate electric refuse haulers and other heavy-duty EVs into their fleets this year. The Collaborative has also facilitated access to new models such as the Ford F-150 Lightning, which has the potential to be transformative, given the great multitude of tasks that pickups perform in fleet operations.

Beyond vehicle access, the Collaborative's impacts include new and improved ways that cities can buy vehicles, tailored to fleets' needs during the transition to a new technology. Leasing EVs, rather than purchasing them, allows tax-exempt public-sector fleets to capture the U.S. federal tax credit. It also allows for a trial period with the vehicles and flexibility in budgets, bypassing upfront capital expenditures. Leases through the Collaborative allow cities to deploy a greater number of EVs than might be possible through purchases. The leases also eliminate financial liability for cities: if budgets are cut, they are not obligated to pay the lease. The Collaborative also offers fleet-as-a-service models that allow for a third-party to handle all maintenance. These offerings are changing the way fleets operate as we move toward an electric transportation future.

The Collaborative has seen firsthand how demand outstrips vehicle availability. Supply chain challenges have disrupted vehicle procurement, and we continue to work with fleets and vehicle manufacturers to prioritize city orders.

5   Conclusion

As leaders across the globe work to further global EV adoption, they should ensure that their work is efficient, long lasting, and equitable. Many cities have found great success in electrification, and they now serve as role models that have forged pathways to adoption. Success stories can be replicated across the world, not only to further streamline EV adoption, but also to increase collaboration in a critical time of need. Recognizing that each community has unique needs, widespread adoption of policies and norms that lower barriers are necessary to achieve widespread global electrification. Key leaders like the Electrification Coalition have the unique responsibility to convene stakeholders, spur and support bold action, and replicate successes.

Acknowledgments

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Authors

Ben Prochazka joined the Electrification Coalition as the director of strategic initiatives, developing all EC programs outside of the Washington, D.C. beltway. Since 2013, Ben has continued to lead these efforts, now as the organization's executive director. Ben has spent more than a decade working on environmental, human rights, and voter engagement efforts. His experience includes leadership roles as the campaign director for the Save Darfur Coalition, the legislative director for the Colorado Environmental Coalition, and the Colorado state director for the New Voters Project.

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