REPORT AND RECOMMENDATIONS ON THE CITY OF KANSAS CITY, MISSOURI'S MUNICIPAL FLEET ELECTRIFICATION

UMKC SELECTED PROJECTS IN
LAW, TECHNOLOGY, & PUBLIC POLICY
COURSE
(FALL SEMESTER 2023)

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I. Context and Purpose of this Report

In 2021, the Biden Administration created the first National Climate Task Force, composed of 25 Cabinet-level leaders, working together to reduce the United States' greenhouse gas ("GHG") emissions while building a clean energy economy.[1] President Biden simultaneously issued two Executive Orders to achieve net-zero emissions by 2050 and decrease GHG emissions 50-52% below 2005 levels by 2030.[2] As the Administration mobilized these climate priorities, regulations and incentives drove automakers, fleets, and individual consumers toward transportation electrification—i.e., electric vehicles ("EVs"). In 2023, new electric light-duty vehicles ("LDVs") sales consequently crossed the one million mark in the US.[3] Medium- and heavy-duty vehicles ("MHDVs") sales also doubled in 2022.[4]

The City of Kansas City, Missouri (sometimes hereinafter referred to as the "City" or "KCMO") is accordingly seeking to achieve substantial reduction in GHG emissions by converting its fleet of Internal Combustion Engine ("ICE") vehicles to Electric Vehicles (EVs), as reflected in City Council Resolution 200005 adopted in 2021.[5] That pursuit is a key step in reducing the City's carbon footprint and promoting clean transportation and aligns with strategies reflected in the City's September 2022 Climate Protection & Resiliency Plan attached adopted in 2022.[6] KCMO's municipal fleet (the "City Fleet") is comprised of approximately 2300 motorized units, consisting of a combination of passenger cars, SUVs, off-road units, and lights and heavy duty trucks of

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[1] The White House, *President Bident's Action to Tackle the Climate Crisis,* (Nov. 23, 2023), https://www.whitehouse.gov/climate/.

[2] Executive Order 14057, referred to as "The Federal Sustainability Plan," provides a whole-of-government approach to net-zero emissions by 2050, including 100 percent zero-emission vehicle acquisitions by 2035 and 100 percent zero-emission light-duty vehicle acquisitions by 2027. Exec. Order No. 14057, 86 FR 70935 (2021). Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, launched an ambitious environmental justice agenda to establish the domestic Climate Policy Office, reconvene global leaders around climate issues, and develop a climate finance plan to direct capital toward clean energy investments, including electric vehicle acquisitions. Exec. Order No. 14008, 86 FR 7619 (2021).

[3] Edison Energy, *Electric Vehicle Policy 101: A Guide to Navigating the Fleet Electrification Regulatory & Incentive Landscape*, at page 3 (2023), https://uploads.edisonenergy.com/2023/10/03103432/EE_TE-Policy-White-Paper_October-2023.pdf.

[4] *Id*.

[5] See City's Sept. 1, 2021 News Release, including copy of the Resolution 200005, in Appendix A below.

[6] Published online. (n.d.) and available at https://indd.adobe.com/view/3e643429-e6da-428d-a6d6-00ef730388f5 (last visited Dec. 1, 2023).

various “Classes” and functionalities[7] The conversion process for such a large and diverse fleet of vehicles involves many facets and poses several challenges, including:

- Considering laws and regulations regarding emissions, alternative fuels, and clean cities;
- Accessing funding mechanisms for conversion costs and overlays to qualify for those funds;
- Assessing the current and potential environment’s capacity to support new vehicles, such as charging behaviors, policy and behavioral adaptation, training users to facilitate positive outcomes, and source constraints posed by funding requirements.
- Balancing the pressures to accelerate the transition to EVs expeditiously against the prospective availability of alternative non-ICE fueling systems that may as they further evolve prove to be superior to current EVs technology in a benefits versus costs/risks analysis.

Despite such challenges, Kansas City remains committed to carefully planning its deployment and charging infrastructure, ensuring that the EVs meet the needs of various departments. The benefits of reduced emissions and lower operating costs make this project a worthwhile community endeavor. By leading the way for other municipalities to invest in sustainable transportation, Kansas City will further its reputation as a leader in the “silicon prairie.”

This Report and Recommendations document (“Report”) reflects information obtained through meetings with several City staff who are connected with EV planning, an independent research analysis, and the development of suggestions regarding City Fleet electrification. A team of UMKC students enrolled in a Fall 2023 semester graduate-level interdisciplinary course completed the research and wrote this Report. The Report also takes into account relevant information gleaned from meetings held late in the semester with staff at the Kansas City Area Transportation Authority (“KCATA”), which deploys and manages a fleet of public transport buses of a variety of fuel types. We hope that this Report will be helpful to the City as it proceeds with its City Fleet electrification endeavors, and also to the KCATA as it continues its work on converting buses to non-ICE fuel systems.

We note that although this Report cites and discusses various laws potentially relevant to conversion of vehicle fleets to alternative fuels, nothing herein is intended to be or should be construed as legal advice or legal opinion. The City, the KCATA, and anyone else involved in, or that may become involved in, subject matters discussed herein should consider engaging legal counsel to advise them on such matters.

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[7] City Fleet description based on conversation with Dan Williams, Fleet Division Manager- City of Kansas City, Missouri, on November 29, 2023. For information on vehicle “Classes” see Vehicle Weight Classes & Categories, Department of Energy.gov, https://afdc.energy.gov/data/10380.

II. Introduction

As new technology integrates into everyday life – from individual usage to community-level deployment – the need for regulatory oversight increases. Governing bodies at all levels cannot freely deploy or test new technology without first considering the potential effects on residents, businesses, and other commonplaces. Therefore, in August 2019, as an outgrowth of its interdisciplinary Selected Projects in Law, Technology, and Public (LT&PP) course, UMKC hosted a design workshop to explore the purpose, principles, establishment, and operations of an advisory board proposed by KCMO's then Chief Innovation Officer to provide advice to City decision makers on municipal interactions with emerging technologies.[8] Nearly 50 individuals from neighborhood associations, government, schools, nonprofit organizations, businesses, and technology ventures participated. The workshop laid the foundation for City Council Resolution No. 190838 (Appendix B**)** establishing Kansas City's Emerging Technology Board (ETB). The ETB exists to evaluate City regulations and make recommendations that best align technological engagements with public interest. The City appointed its first ETB members in late 2021. These members delivered the Board's first Annual Report in July 2022, which, among other things, recommended a "Front Door" website (or portal) for the ETB's evaluation processes. The ETB then turned to UMKC to undertake research and provide suggested strategies for an "Emerging Technologies Front Door System." Student teams in LT&PP courses wrote and presented a "Front Door" report and recommendations document to the ETB, the second one building on the first.

This semester (Fall 2023) our LT&PP course student team explored challenges, benefits, and best practices regarding a specific and rapidly emerging technology – electric vehicles (EVs). EVs recharge while plugged into a charging station or outlet and require no gasoline or diesel. EVs consequently do not emit GHGs produced by fossil fuels. Kansas City, like many cities around the world, recognizes the dangerous contributions of GHG to the climate crisis. Therefore, in 2021, the City Council adopted Resolution No. 200005 to lower 2005 GHG levels by 30% by 2025 and reduce usage by 50% by 2030.[9] The City's overall goal is to become climate neutral by 2040, with a subgoal or milestone of electrifying municipal fleet vehicles.[10] As with other municipalities, the City faces several challenges in this transition to EVs, including assessing the ability for implementation, charging infrastructure, training new users, accessing government

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[8] LT&PP is an interdisciplinary, social and civic entrepreneurship course which, among other things, facilitates student contributions to local government projects regarding interactions with new and existing technologies, technology deployment, assessment, and community engagement. Each fall and spring semester the course tasks student teams with a new project or continuing project from the previous semester. The City has brought several projects to the course since 2014, a recent example being the development of recommendations for the ETB's "Front Door" System (Fall 2022 and Spring 2023).

[9] Kansas City Resolution No. 20005, https://www.kcmo.gov/home/showpublisheddocument/6234/637442285970170000, a copy of which is contained in Appendix A.

[10] *Id*.

funding, and adhering to federal and state policy requirements. While EVs save costs over their lifetime compared to gas-powered vehicles, the initial implementation costs, such as infrastructure updates, purchasing, and planning, raise also significant concerns about cost/ benefit feasibility.

A. Project Team

The Fall 2023 LT&PP "Project Team," the authors of this report, consisted of three UMKC graduate-level students – Matt Walker (second-year law student), Meredith Morrison (second-year law student), and Janelle Sjue (student in the Master of Public Administration program). Course co-instructor, Professor Anthony Luppino, who served as lead mentor of our Project Team, also enlisted several subject matter experts to provide additional mentorship to the team throughout the semester. These mentors included Mike Hughes (consultant, community activist, and former employee for the City of Kansas City, Missouri), Al Winder (founder and CEO of the consulting firm, Winder & Associates; former Manager of Minority Business and Equal Opportunity for the Kansas City Area Transportation Authority; and former workforce development manager for the Saudi Arabia Public Transportation Corporations System throughout the Middle East), and Dr. David Bodde (Automotive Engineering Professor Emeritus at Clemson University, former Deputy Assistant Secretary for the US Department of Energy, and former Vice President of the Midwest Research Institute). Dr. Bodde presented a strong overview of fuel-alternative technology, challenges, and considerations, answered the students' technology-related questions, and served as an ongoing resource. Mr. Winder and Mr. Hughes regularly met with the project team, reviewed draft materials, challenged students to consider socio-economic barriers and equitable approaches, and helped facilitate meetings with the City.

B. Project Methodology

The Project Team first met in August 2023 and continued to convene roughly twice per week through December 15, 2023. An initial challenge was simply deciding where to start in identifying the key personnel in the City who had the knowledge about the City's fleet and what efforts had already been completed took some time to track down. Once identified, those parties, and other stakeholders engaged, provided a wealth of information that continued to inform the team's work. We also realized early on that because EVs fleet management is an emerging field there is limited reliable published information on this subject area. This meant relying significantly on public meetings and webinars happening concurrently with our course, hearing from industry experts and public officials and staff who are planning and implementing solutions in their cities right now. On the plus side, that means much of the information we collected, though evolving, was current.

After initial orientation to the subject area and related challenges, the Project Team decided to focus on individual areas of research (laws and regulations, technology, and Request for Proposals and best practices) and begin engaging relevant stakeholders. Each team member owned a piece of the research and writing, but everyone coordinated with stakeholders, prepared

for and participated in stakeholder interviews (20 total—see list in Appendix C),[11] and presented updates and findings. The graphic below illustrates the team's core areas of effort, including stakeholder engagement, research and analysis, and final deliverables (this Report, including its, appendices, and project presentations).

Stakeholder Engagement	• Completed a stakeholder list of local, regional, and national industry experts, government officials, community leaders, and more. • Conducted 18 stakeholder interviews (see list in Appendix C).
Research & Analysis	• Reviewed 27 Request for Proposals for fleet electrification projects, summarized the 14 most relevant RFPs into the RFP Comparison Chart (Appendix F), and used the chart to compare common factors of each. • Researched technology plans, EV reports, conversion and infrastructure challenges and solutions, and product options. • Researched and analyzed selected laws, regulations, and funding opportunities.
Final Project Deliverables	• Final summary presentation to invited stakeholders and the LT&PP class on Nov. 29, 2023 • This Report.

C. The "Why" of Electric Vehicles and Some Complex Questions

Climate change is complicated. Each region and municipality must wrestle with the tension that their daily operations, which provide citizens the essential business of a city, and the economic progress, which invigorates and stimulates commerce and services, places on the GHGs emitted. Cities across the nation are looking to practices and technologies which may allow the continuation of sustainable growth with ecologically beneficial practices.

Electric Vehicles have been shown to represent one of the technologies which may allow a city to reduce their carbon footprint without compromise on growth.[12] The burden of increasing municipal growth in the volume of GHG cannot be dismissed as Kansas City anticipates the long-term effects of climate induced weather events.[13] Cities are facing difficult weather events due to

[11] The Project Team is grateful to Diana Radzevich, Executive Assistant to KCMO Councilman Kevin O'Neill, for organizing several of the interviews with KCMO and KCATA personnel.

[12] *How electric vehicles can help the developing world*. (2022, December 5). World Economic Forum at https://www.weforum.org/agenda/2022/12/electric-vehicles-developing-world-cities/.

[13] Climate Action | CITY OF KANSAS CITY | OFFICIAL WEBSITE. (n.d.). Retrieved December 14, 2023, from https://www.kcmo.gov/city-hall/departments/city-manager-s-office/office-of-environmental-

climate changes. Extreme temperatures in the summer have been shown to increase humidity and precipitation, degrading air quality.[14] The increased precipitation will also cause more flooding events and stormwater issues.[15] These water events will make it more difficult for cities such as Kansas City to create enough water supply due to storm water contamination of drinking water sources. As a result, the expenses for creating drinking water, dealing with storm water, and flooding events could be devasting for a municipality.[16]

To address some of the locality issues, there is a need to reduce the GHG emissions in the region, and work toward lowering those emissions effects on the local climate. Action by local governments like Kansas City Missouri is necessary to mitigate the areas which can be mitigated. Conversion to EV would decrease the emissions in the City and thereby lessen the potential of the environmental cost to citizens. That said, it is important to acknowledge the following three realities in this application space:

(1) Power used for EVs is still primarily sourced from carbon and in that way not eliminating the effects to the degree that we would like to see. We need to continue to seek green sourced energy.
(2) Technologies in EV are progressing at greater speeds, which raises the question: why deploy now? The argument could always be made that we should wait to adapt for the technology that is on the horizon. The problem with that scenario is that we would never move the arrow, and time is of the essence in the adoption of greener practices.
(3) Other methods to reduce GHG from fleets may eventually be more efficient and effective than other battery-electric approaches—e.g., the potential utilization of hydrogen fuel cell technology discussed at the end of Section IV below.

In addition, and regarding the City Fleet in particular, our Project Team learned that careful analysis of the various components of the fleet is in order—matching technologies to functions is not a one-size-fits-all proposition.[17] Fleet composition and needs remain at the forefront of assessing the inputs required for successful conversion of a municipal fleet to EV.

One particularly notable point is that considering conversion of heavier duty ICE trucks in the class 3 – 8 categories to EVs presents some complications in terms of whether current EVs technology will be sufficient to allow such vehicle to perform the functions expected of them. Related challenges range from no manufacturer who qualifies for the Build America, Buy America,

[14] Climate Look, Kansas City Water Services, https://www.kcwaterservices.org/wpcontent/uploads/2016/05/ClimateLOOK-for-Kansas-City-Missouri-033116.pdf.
[15] *Id.*
[16] *Id.*
[17] Based on information from meeting with Dan Wiliams and Blakeley Butler on November 29, 2023 at KCMO City Hall.

to limited range capability and decreased cargo space.[18] The size of these vehicles also mandates an increased charging capacity infrastructure. In planning for the management of infrastructure needs, forward planning for electric grid updates would have to be completed including, but not limited to, transformer upgrades to increase charging capacity needs.[19]

D. Scope and Flow of this Report

In Section III, this Report explores several laws and regulations – federal and state – relevant to electric vehicle adoption, including funding and other incentives, and examine how these laws are applicable to the City and provide recommendations. Section IV provides an overview of EV technology, EV infrastructure, and EV Fleet technology relevant to a municipal fleet. Section V provides an assessment of RFPs created by other cities, analyzing their key and common features. Finally, Section VI offers next steps recommendations for continuation of this project by a subsequent team.

III. Laws & Regulations: Compliance and Funding/Incentives

Understanding the market drivers, policies, and regulations at all governmental levels will help the City strategically invest in and maintain an electric vehicle fleet. Therefore, this section describes the most influential regulations and funding opportunities for the City's fleet electrification.

A. Compliance Requirements

1. Vehicle Carbon Emission Standards (Federal)

The US Environmental Protection Agency ("EPA") limits vehicle carbon emissions and pollutants by regularly setting targets to restrict allowable emissions based on vehicle model years.[20] In April 2023, the EPA proposed its most ambitious emissions standards yet for LDVs and MHDVs, targeting vehicle model years of 2027 and beyond.[21] The proposed regulation requires original equipment manufacturers to report that their new product lines do not exceed the average tailpipe

[18] *Id.*

[19] Conversation on November 28, 2023 with Julie Dietrich, Lead Program Manager – Evergy, regarding the infrastructure needs for heavy duty fleet.

[20] *Id*. at page 6.

[21] EPA, *Biden-Harris Administration Proposes Strongest-Ever Pollution Standards for Cars and Trucks to Accelerate Transition to a Clean-Transportation Future*, (Apr. 12, 2023), https://www.epa.gov/newsreleases/biden-harris-administration-proposes-strongest-ever-pollution-standards-cars-and.

emission limit.[22] This proposed regulation most significantly impacts automakers, but consumers still face the less-direct effects on available purchasing options.[23]

As the market shifts from gasoline to electric, electric purchasing options will increase while manufacturers meet their minimum production standards. The EPA estimates 67 percent of new LDVs and 25 percent of new MHDVs to be zero-emission by 2032.[24] Comparatively, zero-emission sales will likely hit 9 percent of all passenger vehicle sales in 2023.[25] The new emissions standards could also save the average LDV consumer $12,000 over the vehicle's lifetime, compared to a vehicle not subject to these standards.[26] Overall, EPA projects the benefits will likely exceed costs by at least $1 trillion.[27]

At the end of the Fall 2023 semester, the federal government anticipated adopting a final rule for the proposed emissions standards in early 2024. If adopted, the regulation might become subject to litigation.[28] However, precedent will likely overrule challenges to federal emissions regulations since the EPA has consistently regulated tailpipe emissions since 1994.[29]

Kansas City Focus
If finalized, the EPA's proposed regulations could directly impact the City's electric fleet operations and public infrastructure through: • Cost savings (up to $12,000 for the lifetime of one LDV) • Increased US-made purchasing options for electric fleet vehicles • Greater need for public charging infrastructure since the increased electric vehicle supply will create more economical purchasing options for individual consumers and increase overall usage/ demand

[22] *Id.*
[23] *Id.*
[24] *Id.*
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] See RMI's "questions answered on the EPA's proposed emissions, https://rmi.org. Update on proposed emission standards since the Fall 2023 semester On March 20, 2024, EPA announced a final rule that sets new, more protective standards for light-duty and medium-duty vehicles starting with model year 2027. See "Final Rule: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles," https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-multi-pollutant-emissions-standards-model.
[29]. *Id.*

1. Alternative Fuel Vehicle Acquisition Requirements

a. The Energy Policy Act (Federal)

When purchasing fleet vehicles, state and federal agencies turn to the 1992 Energy Policy Act's ("EPAct") alternative fuel vehicle ("AFV") acquisition and alternative fuel use requirements.[30] The EPAct defines alternative fuel as biofuel, ethanol, methanol, hydrogen, coal-derived liquid fuels, electricity, natural gas, propane gas, or a synthetic transportation fuel. The Act requires state and federal fleets to acquire a certain number of AFVs annually or biennially.[31] Private and local government fleets, such as the City Fleet, are not subject to the EPAct's AFV acquisition and fuel use requirements, but these entities can leverage federal resources to voluntarily follow the federal provisions.[32]

b. Missouri's Alternative Fuel Acquisition Requirements (State)

In alignment with the EPAct, Missouri's General Assembly established AFV requirements for state-operated fleets by enacting in 2002 an AFV statute that mirrors the EPAct's standards and applies solely to state vehicles, not municipal government fleets.[33] Under §414.400, et seq., a state agency with a fleet of 15 or more vehicles must ensure at least 50 percent of new vehicles purchased over a defined biennial period use alternative fuel.[34] If an agency fails to meet a biennial acquisition goal, purchases of any non-AFVs are not permitted until the goals are met or an exemption has been granted.[35]

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[30] Office of Energy Efficiency and Renewable Energy, Vehicle Technologies Office**,** *EPAct Regulated Fleets***,** https://www.energy.gov/eere.

[31] *Id.*

[32] The 1992 EPAct directed the US Department of Energy to determine whether private and local government fleets should be mandated to acquire AFVs. DOE published a final rule in 2004, announcing its decision not to implement an AFV acquisition mandate for private and local government fleets. After extending the EPAct's Replacement Fuel Goal in 2008, DOE again issued a determination not to implement a fleet compliance mandate for private and local government fleets. 42 U.S.C. § 13257.

[33] Mo. Rev. Stat. § 414.400 (2002).

[34] Mo. Rev. Stat. §§ 414.400, 414.110 (2002).

[35] *Id.*

Kansas City Focus
Since the EPAct's and Missouri's AFV requirements are not mandated for municipalities, the impact of such standards is left to the City's discretion. These AFV requirements were designed for large fleets of 15 or more vehicles, but the City currently exceeds this number by over 2,000 vehicles (2,350 total). If the City failed to meet the statutory AFV standards, it would not be bound to zero-vehicle purchases, like state and federal agencies. This leaves room to change purchasing plans if issues with meeting the acquisition goal arise. Since the City has targeted lowering GHG emissions by 50 percent by 2030 and electrifying its fleet, the EPAct's biennial acquisition standard aligns with local municipal goals. Therefore, the City could consider adopting this standard when determining its annual fleet budget and purchasing plan. The US Department of Energy (DOE) offers support to local entities who voluntarily follow the EPAct's AFV standards, including feasibility assessments. See the description of the federal "Clean Cities Program (Local)" below (sub section c).

c. The Clean Cities Program (Local)

The DOE, which oversees EPAct AFV acquisitions, manages a voluntary AFV program for cities and local governments.[36] The Clean Cities Program helps both regulated and non-regulated entities reduce petroleum consumption, while increasing alternative fuel transportation deployment.[37] The Program operates under a nationwide coalition model. At the national level, the DOE's Vehicle Technologies Office provides objective resources and information to help transportation stakeholders evaluate options and achieve their sustainability goals.[38] 75 local and regional coalitions leverage these resources to create networks of local stakeholders that advance transportation projects.[39] Beginning in 1998, the Metropolitan Energy Center's Kansas City Regional Clean Cities Coalition has provided public and private stakeholders technical assistance, education, training, and support for policy initiatives in western Missouri and eastern Kansas.[40]

Kansas City Focus
A Metropolitan Energy Center program, Electrify Heartland, used a 2012 DOE grant to develop a phased EV infrastructure installation plan for the Kansas City metropolitan area.[41] Our Project Team did not find an Electrify Heartland Kansas City plan published after 2012. The City might consider collaborating with Electrify Heartland to recreate a modernized EV readiness plan or use the program's services to educate and train City personnel on EV management. In fact, Electrify Heartland indicates on its website that it provides training resources for local governments and fleets.[42]

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[36] *Id.* 42 U.S.C. § 13257.

[37] *Id.*

[38] *Id.*

[39] *Id.*

[40] See Kansas City Regional Clean Cities, http://metroenergy.org/programs/clean-cities/kansas-city/.

[41] See Electrify Heartland, https://electrifyheartland.org.

[42] *Id.*

2. Bipartisan Infrastructure Law – Buy America Requirements (Federal)

In 2021, Congress passed and the President signed into law the $550 billion Infrastructure Investment & Jobs Act or Bipartisan Infrastructure Law (BIL) to develop and modernize the country's infrastructure – from upgrading roads and telecommunications systems to advancing environmental justice initiatives.[43] With BIL's passage, came the Build America Buy America Act (BABA), which established a domestic content procurement preference for federally funded infrastructure projects after May 14, 2022.[44] The federal code states that federal funds cannot be distributed to an infrastructure project unless all the iron, steel, manufactured products (with some exceptions), and construction materials used in the project are produced in the US.[45] "Federal funds" encompass any grants, cooperative agreements, non-cash contributions or donations of property, direct assistance, loans, and loan guarantees.[46] These funds become subject to BABA guidelines if distributed for infrastructure projects, including electric vehicle infrastructure, roads/ highways, public transportation, electrical transmission facilities and systems, utilities, and other structures.[47]

Certain circumstances allow waiver of BABA requirements, but the funding applicant must first submit a waiver application to the agency. The agency may grant three types of waivers if the following circumstances are present:

- "Nonavailability" – the type of covered material under BABA is not sufficiently and reasonably available by quality or available quantity.
- "Unreasonable cost" – the type of covered material will increase the cost of the overall project by more than 25 percent.
- "Public interest" – applying this domestic content procurement preference would not align with the public interest. Public interest causes may include de minimis standards, urgent matters, and adjustment periods.[48]

The Office of Management and Budget requires federal agencies to use a series of principles and conditions before issuing a waiver, such as targets for a particular material, time limits, or award-specific conditions. The agency will post the waiver application for at least 15 days for public comment and will submit the application to the Made in America Office for additional review.[49]

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[43] The White House, *Fact Sheet: The Bipartisan Infrastructure Deal,* (Nov. 6, 2021), https://www.whitehouse.gov/briefing-room.

[44] The White House, *Biden-Harris Administration Issues Proposed Buy American Rule, Advancing the President's Commitment to Ensuring the Future of America is Made in America by All of America's Workers,* (Jul. 28, 2021), https://www.whitehouse.gov/briefing-room, FR 635.410.

[46] *Id*.

[47] *Id*.

[48] *Id*.

[49] *Id*.

The BIL Programs listed in the Funding Opportunities and Incentives subsection below follow BABA's guidelines.

Kansas City Focus
When the City applies for federal infrastructure funding, project materials may be limited to US suppliers under BABA, including programs not funded through BIL. Therefore, it is important to review the desired program's Notice of Funding Opportunity for BABA language and consider all buying options. Since waivers involve a strict, multi-level review process and no guarantee, the City should consider consulting the specific agency on the process and all purchasing options before applying for one of the three waivers.

B. Funding Opportunities and Incentives

1. Bipartisan Infrastructure Law Grant Programs

BIL allocated significant funding to EV infrastructure through the US Department of Transportation ("US DOT") National Electric Vehicle Infrastructure (NEVI) Formula Program and the Charging and Fueling Infrastructure (CFI) Discretionary Grant Program.[50]

Bipartisan Infrastructure Law Grant Programs			
Program	**Purpose**	**Eligible Entities**	**Federal Initiatives**
National Electric Vehicle Infrastructure (NEVI) Formula Program Funding: $5 billion	To install publicly available EVSE along designated alternative fuel corridors (AFCs) in every state	- States	- Justice40 - Buy America
Charging and Fueling Infrastructure (CFI) Discretionary Grant Program Funding: $2.5 billion	To install publicly available EVSE and other alternative fueling infrastructure along ACFs and within communities	- State/ local gov. - Indian tribes, - City planning orgs. - Other public entities	

[50] USDOT, *Federal Funding Programs*, (May 5, 2023), https://www.transportation.gov/.

2. The NEVI Formula Program

The NEVI Formula Program (NEVI) apportions $5 billion to states and local governments over five years (Fiscal Year 2022 - 2026), to strategically deploy EV charging infrastructure and establish an interconnected national network of station data facilitation, access, and collection. Program funds are used for acquisition, installation, network connection, operation, and maintenance of EV charging stations, as well as long-term EV charging data sharing.[51] NEVI funds primarily support designated Alternative Fuel Corridors ("AFCs"). AFCs include the US DOT's Federal Highway Administration ("FHWA")-selected areas along the interstate highway system, where publicly accessible, direct current fast chargers will be installed every 50 miles, within one mile of an exit ramp.[52] FHWA designates AFCs by soliciting nominations from state and local officials. Each AFC then falls into one of two categories, "ready" and "pending." [53] A ready corridor offers adequate charging and fueling capability, while a pending corridor includes charging and fueling infrastructure but lacks the "right frequency or locations" to meet the ready standard.[54] Throughout NEVI's five-year implementation period, Missouri will receive $98.9 million to deploy EV charging infrastructure.[55] Missouri's NEVI plan aims to install charging ports across 1,184 miles of AFCs, significantly expanding the state's current network of 2,147 ports.[56] FHWA earmarked four stretches of interstate within and around the Kansas City metropolitan area as ACFs, including:

- Interstate 35 from Kansas City to the Missouri/ Iowa border
- Interstate 49 from the Kansas City area to the Missouri/ Arkansas border
- Interstate 70 from the Kansas City area to Wentzville, Missouri
- Interstate 29 from St. Joseph to the Missouri/ Iowa border [57]

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[51] *Id.*

[52] Outside of the AFC designation process, US DOT annually sets aside ten percent for discretionary grants to fill network gaps. https://www.modot.org/nevi.

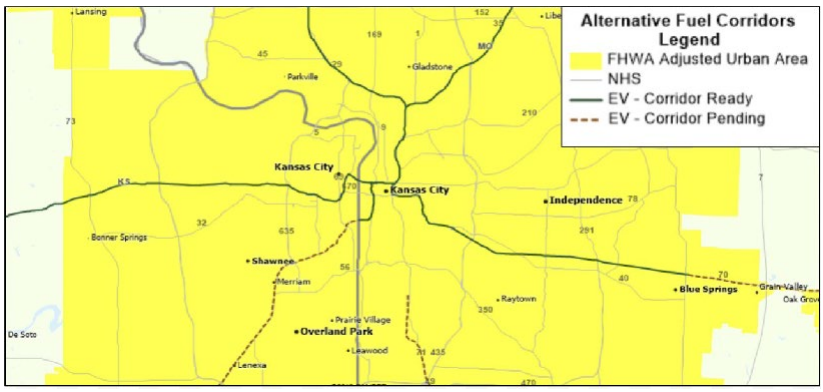
[53] US DOT, Fed. Hwy. Admin., *Federal Funding is Available for Electric Vehicle Charging Infrastructure on the National Highway System*, at page 9 (Apr. 22, 2021), https://dmampo.org/.

[54] *Id.*

[55] MODOT, *Alternative Fuels: National Electric Vehicle Infrastructure Formula Program*, https://www.modot.org/nevi.

[56] 41 KSHB Press Release (Sep. 27, 2022), https://www.kshb.com/news/local-news/biden-approves-missouris-35-7-million-electric-vehicle-plan.

[57] *Id.*



FHWA's November 2023 map of pending and ready AFCs within Kansas City's metropolitan area.[58]

Kansas City Focus
The four AFCs make Kansas City a potential future hub of EV charging infrastructure with the ability to support both long distance, interstate travelers and localized fleet operations. NEVI requires each site to offer at least 600kW power and a minimum of four 150kW chargers capable of simultaneous charging.[59] Furthermore, charging solutions are non-proprietary, and all EVs, light-to-heavy duty, will be able to successfully charge at any station.[60]

3. CFI Discretionary Grant Program

Since AFCs are built around the interstate system, they lack precise alignment with Kansas City's local transportation system and specific community needs. Fortunately, the FHWA's $2.5 billion CFI Discretionary Grant Program targets city, county, and tribal governments to fill the network's gaps and expand charging locally.[61] The CFI Program prioritizes bringing EV charging into urban and rural communities, particularly in underserved and disadvantaged communities, as well as to designated alternative fuel corridors.[62] The program's funding falls equally into two categories (or

[58] See FHWA's AFC interactive map, https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/maps/.

[59] Public Law 117-58 and 23 USC. 165.

[60] *Id.*

[61] US DOT, Fed. Hwy. Admin., *Biden-Harris Administration Opens Applications for First Round of $2.5 Billion Program to Build EV Charging in Communities & Neighborhoods Nationwide*, (Mar. 13, 2023). https://highways.dot.gov/newsroom/biden-harris-administration-opens-applications-first-round.

[62] *Id.*

subprograms), the Community Program and the Corridor Program.[63] The Community Program funds the development of publicly accessible EV charging infrastructure, and hydrogen, propane, or natural gas fueling infrastructure in communities.[64] The Corridor Program supports strategic deployment of the same infrastructure along AFCs, preferably within five miles of a corridor.[65] For the Corridor Program, FHWA recommends cities coordinate with State agencies to determine the next best locations for EV charging stations, including locations where station redundancy is needed.[66] Alternatively, if cities prefer applying alone, the Community Program may be the better funding option.[67]

Kansas City Focus
KCMO could benefit from both the Community and Corridor programs. However, the quadrant of AFCs appears to position the City to more immediately benefit from the Corridor Program, particularly if the City coordinates efforts with Missouri's Department of Transportation (MODOT).

4. The Justice40 Initiative

The NEVI Program, the CFI Discretionary Grant Program, and all others created by BIL are subject to the Justice40 Initiative (Justice40).[68] Justice40 reflects the Administration's goal that 40 percent of the benefits from specific federal investments flow to "disadvantaged communities."[69] The US DOT and DOE identify "disadvantaged communities" as census tracts with common conditions, such as low income, high and/or persistent poverty; high unemployment and underemployment; racial and ethnic residential segregation; high transportation cost burden and/or low transportation access; disproportionate environmental stressors with high cumulative

[63] See FHWA's CFI Program Overview and Notice of Funding Opportunity at https://www.fhwa.dot.gov/environment/cfi/.
[64] *Id*.
[65] *Id.*
[66] Electric Coalition, Case Study: "Powerberg" Is Electrifying Its City Fleet, https://electrificationcoalition.org/.
[67] *Id*.
[68] The White House, Justice40, (2022), https://www.whitehouse.gov/environmentaljustice/justice40/.
[69] *Id*.

impact, and more.[70] The categories of investment, as called ”categories of burden,” include climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure.[71]

Justice40-covered programs require applicants to submit a Stakeholder Engagement Plan, describing the applicant's plans and actions to engage with community-based organizations, such as residents and businesses, labor unions and worker organizations, local government, educational institutions, tribes, and other industry leaders.[72] Applicants should also address how to include stakeholders in project decision-making, equitably distribute benefits, and protect community members from relevant harm.[73] Justice40 recognizes that engagement methods, stakeholders, and levels of necessary engagement vary between projects, programs, and communities.[74] Therefore, local DOE Offices, including the Missouri Department of Natural Resources (“MO DNR”), are ideally equipped to consult applicants as they develop their Stakeholder Engagement Plans.

5. The Inflation Reduction Act Tax Credits and Grant Programs

The Inflation Reduction Act (“IRA”) of 2022 reflected a federal commitment to build a clean energy economy through consumer investment tax credits, production tax credits, and distinct grants for

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[70] 23 C.F.R. § 680.104 (2023). The NEVI program uses the Climate and Economic Justice Screening Tool to show census tracts identified as disadvantaged communities. The identified tracts or communities are based on census data filtered into the eight ”categories of burden.“ In the Screening Tool, a census tract is highlighted as disadvantaged if its population is (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden. A census tract that is completely surrounded by disadvantaged communities and is at or above the 50th percentile for low income is also considered a disadvantaged community. Climate and Economic Justice Screening Tool, Methodology, (November 22, 2022), https://screeningtool.geoplatform.gov/en/methodology#11.33/29.4384/-100.6814.

[71] The White House, Justice40*,* (2022).

[72] DOE, General Guidance for Justice40 Implementation, at page 23. https://www.energy.gov/sitesJustice40 General Guidance 072522.pdf.

[73] Benefits and other project terms can be negotiated through a Community Benefits Agreement, Good Neighbor Agreement, or similar agreement. Such agreements facilitate community input and social buy-in, identify how concerns will be mitigated, and specify the distribution of community benefits, including access to jobs and business opportunities for residents, thus reducing or eliminating project risks associated with project development. *Id.* at page 24.

[74] *Id*.

clean energy transition, while advancing the Justice40 Initiative.[75] This section summarizes the IRA tax credits and grants potentially available for the City's fleet electrification.[76]

Inflation Reduction Act Tax Credits		
Tax Credit	**Eligible Entities**	**Qualifying Vehicles**
Commercial Clean Vehicle Tax Credit (IRC Section 45W) Credit: Up to $40,000	- Businesses -Tax-exempt orgs, e.g., municipalities	- Subject to a depreciation allowance, except those placed in service by a tax-exempt org. and not subject to a lease - Plug-in EVs with specific battery capacity *or* - Fuel cell motor vehicles that satisfy IRC 30B(b)(3)(A) and (B) requirements

Inflation Reduction Act Grant Programs			
Program	**Purpose**	**Eligible Entities**	**Initiatives**
Climate Pollution Reduction Grant Program Phase 1: $250 million Phase 2: $4.6 billion	To develop and implement plans for reducing greenhouse gas emissions and other air pollution	- States/ local gov. - Indian tribes - Territories	- Justice 40
Clean Heavy-Duty Fleet Electrification Program Funding: $1 billion	To replace dirty heavy-duty vehicles with clean, zero-emission vehicles, support zero-emission vehicle infrastructure, and train and develop workers	- States - Indian Tribes - Municipalities - Nonprofit school associations	- Buy America

[75] White House, *Building a Clean Energy Economy: A Guidebook to the Inflation Act's Investments in Clean Energy and Climate Action*, *Version 2,* (Jan 2023), https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf.
[76] *Id*.

6. Commercial Clean Vehicle Tax Credit (IRC Section 45W)

The Commercial Clean Vehicle Credit helps fleets use clean light- and heavy-duty vehicles by covering the upfront purchase cost of a clean vehicle versus an internal combustion engine vehicle.[77] Businesses and tax-exempt organizations, such as municipalities, that buy a qualified vehicle may receive a tax credit of up to $40,000, defraying up to 30 percent of the incremental cost for commercial vehicles over 14,000 pounds (larger vans, buses, refuse trucks, long haul trucks).[78]

7. Climate Pollution Reduction Grant Program

The Environmental Protection Agency's (EPA's) Climate Pollution Reduction Grant ("CPRG") Program provides grants to states, local governments, tribes, and Territories to create and implement plans to reduce GHG emissions. The EPA split the program into two grant phases, a planning phase with $250 million for noncompetitive planning grants and a competitive implementation phase with $4.6 billion. The planning grants are used to develop non-binding climate action plans over the next four years. During the upcoming implementation phase, EPA will evaluate competitive applications to fund projects included in the climate action plans. Any government entity (state, county, local, etc.) that is included in a climate action plan is eligible to apply for implementation funding.[79]

In October 2023, the Mid-America Regional Council (MARC) received $1 million in CPRG funds to develop a climate action plan for implementation of clean investment-ready policies, programs, and projects.[80] MARC is beginning its stakeholder engagement process, including engagement with environmental justice and disadvantaged communities, to ensure that planning addresses local and regional needs.[81] MARC also opened a portal for community project submissions for consideration in their climate action plan, which was due in April 2023.[82] The organization's project evaluation criteria and their most recent climate action plan did not specify government or business fleet electrification as example projects. However, the criteria, including GHG emission reductions, regional impact, sustainability co-benefits, fit the scope of municipal fleet

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[77] *Id*.
[78] *Id*.
[79] *Id.*
[80] See MARC's Carbon Reduction Program, https://www.marc.org/transportation/funding/carbon-reduction-program.
[81] *Id*.
[82] *Id*.

electrification.[83] Therefore, we suggest that the City consult with MARC on any potential future funding opportunities and seek to leverage their existing efforts to avoid duplication.

In August 2023, MO DNR received $3 million for planning grants, which are handled by the Department's Air Pollution Control Program.[84] The Department, in conjunction with municipalities and planning groups, must develop climate action plans to reduce greenhouse emission. Emissions reduction projects included in these plans are then eligible for the second phase of funding in which EPA will choose projects for implementation. The Department is currently meeting with municipalities and groups across the state to ensure the broadest eligibility for implementation possible. In September 2023, the Department also announced a sub-grant opportunity to municipal governments and planning groups to expand outreach efforts. By including municipalities, MO DNR has significantly broadened outreach across a wider geographic area, particularly areas outside of the KCMO and St. Louis Metropolitan Statistical Areas since they already received CPRG planning grants. Despite the MO DNR's broader focus, it appears that MO DNR can support the City's planning efforts, at least in sharing local project strategies and stakeholder engagement methods.

8. Clean Heavy-Duty Fleet Electrification Program

IRA allocated $1 billion to replace class 6 and 7 ICE vehicles with clean, zero-emission vehicles, support zero-emission vehicle infrastructure, and train and develop the workforce accordingly. The EPA's Clean Heavy-Duty Fleet Electrification Program will distribute funds via grants, rebates, and contracts through Fiscal Year 2031. The program's Request for Information closed in June 2023, and at the time of our research for this report, the EPA had not yet announced when funding opportunities will open to applicants. Since the program includes municipalities among its eligible entities, the City might consider signing up for funding opportunity updates, if it has not already done so.

IV. Technology Considerations in Fleet Electrification Planning

There are multiple key pieces of technology needed to support fleet electrification, including vehicle chargers, a charge management solution, and the vehicles themselves. The adept use of this technology necessitates a deeper understanding of EVs and the underlying charging technology. This section will briefly summarize the types of EV chargers and corresponding charging plug types. It will also discuss the different charge management and "telematics" platforms offered by large vendors—i.e., platforms for gathering and reporting large set of data—

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[83] *Id*.

[84] See Missouri's DNR Community Grant Presentation at https://dnr.mo.gov/mogov-search/results?search=Justice40.

and the EVs produced by major manufacturers relevant to municipal fleet electrification. Finally, this section will discuss the concept of EV Readiness as it applies to a municipal fleet.

A. EV Charging Technology

Unlike Internal Combustion Engine (ICE) vehicles, which measure engine efficiency in miles per gallon ("MPG") and total travel distance by the capacity of the fuel tank, EVs rely on the capacity of the battery, measured in kilowatt hours (kWh), and their efficiency at utilizing the battery capacity to determine how many miles they can travel per kWh of energy stored.[85] For example, an EV with a battery capacity of 100 kWh and an efficiency of 5 miles per kWh of energy used would be able to travel 500 miles under ideal travel conditions. The following discussion will use hypothetical EV with a 100-kWh battery, able to travel 5 miles per kWh, to illustrate how charging technology works.

Vehicle chargers operate similar to a traditional gas pump, where a vehicle parks in front of a charger and inserts a large cable into the charge port of the vehicle in order to resupply it with energy. Some vehicle chargers are as simple as a plugging one end into an outlet on the wall and the other end into the vehicle.[86] Other chargers are more sophisticated and may be permanently installed structures, capable of pulling data directly from the vehicle, such as VIN number, and then reporting this data wirelessly over the internet.[87]

1. Types of Charging

There are three different levels of charging when it comes to EVs.[88] Level 1 charging is the slowest form of charging, using a standard 120v wall outlet, and delivers between 1.3 and 2.4 kW.[89] This type of charging is not practical for a municipal fleet, as it would take nearly 42 hours to charge the 100-kWh battery from 0 to full at a rate of 2.4kW under ideal conditions. However, due to their abundance and ease of access, Level 1 charging is a suitable option in emergency situations where there is no other means to charge a vehicle.

Level 2 charging is the most common type of EV charging and is the primary means of charging an EV fleet.[90] Level 2 charging requires higher capacity infrastructure than a standard outlet and

[85] U.S. Environmental Protection Agency, *Fuel Economy and EV Range Testing,* https://www.epa.gov/greenvehicles/fuel-economy-and-ev-range-testing.
[86] U.S. Department of Energy, *Electricity Infrastructure*, https://afdc.energy.gov/fuels/electricity_infrastructure.html.
[87] *Id*.
[88] *Id*.
[89] *Id*.
[90] *Id.*

is similar to the requirements of a traditional clothes dryer.[91] A Level 2 charger delivers between 3kW and 19.2kW, which is capable of charging a 100 kWh battery in 5.2 hours at a rate of 19.2 kW under ideal conditions.[92] EV manufacturers typically include a portable charge cable that connects to a NEMA 14-50 outlet, which is recommended to be wired to a dedicated 40 amp or 50 amp circuit.[93] There are also third-party chargers that can be wall mounted which require the same type of dedicated circuit to operate.[94] The advantages of a dedicated charging terminal over a portable cable are that the dedicated terminal has decreased wear and tear, cannot be lost or stolen, and can integrate with a charge management platform for remote management of vehicle charging.

The final type of charging is Level 3 charging, sometimes called "Super Charging" or "DC Fast Charging." [95] This type of charging is the fastest way to recharge a battery and may play a limited role in the electrification of some fleets. Level 3 charging delivers between 50 kW and 400 kW, capable of charging a 100-kwh battery in 15 minutes at 400 kW under ideal conditions.[96] The infrastructure needed to deliver these rates is also much more expensive compared to Level 2 charging infrastructure. This type of charging is best used when there is no alternative such as in the case of a vehicle that must travel hundreds of miles before reaching its destination in a short time frame.[97] Heavy duty fleet vehicles such as garbage trucks or passenger buses are most likely to require Level 3 charging.

2. Connector Types

The two names for Level 3 charging come from the two types of connectors used. Super Charging is the proprietary charging technology developed by Tesla, which uses a connector that is now called the North American Charging Standard ("NACS").[98] Following the passage of the Bipartisan Infrastructure Law, Tesla opened their design standard to other manufacturers. Most major manufacturers have announced plans to this style of connector by 2025.[99] Tesla is working towards adding adapters to new and existing Tesla chargers to make them compatible with the other type of connector.[100]

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[90] *Id*.
[91] *Id*.
[92] *Id*.
[93] *Id*.
[94] *Id*.
[95] *Id*.
[96] *Id*.
[97] *Id.*
[98] *Id*.
[99] *Id*.
[100] *Id.*

The other type of connector is the J1772 connector and corresponding Combined Charging System ("CCS") connector.[101] The J1772 connector enables Level 2 charging, with the CCS being an extension of the J1772 connector to enable Level 3 charging via DC Fast Charging.[102] DC Fast Charging is a technology and platform agnostic term that applies to all non-Tesla chargers capable of charging at Level 3 speeds.[103] The largest vendors utilizing this connector for fast charging stations are ChargePoint and Electrify America, both of which are working to implement adapters that will make their chargers compatible with the NACS connector.[104] Nearly all non-Telsa EVs manufactured up to now have been built to utilize the J1772 connector, but many manufacturers are announcing plans to switch to the NACS connector by 2025.[105]

3. Battery Technology

There are special considerations to take into account with the use of battery technology over ICE. The most common type of EV battery is lithium-ion based.[106] Demand for EV batteries is expected to greatly increase in the coming years, however announced production capacity from manufacturers already outpaces these demand predictions as prices for EV batteries continue to fall.[107] At the end of the EV's life, the spent lithium-ion batteries will be considered hazardous waste, however they are also highly recyclable.[108] EV battery recycling methods currently recover nearly 95% of the useable material, making EV battery recycling highly profitable as an emerging industry.[109] There are also "second life" uses for spent EV batteries in other industries that further extend their useable lifespan, reducing their environmental impact.[110]

Lithium-ion batteries are the top choice for EVs due to their efficiency, ability to hold high voltages, and ability to charge quickly.[111] However, these batteries can be affected by weather conditions. The temperature outside will impact the range of the vehicle. Ideal operating conditions for an EV

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[101] *Id.*

[102] *Id.*

[103] *Id.*

[104] Will Kaufman, *Largest EV Charging Companies in 2023,* Edmunds (Aug. 11, 2023), https://www.edmunds.com/electric-car/articles/largest-ev-charging-companies.html.

[105] U.S. Department of Energy, *Electricity Infrastructure*, https://afdc.energy.gov/fuels/electricity_infrastructure.html.

[106] U.S. Department of Energy, *Electric Batteries*, https://afdc.energy.gov/vehicles/electric_batteries.html.

[107] Environmental Defense Fund, *Analysis Finds U.S. Electric Vehicle Battery Manufacturing on Track to Meet Demand*, https://www.edf.org/media/analysis-finds-us-electric-vehicle-battery-manufacturing-track-meet-demand.

[108] Andrew Moseman, *How well can electric battery vehicles be recycled?*, MIT Climate Portal (Sept. 5, 2023) https://climate.mit.edu/ask-mit/how-well-can-electric-vehicle-batteries-be-recycled.

[109] *Id.*

[110] *Id.*

[111] U.S. Department of Energy, Electric Batteries, *supra* note 106.

are 70 degrees F.[112] At this temperature, an EV can actually operate at 115% of its normal range, meaning, for example, that a 500 mile range vehicle would be capable of getting up to 575 miles under ideal circumstances.[113] As the temperature increases to 105 degrees F, range drops to 80%.[114] Similarly, as the temperature decreases to freezing (32 degrees F) range drops to 80%.[115] As temperature approaches 0 degrees F, range can drop all the way to 50%.[116] Part of the loss in range is due to the need for the driver to run climate controls to maintain a comfortable temperature in the cabin of the vehicle, but range is also lost from the vehicle operating additional safety measures to condition the temperature of the battery.[117]

There are methods to mitigate this loss in range, including not running the heat and AC in the car unless absolutely necessary.[118] This is one reason why heated seats and heated steering wheels are more common in EVs, due to their ability to keep the driver warm without needing to heat the entire cabin.[119] Some EVs also come equipped with heat pumps designed to condition the battery during inclement weather.[120] Ordinarily, charging a battery when the temperature is below freezing can damage the battery and decrease its range over time.[121] A dedicated heat pump can mitigate these effects by keeping the battery's temperature within a safe range, regardless of ambient air temperature.[122] Regenerative braking is another technology utilized by EVs to extend the range of the battery.[123] Rather than relying on traditional brakes, EVs have a regenerative braking system that slows the car down independently of the mechanical brakes.[124] This system is capable of recapturing spent energy and using it to partially recharge the battery.[125]

Another concern with batteries is not related to performance, but to their weight. EVs may weigh up to 35% more than their ICE counterpart.[126] Heavier vehicles have a larger impact to wear and

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[112] Charlotte Argue, *To What Degree Does Temperature Impact EV Range?* Geotab (Feb. 6, 2023), https://www.geotab.com/blog/ev-range.

[113] *Id*.

[114] *Id*.

[115] *Id*.

[116] *Id*.

[117] *Id*.

[118] *Id*.

[119] *Id*.

[120] *Id*.

[121] *Id*.

[122] *Id*.

[123] U.S. Department of Energy, *How Regenerative Brakes Work,* https://www.energy.gov/energysaver/how- regenerative-brakes-work.

[124] *Id*.

[125] *Id*.

[126] Mark Pittman, *Electric Vehicles and the Impact on Infrastructure,* Forbes (Dec. 29, 2022), https://www.forbes.com/sites/forbestechcouncil/2022/12/29/electric-vehicles-and-the-impact-on-infrastructure.

tear impact on roads and bridges.[127] However, the added weight to passenger vehicles is expected to have a negligible impact on physical infrastructure as most of the damage is caused by commercial vehicles such as heavy trucks and freight haulers.[128] While an axle weight of 18,000 lbs. is only 9 times heavier than an axle weight of 2,000 lbs., it is 5,000 times more destructive.[129] On top of that, an increase in axle weight from 18,000 lbs. to 20,000 lbs. causes 50% more damage to pavement.[130] Heavier vehicles are also more deadly in collisions, where an increase of 1,000 lbs. can lead to a 47% increase in the probability of making a collision fatal.[131]

4. Electricity Use

Due to the high amount of electricity required to charge an EV battery, it is important to consider the prices of electricity and the impact EV charging has on the supply and demand of electricity relative to the local electric company. Electricity prices can fluctuate throughout the day based on a variety of factors. Renewable energies, such as wind and solar, produce more electricity during the day than overnight, causing the electricity generation to be cheaper due to the increased supply.[132] However, demand for electricity spikes in the evening between 5:00 and 8:00 pm due to residents getting home from work and increasing use of electricity at home.[133] Commonly this period of time accounts for the highest prices of electricity.[134] There are strategies that can help a fleet manage electricity use to avoid charging during these periods.

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[127] *Id.*

[128] *Id.*

[129] U.S. Government Accountability Office, *Truck Weight and Its Effect on Highways,* https://www.gao.gov/products/109954.

[130] U.S. Department of Transportation, *Exploring Vehicle Size and Weight Solutions,* https://highways.dot.gov/public-roads/mayjun-2009/exploring-vehicle-size-and-weight-solutions.

[131] The Associated Press, *NTSB Head Warns of Risks Posed by Heavy Electric Vehicles Colliding with Lighter Cars,* NPR (Jan. 11, 2023), https://www.npr.org/2023/01/11/1148483758/ntsb-heavy-electric-vehicles-safety-risks.

[132] U.S. Energy Information Administration, *Hourly Electricity Consumption Varies Throughout the Day and Across Seasons,* https://www.eia.gov/todayinenergy/detail.php?id=42915.

[133] *Id.*

[134] *Id.*

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Evergy assists EV planning for business entities using an EV Infrastructure Tool[135] to meet operational needs for an organization in the present and future EV use and implementation. Key decisions in producing a beneficial outcome need to be assessed in the early planning period. These include number and type of EV vehicles needed, where vehicles will dwell for charging, current electrical grid infrastructure, charging behavior, whether vehicles are "hot-seated" or binary, strategic future forecasting implementation goals, current field of manufacturers and support technologies and financial support. Evergy has specialists who assist with the customized energy needs of clients to help create successful implementation.[136] The Kansas City Area Transportation Authority (KCATA) has utilized Evergy in collaboration for implemented upgrades to the transformer and internal electrical infrastructure to support the current and future needs for the EV buses on site.[137] In addition, the KCATA has received allocation of funds from MARC[138] and SAMPLE corridor funds from BIL allocated to the DoT.[139]

B. EV Fleet Technology

In many respects, managing a fleet of EVs is not that dissimilar from managing a traditional fleet of ICE vehicles. The key difference is that an EV fleet needs to take into account the need to recharge batteries as opposed to the need to refuel gas tanks. Accomplishing fleet electrification is dependent on several factors, including identifying an appropriate charging solution, tracking fleet data (telematics), determining the right EV vehicle to use in a given job or function, and both proactive and reactive maintenance and service for the vehicle.[140]

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[135] Business Electric Vehicles—Evergy. (n.d.). Retrieved January 30, 2024, from https://www.evergy.com/smart-energy/renewable-resources-link/business-electric-vehicles/?utm_campaign=fleet&utm_source=google&utm_medium=ppc&utm_term=ev%20fleet&utm_content=4280561-e1-ng-mp-c20330240374-g149492493574-a664188269422-uEAIaIQobChMIn5qsi5fVggMVDBqtBh1YKAMVEAAYASAAEgKmXfD_BwE-cat11378589-kev%20fleet-mod&gad_source=1.

[136] Evergy Manager for Fleet Electrification Julie Dietrich conversation on November 28, 2023.

[137] Bill Yord, Senior Project Manager KCATA conversation on December 13, 2023.

[138] Hanzlick, C. J., Co-Chair, K., Jones, M. L., & Co-Chair, M. (n.d.). OPEN MEETING NOTICE TOTAL TRANSPORTATION POLICY COMMITTEE.

[139] Reps. Cleaver, Davids Announce $14,880,000 in Federal Transportation Funding for KCATA | Congressman Emanuel Cleaver. (2023, June 26). http://cleaver.house.gov/media-center/press-releases/reps-cleaver-davids-announce-14880000-federal-transportation-funding.

[140] Electric Autonomy, *How to Buy a Fleet EV: The Key Differences from Your Usual Process,* YouTube (Mar. 21, 2023), https://www.youtube.com/watch?v=Dp_sRc1E5KE.

1. Fleet Charging Solutions

The most common charging solution for an EV fleet is Level 2 charging at a fleet depot. Level 2 charging can charge most EVs in 8-10 hours, allowing vehicles to top off their batteries overnight.[141] Typically, fleet vehicles are already stored in a garage or other depot type facility, and EV chargers are added to this facility to accommodate additional EVs. Charging EVs in this type of setting is known as Depot Charging.[142] Installing enough chargers at a depot to accommodate a fleet may require expanding the electrical service of the facility, which will require planning with the local utility company and likely will include permits and inspections from local government.[143]

Public charging, which simply means to use existing publicly available chargers, may also be part of a fleet management strategy. Public chargers are typically privately operated and typically charge based on the amount of energy used, and may bill at different rates based on the current price of electricity from the local utility company. Public charging is best used as an emergency or backup solution to ensure a vehicle has enough energy to return to a depot to recharge.[144] However, there may be instances where public charging is the best solution, such as a vehicle that is traveling between major cities or states. Under these circumstances, charging the vehicle is similar to stopping at a gas station and using an employer provided credit card to pay for and track expenses.[145] There are charge networks that offer commercial and corporate charging plans to facilitate this charging method.

The third charging strategy which may be used is Home Charging. “Home Charging” simply means that employees take their vehicle home at the end of the day and charge their vehicles from there.[146] This requires the installation of an EV charger at the employee’s residence. This can create logistical issues if the employee rents their home or apartment and can’t install a charger.[147] It may also require the employee to upgrade the electrical service of the home in order to accommodate the capacity required for an EV charger.[148] Commonly, the employer will reimburse the employee for the installation of the charger, but it is also common that local utility companies have rebate programs for homeowners who install EV chargers.[149] There are also

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[141] *Id*.
[142] *Id*.
[143] *Id*.
[144] *Id*.
[145] *Id*.
[146] Electric Autonomy, *When Your Fleet Charges at Home,* YouTube (Oct. 6, 2023), https://www.youtube.com/watch?v=GcPxacS_r9c.
[147] *Id*.
[148] *Id*.
[149] *Id*.

federal and state tax incentives for homeowners who install EV chargers.[150] Home Charging is best utilized in fleets where a driver uses the same vehicle every day and can start and end their shift without the need to report to a centralized location each day, such as a taxi driver or police officer.[151]

Kansas City Focus
There are specific KCMO challenges in the selection of centralized charging or dispersed localized charging of fleet vehicles. Currently, most municipal light duty fleet are kept in Wolfe Garage when not in use. The Wolfe Garage location, although convenient to City Hall, has challenges of electrical upgrades to the transformer.[152] The transformer upgrades would interrupt service to the majority of downtown KCMO for an extended period which may preclude this a viable option.[153] The possibility of decentralized charging stations relies on the stability of land use and ownership by the City, as the infrastructure upgrades are at significant cost and planning. Historically, the non-centralized charging lots have been determined to be dispositioned without first consulting the assets that may affect the ability to maintain the charging infrastructure.[154] The building out of charging infrastructure will depend on the stability of lease or ownership to maintain the continuity of access. When considering heavy fleet conversion, the vehicle range and load capacity will have to be forecasted in relation to operational logistics, range of use, and charging. For instance, the heavy-duty truck required for refuse pick up, Class 8, limits the range to not be considered viable in some routes.[155] The City maintains a vast geographic area which logistically causes some garbage pickup routes to be more mileage than the current options for Class 8 can accommodate.[156] In addition, the Class 8 EV trucks that are currently available for use have a reduced load capacity by virtue of the additional weight of the EV battery, and would require access to a localized based dump station and then leveraged transportation of garbage by semi tractor to the landfill.[157] KCATA faces some of the same challenges as the current terminal garage is now at maximum capacity for electrical charging infrastructure. [158] The solution for the KCATA is to build a new garage for electric bus charging as funded by SAMPLE corridor funds.[159]

[150] *Id.*
[151] *Id.*
[152] Conversation with Dan Williams, KCMO Fleet Manager on November 29, 2023.
[153] *Id.*
[154] *Id.*
[155] *Id.*
[156] *Id.*
[157] *Id.*
[158] Bill Yord, Senior Project Manager KCATA conversation on December 13, 2023.
[159] *Id.*

2. Telematics

One of the benefits of EVs is that they typically come with the ability to gather and report on a large amount of data.[160] Most EVs are equipped with the ability to wirelessly send and receive data over the air ("OTA").[161] This includes the ability to receive vehicle software updates from the manufacturer, and also send current information about the vehicle, such as battery level, odometer data, and other information.[162] This data can be put to use by fleet managers through "Telematics," giving them the ability to see up to the minute information on the fleet as vehicles are in the field or plugged in charging at the depot.[163] Through telematics, fleet managers know what time their vehicles will finish charging, whether a vehicle in the field has enough range left to complete its work for the day, or whether a battery is approaching the end of its life cycle.[164] This data can be used to determine the most efficient places to use an EV in a fleet, whether additional chargers are needed at a depot, and also measure the total amount of energy used to charge over its lifecycle, which can be converted to measure the total CO2 offset by that vehicle over an equivalent ICE vehicle.[165] Two of the largest EV telematics solutions are ChargePoint and Ford Pro.[166]

3. EV Fit

The process of determining where to start placing EVs in a fleet is known as "EV Fit."[167] It is possible that there is an ICE vehicle in a fleet that, because of the tasks it performs, cannot be suitably replaced by an EV. However, other vehicles in the fleet likely can be suitably replaced. The factors to consider when looking at EV Fit involve the type of daily driving the vehicle performs, the temperature ranges the vehicle operates in, the payload of the vehicle (whether it is hauling a trailer such as a commercial freight vehicle, or carrying a large number of passengers like a city bus), how many miles the vehicle must travel to complete its functions, the conditions the vehicle must travel under, and whether any vehicle upfits (aftermarket upgrades) are required.[168]

As already discussed, temperature changes can affect the range of an EV. Vehicle speed can also affect range. An EV traveling at highway speeds will deplete a battery faster compared to

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[160] See Electric Autonomy, *How to Buy a Fleet EV, supra* note 140.
[161] *Id*.
[162] *Id*.
[163] *Id*.
[164] *Id*.
[165] *Id*.
[166] *Id*.
[167] *Id*.
[168] *Id*.

traveling at city speeds, even when taking stop/go driving into account.[169] In fact, because of the high torque of electric motors, EVs excel at stop/go driving and are able to get up to speed much quicker and more efficiently than an ICE vehicle.[170] Because of this, EVs are ideal for vehicles that drive within city limits, such as delivery vehicles, passenger vehicles, or other light duty vehicles.[171] As payload and required range increase, the cost of replacing a vehicle with an EV increases and may approach the point of not being feasible with current technology.[172]

Upfits are another factor to consider when looking at EV Fit.[173] Upfits are add-ons installed on a vehicle in addition to the way it normally comes from a manufacturer.[174] This may include rails and toolboxes on a truck, or shelving and storage in a van. Because there are fewer EV manufacturers and fewer EVs designed for commercial applications compared to ICE vehicles, the ability to modify and install upfits on EVs may present an obstacle at converting some vehicles to electric.[175] However, many of the major vehicle manufacturers, such as Ford, use the same chassis and design for their EV versions of their most common commercial vehicles, including the F150 and E-Transit Van,[176] thereby making upfits a more neutral item when comparing upfit costs of the ICE or EV version of the vehicle.

Kansas City Focus
An important consideration is to define the scope of work and type of vehicle, so Kansas City can determine if conversion to EV is feasible. Class 1 and 2 vehicles, sedans and light duty trucks, have a large variety of manufacturers and models in comparison to heavy duty Class 3 – 8 vehicles.[177] The Class 1 and 2 are heavily represented in the consumer market, as the market has been consumer driven by incentives and choice.[178] There are fewer manufacturers in the Class 3 – 8 market due to the market share being lower, and the requisite investment in technologies to overcome the increasingly complex mechanics of the larger vehicles. [179] There is a broader range of applications of the vehicle and a greater combination of chassis and

[169] *Id.*
[170] *Id.*
[171] *Id.*
[172] *Id.*
[173] Lightning eMotors, *Fleet Electrification Equation | 1. Choosing the right Electric Vehicle,* YouTube (Mar. 4, 2023), https://www.youtube.com/watch?v=WbqJaVWxU4I.
[174] *Id.*
[175] *Id.*
[176] *Id.*
[177] Ready, Set, Electric: Vehicle Types and Electric Opportunities. (2021, November 18). Edison Energy https://www.edisonenergy.com/blog/ready-set-electric-vehicle-types-and-electric-opportunities/.
[178] Why consumers are charging toward electric vehicles. (n.d.). Retrieved January 30, 2024, from https://www.ey.com/en_us/automotive-transportation/mobility-consumer-index-wave-3.
[179] An, F., Stodolsky, F., Vyas, A., Cuenca, R., & Eberhardt, J. J. (2000). Scenario Analysis of Hybrid Class 3-7 Heavy Vehicles. SAE Transactions, 109, 1152–1165. https://www.jstor.org/stable/44634294.

engine torque requirements to be competitive in the large truck market. [180] In some cases, the limited number of players who can present viable options for an EV option to replace an IHE prevents the conversion of larger Class trucks at all.[181]

The KCATA additionally is required to Buy America when using federal grant funds. Buses have a very limited number of market players in the EV passenger bus that qualify for the Buy America overlay.[182] There is even resistance from current manufacturers who qualify for Buy America to allow other players into the field.[183] The passenger buses that do qualify for the federal monies are not constructed to the length specifications required by the KCATA to meet their labor agreement.[184] The length of bus to comply with the labor agreement is 30 feet, and while bus manufacturing companies like Gillig may agree to the length, the batteries required to meet the functional needs are too heavy for the shorter chassis.[185] The KCATA, like KCMO, also faces similar requirements for range to meet the needs of the geographic area of Kansas City.[186]

4. Fleet Service and Maintenance

Service and maintenance are the final components to consider in EV Fleet technology. There are multiple factors to consider, including charge management, charger maintenance, and vehicle maintenance.[187] Charge management refers to the process of maintaining the charge levels of an EV.[188] Because of the ability of EVs and chargers to report data wirelessly, fleet managers can use this data to not only monitor vehicles, but to control them as well.[189] Vehicles can be programmed to charge only during certain times of day, or only charge when a battery is below a certain threshold (commonly when below 80% charge).[190] More advanced systems even monitor the price of electricity and charge only during certain price ranges.[191] These strategies can be used to help reduce the cost of charging a fleet by avoiding charging during peak demand hours. Charge management can also be used to program EVs to turn on and condition the interior cabin while still plugged in, allowing for a vehicle to be ready for its driver at the start of their shift while

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[180] *Id.*
[181] *Id.*
[182] Interview with Dick Jarrold, Deputy Chief Executive Officer KCATA, December 6, 2023.
[183] *Id.*
[184] *Id.*
[185] *Id.*
[186] *Id.*
[187] Electric Autonomy*, How to Buy a Fleet EV*, *supra* note 140.
[188] *Id*.
[189] *Id*.
[190] *Id*.
[191] *Id*.

avoiding added drain on the battery through warming or cooling the vehicle while still connected to electricity.[192]

In addition to charge management, there is also service and maintenance of the chargers themselves. Some chargers require regular inspections to ensure they are safe to operate, while other chargers may require a data connection (Wi-Fi or Cellular) in order to provide full functionality.[193] Level 3 chargers typically have a maintenance schedule requiring the replacement of components over time.[194] These are all things to take into account when choosing a charging solution.

Vehicle maintenance is not new to fleet management, but maintaining an EV is different from maintaining an ICE vehicle. Maintenance for an EV generally requires 40% fewer scheduled maintenance costs.[195] This is because electric motors have no need to be serviced like a traditional ICE.[196] There are no oil changes, no spark plugs, no transmissions, even the brake pads wear out more slowly on an EV due to the regenerative braking technology bearing most of the burden in stopping the vehicle. Because of the reduced maintenance required for EVs, it is possible for a fleet to be supported by fewer mechanics and other support staff.[197]

Kansas City Focus
The decrease in maintenance and associated costs is particularly advantageous to the KCMO as the City currently faces a shortage of workers in its vehicle maintenance teams.[198] Switching to EVs could allow the City to better meet ICE vehicle maintenance demands with current staffing levels, but may necessitate new training.

C. Costs of Ownership

The initial up-front costs of switching to electric are significantly higher than a traditional ICE fleet, however the costs of EV fleet ownership are actually lower in the long term as compared to an ICE fleet. Most EV fleets break-even within three-five years, seeing cost savings for the remainder

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[192] *Id.*

[193] Lightning eMotors, *Fleet Electrification Equation | 2. Charging Infrastructure,* YouTube (Mar. 4, 2023), https://www.youtube.com/watch?v=YZHchNd9iAk.

[194] *Id.*

[195] Electric Autonomy, *Understanding the Total Cost of Ownership for EV Fleets,* YouTube (June 21, 2023), https://www.youtube.com/watch?v=hM7aFpTEn7E.

[196] *Id.*

[197] *Id.*

[198] Conversation with Bill Yord, Senior Project Manager at Kansas City Area Transportation Authority (KCATA), December 13, 2023.

of the life of the vehicle.[199] Evergy has an EV fleet tool that calculates total cost of ownership in converting from ICE to an equivalent EV fleet—see Appendix D of this Report.

Cost of Chargers and Charging

The primary cause of the increased costs of fleet electrification is due to the initial cost of installing necessary charging infrastructure. This often means drilling through concrete to run new and larger conduit to install the necessary wiring, upgrading service panels to accommodate the increased power usage, and the local utility needing to upgrade other infrastructure in the area to be able to deliver sufficient power to the area.[200] This is why it is important to engage the local utility early in the planning process, particularly if there are other businesses or entities in the area that may also be planning to install EV infrastructure and thus may be competing for any current excess electricity availability in the area.[201] If the local utility needs to upgrade its own infrastructure prior to expanding service, this will create significant lead times to being able to operate new chargers.[202]

Another cost factor to consider with EV charging, in addition to time of use rates, are peak demand charges.[203] While time of use rates charge a per kWh fee based on the amount of electricity actively being used, peak demand charges are an additional fee based on the highest level of electricity used during a billing period.[204] This is why it is important to use charge management strategies to help flatten the demand curve for electricity.[205] Local utilities may offer special rates or discounts to organizations that are installing a large number of chargers in order to offset the cost of increased demand charges.[206]

Because of the increased upfront costs in electrification, there are many solutions to help distribute the cost over the life of the fleet, including opportunities for private / public partnerships, lease to own agreements that include the cost of infrastructure, and the idea of "charging as a service" where an organization partners with a single manufacturer and pays a pre-negotiated flat fee that covers the cost of the infrastructure and the electricity costs for charging.[207] Some vendors

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[199] Electric Autonomy, *Understanding the Total Cost of Ownership for EV Fleets,* YouTube (June 21, 2023), https://www.youtube.com/watch?v=hM7aFpTEn7E.

[200] *Id.*

[201] *Id.*

[202] *Id.*

[203] *Id.*

[204] *Id.*

[205] Id.

[206] Evergy, *Fleet Electrification,* https://www.evergy.com/ways-to-save/incentives-link/ev-charging-rebates/fleet-electrification.

[207] *Id.*

are also able to include the cost of the vehicles in this monthly fee, allowing for the total cost of fleet electrification to be amortized over the expected life of the fleet.[208]

Kansas City Focus
In Kansas City, Evergy recently announced a time of use rate plan specifically geared towards lower costs for people who use more energy outside of peak demand times.[209] The plan attempts to adjust user consumption behavior.[210] Energy consumption behavior can be mitigated using passive or active strategies.[211] Evergy recently has implemented a plan to engage passive energy consumption strategies.[212] The new rate plan would be a potential problem for the City as many of the vehicles would typically be plugged in during peak hours.[213] In response to this issue Kansas Corporation Commission *et al.* reached an agreement with Evergy to keep rates level.[214] Kansas City could negotiate a similar rate structure with Evergy.

Cost of Vehicles

Base cost. EVs also have a higher base cost than ICE vehicles. However, there are federal and local incentives which may help lower the costs of purchasing a new EV.[215] These incentives include the Commercial Clean Vehicle Tax Credit, the Climate Pollution Reduction Grant Program, and the Clean Heavy-Duty Fleet Electrification Program, all of which are available to the City. After the initial purchase, the operating costs of EVs are significantly lower than the operating costs of an ICE vehicle. EVs have 40%-80% fewer maintenance costs—this means not only are there fewer service intervals as the EVs have fewer moving parts and fluids to change and maintain, so fewer parts to replace during service, and fewer staff are required to maintain a fleet.[216]

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[208] *Id.*

[209] Evergy, *Default Time-Based Plan,* https://www.evergy.com/manage-account/rate-information-link/plan-options/default-time-based-plan.

[210] Zhou, K., & Yang, S. (2016). Understanding household energy consumption behavior: The contribution of energy big data analytics. Renewable and Sustainable Energy Reviews, 56, 810–819. https://doi.org/10.1016/j.rser.2015.12.001.

[211] *Id.*

[212] Missouri Rate Plans Page. (n.d.). Evergy.Com. Retrieved January 30, 2024, from https://www.evergy.com/landing/missouri-rate-plans.

[213] Conversation with Dan Williams, KCMO Fleet Manager, November 29, 2023.

[214] Kansas Corporation Commission—News Release 12-06-21. (n.d.). Retrieved January 30, 2024, from https://www.kcc.ks.gov/news-12-06-21.

[215] *Id.*

[216] Fulton, L. (2018*). Ownership Cost Comparison of Battery Electric and Non-Plugin Hybrid Vehicles: A Consumer Perspective.* Applied Sciences, 8(9), Article 9. https://doi.org/10.3390/app8091487.

Tire costs. The most common service to perform is tire rotation and replacement. This is because tire wear and tear on EVs is slightly higher than tire wear on an ICE. However, EVs have greatly reduced wear and tear on other components such as brake pads.[217]

Fuel costs. Fuel costs are another area where EVs are far less expensive than ICE vehicles. The cost to charge an EV is generally 3 to 4 times less expensive than filling an ICE with an equivalent amount of fuel.[218] This savings is even more significant when vehicles that traditionally spend significant portions of the day with engines idling are electrified.[219] Another way EVs save over ICE vehicles involves the type of work the vehicle is used to perform. EVs can come with traditional AC outlets, allowing for the ability to plug in and recharge power tools on the job site.[220] This allows for the use of more electric power tools and fewer gas-powered power tools, which generates even further cost savings and emissions reductions from fuel. [221]

Depreciation. Finally, depreciation of an EV fleet is generally less than the depreciation of an ICE fleet. While the vehicles themselves still depreciate and wear out, the residual value of an EV battery remains high.[222] This is due in large part to the efficiency in recycling an EV battery. Manufacturers are generally able to reclaim over 90% of the useable materials of an EV battery.[223]

Kansas City Focus
The City has over 350 ICE passenger vehicles and small SUVs. These are prime candidates to be replaced with EVs as they reach the ends of their lifecycles as their current use are well suited to electrification: short and infrequent trips within the City, with many of these vehicles logging less than 2000 miles driven per year.[224]

D. Environmental Costs

The last category of cost measurement comes from environmental factors. The negative effects of ICE vehicle emissions on both public health and the climate are well documented.[225] Taking

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[217] *Id.*

[218] Verma, S., Mishra, S., Gaur, A., Chowdhury, S., Mohapatra, S., Dwivedi, G., & Verma, P. (2021*). A comprehensive review on energy storage in hybrid electric vehicle.* Journal of Traffic and Transportation Engineering (English Edition), 8(5), 621–637. https://doi.org/10.1016/j.jtte.2021.09.001.

[219] *Id.*

[220] *Id.*

[221] *Id.*

[222] *Id.*

[223] *Id.*

[224] Conversation with Dan Williams, KCMO Fleet Manager, November 29, 2023.

[225] Vivien Bui, *The Road to an Electric Vehicle Future*, US Department of Energy (June 23, 2023), https://www.energy.gov/articles/road-electric-vehicle-future.

steps to reduce vehicle GHG emissions can have positive outcomes on both the health of local communities and the climate.[226] Even though EVs have a higher initial carbon footprint than ICE vehicles due to the manufacturing process, EVs still produce a lower amount of GHG emissions over the life of the vehicle compared to ICE vehicles – even when emissions from coal fired power plants used to generate electricity are taken into account.[227] And although the batteries themselves have a limited lifespan of eight-twelve years, they are profitable to recycle.[228]

Electrifying fleets that operate in underserved communities can be a way to reduce GHG emissions in these communities, which traditionally have decreased air quality due to being more densely populated and being adjacent to major highways.[229] Fleet charging depots can also be constructed in ways that allow for public use in underserved communities.[230] As demonstrated by the City of Charlotte, North Carolina, fleet chargers can be open to the public during the day but reserved for fleet vehicles overnight.[231]

Kansas City Focus
Reducing emissions along highways would provide health benefits to the citizens who live there – many of whom are minorities and underrepresented populations as historically the Interstate system was built directly through minority neighborhoods. This could be used to help meet Justice 40 requirements when applying for certain grants.

E. Hydrogen Fuel Cell Technology

Information on the KCATA's exploration of hydrogen fuel cell technology came very late in the Fall 2023 semester,[232] and this section is therefore not as thoroughly researched as the rest of the Report. However, the information obtained is compelling and worth including here and considering in our next steps recommendations in Section VI below. The KCATA visited the Champaign-Urbana Mass Transit District ("MTD"), who operates hydrogen fuel cell buses as part of their public transit strategy. Following this visit, the KCATA began researching the possibility of bringing hydrogen fuel cell buses to Kansas City.[233]

Hydrogen fuel cell vehicles function similarly to EVs, in that they operate from a battery and electric motors. The key difference however is that the battery on board is much smaller than a

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[226] *Id.*
[227] *Id.*
[228] *Id.*
[229] *Id.*
[230] *Id.*
[231] *Id.*
[232] Conversation with Bill Yord, Senior Project Manager KCATA conversation on December 13, 2023.
[233] *Id.*

full EV, and the battery is continually recharged by the on-board hydrogen fuel cell. During use, the fuel cell is depleted through a process that produces electricity for the battery, with the only other biproduct being water vapor.

The cost of a hydrogen fuel cell vehicle is comparable to that of an EV, but there are some key advantages. The reduction in battery size means that hydrogen fuel cell vehicles are lighter than EVs and are comparable in weight to ICE vehicles, which means they are less damaging to infrastructure than comparable EVs.[234] In addition, hydrogen fuel cells do not suffer from reduction in range caused by wintry weather the way EVs do,[235] making hydrogen fuel cells a potentially better fit for the City.

The key challenge to overcome in an adoption of hydrogen fuel cells technology for vehicles will be sourcing the necessary compressed hydrogen gas to refuel the vehicles. [236] There is a facility in Wentzville, MO that may be a supplier. The KCATA has been studying the possibility of purchasing two refueling tanks that would provide enough fuel to operate 4 hydrogen fuel cell buses for almost a full week before needing to refuel the tanks at the Wentzville facility. This would require the KCATA to send a vehicle to the facility every week to drop off and pick up a new fuel tank.[237]

V. Fleet Electrification RFP Features/Characteristics

Kansas City, like other cities around the world, is aware of the challenges and conditions resulting from the changing climate. GHG created by fossil fuels contribute to the growing issue. As noted above, City Council Resolution 200005 aims to lower GHG emissions when using 2005 levels by 30% by 2025 and 50% by 2030.[238] The Resolution's goal is to be climate neutral by 2040.[239] The Kansas City municipal government has a goal for the electrification of its fleet vehicles as part of its efforts to reduce carbon emissions and promote sustainability and reach this goal. The effort, to be implemented by 2030, was adopted by Kansas City Council in 2021.[240] However, Kansas City faces several challenges in this transition, including assessing the ability for implementation, charging infrastructure, and training new users and repair technicians. KCMO should consider

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[234] Cunanan, C., Tran, M.-K., Lee, Y., Kwok, S., Leung, V., & Fowler, M. (2021). A Review of Heavy-Duty Vehicle Powertrain Technologies: Diesel Engine Vehicles, Battery Electric Vehicles, and Hydrogen Fuel Cell Electric Vehicles. Clean Technologies, 3(2), Article 2. https://doi.org/10.3390/cleantechnol3020028

[235] *Id.*

[236] Conversation with Bill Yord, Senior Project Manager KCATA conversation on December 13, 2023.

[237] *Id.*

[238] *Appendix B* of this Report.

[239] *Id.*

[240] *Climate Action | CITY OF KANSAS CITY | OFFICIAL WEBSITE*, 2022.

developing a comprehensive plan to address these challenges and successfully electrify its fleet or a substantial portion of the fleet while ensuring that it remains cost-effective and efficient.

In this connection, our Project Team studied and compared 14 Request for Proposals documents (RFPs) from various jurisdictions relating to electrification of vehicles—see "RFPs Comparison Chart" in Appendix E of this Report. The RFPs considered are from townships and regions ranging in populations of 40,000 to 699,000 populations. Several of the RFPs came from California, a earlier adopter of EV technologies. Several Midwest cities were also culled for the RFP field scan. This Section V describes our methodology and comparative observations regarding that set of RFPs.

A. RFP Analysis Methodology

The methodology used in our RFPs analysis consisted broadly of looking at what issues the RFP is trying to address in the sphere of electrification. The purview of selected RFPs consisted primarily of fleet electrification and peripheral issues. The problems communities are trying to address are generally related to climate action plans and sustainability for localities addressing the cost of climate inaction. These matters have been prioritized by and pursued in the federal budget and allocated monies.

The categories collected for each of the 14 RFPs we studied and compared were based on five main topics:

1. General Information to provide the logistical characteristics of the RFP
    a. Location – jurisdiction/locality/state where the RFP is designating the work to be done.
    b. Type of entity for disbursement – who is releasing the RFP and collecting applications, dispersing monies, and managing the rubric/qualifications for submittals.
    c. Title of the RFP – description of the general scope of the work
    d. URL link – where is the RFP hosted in the World Wide Web
2. Funding
    a. Funding source(s) - who is the sponsor?
        i. Federal – US government sources of funds
        ii. Local – sponsor is a locality or more locally sourced than federal.
    b. Award amount (if specified) - dollar amount to be allocated for the RFP awardee. Sometimes a range.
    c. Federal match amount (maximum is specified) - For a project funded by a locality, will there be federal match funds used?
    d. Does the funding require matching funds - Are the funds requiring a match for federal dollars
    e. Minimum match – what is the minimum match of local monies.
3. Timing

a. An important component to consider in accessibility of the RFP for varying communities and Disadvantaged Business Enterprise (DBE)[241] would include additional allowance of time in the period to submit a competitive RFP.[242] As in the analysis of the competitive bid process, the capacity building for submitting a successful proposal.[243]
b. Award announcement – when was the RFP posted.
c. Proposal deadline – when do submissions need to be received to qualify for candidacy.

4. Requirements
    a. Eligible entities – can the applications come from consultants, non-profits, government agencies
    b. Justice 40[244] – will there be a requirement for addressing the Justice 40 initiatives?
    c. Other minority or distressed business overlay – will the RFP have a Disadvantages Business Enterprise, or other overlay
    d. Buy America – is there a requirement for Build America Buy America[245]
    e. Community stakeholder engagement – if engagement is required of the RFP awardee
        i. Type of stakeholders
            1. Internal – an employee of the entity issuing the RFP
            2. External – not an employee of the entity issuing the RFP
        ii. Type of engagement – qualitative measurement of engagement
            1. Visit with stakeholders for needs assessment
            2. Survey stakeholders
            3. Implementation engagement

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[241] Disadvantaged Business Enterprise is an entity that has been defined by the Department of Transportation (DoT) "remedy ongoing discrimination and the continuing effects of past discrimination in federally-assisted highway, transit, airport, and highway safety financial assistance transportation contracting markets nationwide. The primary remedial goal and objective of the DBE program is to level the playing field by providing small businesses owned and controlled by socially and economically disadvantaged individuals a fair opportunity to compete for federally funded transportation contracts." U.S. Department of Transportation, Disadvantaged Business Enterprise (DBE) Program, https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise.

[242] Tommelein, I. D., & Gazzaniga, T. (2022). Small and Disadvantaged Business Enterprise (SB/DBE) Issues in Caltrans Contract and Bid Process. https://doi.org/10.7922/G20863MN

[243] *Id*.

[244] As noted in Section III above, Justice40 investment are climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure. *See* https://www.whitehouse.gov/environmentaljustice/justice40/.

[245] Office of Acquisition Management, Build America Buy America, https://www.commerce.gov/oam/build-america-buy-america.

f. Tech requirements - what tech is required of the RFP awardee
g. Post award reporting – is there post award reporting required or evaluation requirement

5. Additional information – what items are unusual for the RFP which have not been captured

B. Observations on the RFP analysis

The RFPs Comparison Chart in Appendix E, reflecting our field scan analysis using the above-described methodology, demonstrated several commonalities:

- Contractors/consultants are the primary audience for the RFPs
- Large federal monies (NEVI) require a match, but smaller amounts may be federal pass through
- Justice 40 seems to only overlay large federal money
- Many municipalities have independent Disadvantaged Business Enterprise (DBE) type requirements
- Engagement is required on most of the RFPs mostly with key internal stakeholders
- GIS and tech enabled solutions are common
- Post award requirements are included in most of the RFPs
- Construction and engineering documents are required for several for the contractor bid process
- Requirement for the awardee to find funding sources is common

Some other interesting observations:

- The timelines from RFP release to submission is typically about 1 month,
- There are not many RFPs addressing substantial disadvantaged communities of concern
- Buy America is common for the RFPs with federal matching funds
    - Waivers are considered for market unavailability; there is a process for waiver requests to be submitted for review[246]
    - Waivers are not moving at the rate of market
    - Buy American overlay may encourage new markets for implementation in the US.

Kansas City Focus
If KCMO were to explore issuing one or more RFPs in connection with fleet conversion to alternative fuels, there are several key elements for the City to consider. First, engagement of stakeholders should be a requirement in the process of an EV readiness plan as input from stakeholders who are doing the work can most easily identify the challenges and opportunities.

[246] U.S. Department of Transportation, Federal Highway Administration, Notice of Buy America Waiver Request, https://www.fhwa.dot.gov/construction/contracts/waivers.cfm.

The implementation of the City Fleet conversion plan in KCMO may increase successful implementation with this informed process. Secondly, the time is right for the maximum opportunity for grant funding and matching funds from federal, state, and local entities. Ensuring that petitioners to the RFP identify and align the specific opportunities that the City could apply to for this funding. Third, ensure solutions with tailored technology integrations specific for KCMO. This would include research on compatible elements or suppliers who have compatible technology to the concurrent developments within Kansas City. Fifth, all submissions for the RFP should speak to the overlay and expectations of inclusion of historically disadvantaged communities and businesses. Have the documents available as appendices to the RFP for the applicants to clearly understand expectations. These elements are recommended for consideration by future participants of Law, Technology and Public Policy or other researchers to help inform potential development RFPs for EV readiness. Creating a guided stakeholder integration form for a detailed stakeholder survey and operational standardized practice.

VI. Recommendations and Next Steps

A. Importance of Inclusive Stakeholder Engagement

Utilizing stakeholder engagement is crucial for creating strategy solutions. The purpose of involving key individuals or groups in the planning and construction of alternatives is to increase successful outcomes.[247] When approaching a complex objective, early inclusion of key stakeholders can inform with evidence gathering to frame the problem which is attempting to be addressed.[248] The ability to gather information from these key stakeholders informs the alternatives will allow for greater success in the implementation phase.[249] Stakeholders assist with consultation to build better solutions to address problems. The feedback synthesizes into the framework of construction of alternatives for the problem solution. Collaboration with stakeholders shows improved outcomes for alternatives.[250] In the process of involving stakeholders there is a co creation of solutions with contextual understanding. The ability to acknowledge what you do not understand about the issues intricate to the success of a policy allows the space to invite others in.[251]

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[247] Häberlein, L., & Hövel, P. (2023). Importance and Necessity of Stakeholder Engagement. In E. González-Esteban, R. A. Feenstra, & L. M. Camarinha-Matos (Eds.), Ethics and Responsible Research and Innovation in Practice: The ETHNA System Project (pp. 38–53). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-33177-0_3.

[248] *Id.*

[249] *Id.*

[250] *Id.*

[251] National Implementation Research Network, University of North Carolina at Chapel Hill, https://nirn.fpg.unc.edu/sites/nirn.fpg.unc.edu/files/resources/Stakeholder%20Engagement%20Process%20Handout.pdf.

Kansas City Focus

In KCMO, several key stakeholders were identified as essential to create a framework for implementation of EV solutions. Taking a methodical approach to producing a needs assessment for the City would ensure a baseline could be accessible for solution discovery.[252] Through our conversations with stakeholders, we have identified several of the key stakeholders:

The **Office of Budget** functions as the fiscal manager of Kansas City. A mandate unfunded in the budget rarely can be implemented, especially at the scale of KCMO Fleet conversion. Addressing the following questions would be a good way to build foundational knowledge.

- How will the implementation of EVs fit into the annual budget?
- How would grant seeking affect the budget allowances?
- How will the infrastructure upgrades be phased in budgetarily to accommodate the fleet timeline needs?

Fleet Management for KCMO and specifically the Fleet Division Manager and Fleet Asset Manager. Many of best solutions in asset knowledge and potential implementation abilities will reside in the Fleet department of KCMO. Questions to address include:

- Can division procurement processes be adjusted for like for like in trading an attritional ICE for an EV? At what rate can this be accomplished considering the infrastructure limitations and maintenance differences?
- What are the functions required of the vehicle or what job does the vehicle need to do? What are the features – what features of the vehicle help it to do that function?
- Where would training or hiring need to be planned to accommodate the change in vehicles?

Evergy, as KCMO's electric service provider will need to help identify any electrical upgrades necessary to support Electric Vehicle Supply Equipment ("ESVE"). Working closely with Evergy would be beneficial to create a sound implementation plan. Iterations will be necessary as technology changes.

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[252] James W. Altschuld, & David Devraj Kumar. (2010). *Needs Assessment: An Overview (Book 1)*. SAGE Publications, Inc.

Facilities or City Maintenance staff to guide EVSE construction and installation projects.[253] Infrastructure needs assessment should be completed in conjunction with budget alignment.

- Departments analysis of fleet vehicles to ensure EVs can meet their required use cases.[254]
- Fleet or city staff managers personnel needs to support electricity rate schedules, data tracking, EVSE metering needs, and telematics.
- Degree of need of new facilities construction or alteration/enhancement of existing facilities
- Capacity in electrical structures
    - Electrical contractors to build out any additional wiring needed for EVSE.
    - Vehicle – projections on system needs and safety buffer

Compliance manager to ensure EVSE comply with relevant building codes and safety standards. Compliance with usage and charging policy to optimize charging capacity and minimize cost.

The **IT/Technology Department** will need to assess the technology needed to capture fleet data for financial, feasibility, and siting assessments. EVSE data tracking system implementation and supervision will be crucial in a successful program. Creation of technology interface for control of EV charging schedule and maintenance schedules.

Data Storage and Management will need a plan to use data to optimize performance and a secure archival system.

Cybersecurity will have considerations of the data and systems integrated in the EVs to protect users and employees.

Human Resources will need to plan for incorporating EV and EVSE maintenance trainings or materials for new hires or for existing employees that may be realigned.

B. KCATA Research

The KCATA is presently expanding its electric bus operations. They received two electric buses in 2019, before they had the necessary DC Fast Charging infrastructure in place to put them in service. Despite the supply chain and labor challenges during the Covid-19 pandemic, the KCATA

[253] Office of State and Community Energy Programs Blueprint 4A: Electric Vehicles and Fleet Electrification https://www.energy.gov/scep/blueprint-4a-electric-vehicles-and-fleet-electrification
[254] *Id*.

still installed 2 ChargePoint stations and put the buses into service in 2021. The KCATA then began a project to expand their capacity to accommodate charging 10 buses at once. As of the3 end of the Fall 2023 semester they were projected to have these 10 chargers operational by Q1 of 2024, with the goal of having 10% of their fleet converted to zero emissions vehicles by 2027. However, the KCATA is unsure how to proceed from here with further efforts to electrify their fleet. This expansion project has maxed out the current grid infrastructure for their building. More research will of course be in order as the KCATA continues to explore viable solutions for expanding zero emissions fleet initiatives.

Hydrogen fuel cell vehicles offer a promising solution by operating similarly to electric vehicles (EVs) but with key differences. Unlike EVs, hydrogen fuel cell vehicles have a smaller battery that is continuously recharged by the onboard hydrogen fuel cell. This process produces electricity for the battery, with water vapor as the only byproduct. The cost of hydrogen fuel cell vehicles is comparable to EVs, but they have advantages such as reduced overall weight and less range loss in wintry weather. The primary challenge is sourcing compressed hydrogen gas for refueling, with a potential supplier located in Wentzville, MO. Further research is needed to evaluate the viability of hydrogen technology, including its reliability, costs, supply availability, and the safe transportation and storage of hydrogen.

C. KC Municipal Fleet – Additional Research

KCMO is working on electrifying portions of its municipal fleet. This includes sourcing locations to install EV chargers, researching appropriate types of EVs that are counterparts to their current fleet vehicles, and identifying future funding sources. The City will need long term facilities where chargers can be installed. Research on possibilities for public / private partnerships where a private entity builds a depot charging station that the city can lease should be considered. There are also opportunities to research additional ways to help underserved communities, such as by co-locating fleet chargers that are available for public use, or further research into emissions reductions from replacing ICE vehicles with EVs in these communities. Gathering more information from the City to help envision potential RFPs specific to its needs, or drafting a rubric to analyze an RFP, would both be potential next steps for the City in its fleet conversion endeavors.

Appendix A: KCMO 9-1-2021 News Release and Resolution 200005

City News

Kansas City going green with electric vehicles City Manager makes commitment to increase clean energy fleet Post Date: 09/01/2021 1:35 PM

NEWS RELEASE

The push toward a healthier environment is taking another step forward with City Manager Brian Platt's announcement that new municipal fleet purchases for the City of Kansas City, Missouri, must all be full battery electric vehicles where available.

“This is a big and bold step toward cleaner air, reducing greenhouse gas emissions, and decreasing the city’s dependence on fossil fuels, Platt said. “We all want cleaner air in Kansas City, and to reduce our impact on the planet for future generations.”

Platt on Wednesday signed the new policy, called an administrative regulation, in a ceremony at a city-owned parking lot at 18th & Lydia.

Air pollution contributes to the high rate of asthma in the central city, so reducing gas emissions will make breathing easier for many or our residents. Additionally, increasing our use of electric vehicles will help us achieve our climate protection goals.

“The municipal fleet produces approximately 15% of the city’s greenhouse gas emissions,” said Andy Savastino, the city’s Chief Environmental Officer. “Electrification of our fleet is a necessary step to reach the city’s goal of carbon neutrality for municipal operations by 2030.”

The City of Kansas City already has about 15 electric vehicles in its fleet.

Kansas City has pledged to be climate neutral citywide by 2040. Go to KCMO.gov to learn more about the planning process and join the conversation on electric vehicles and other strategies.

For information, contact City of Kansas City, Missouri Media Relations Manager, Maggie Green, 816-379-6562.

Return to full list >>

https://www.kcmo.gov/Home/Components/

News/News/1700/16 1/3

12/15/23, 10:43 AM Kansas City going green with electric vehicles | City News | CITY OF KANSAS CITY | OFFICIAL WEBSITE

COMMITTEE SUBSTITUTE FOR RESOLUTION NO. 200005

Updating the City's Climate Protection Plan to include new greenhouse gas reduction goals, resiliency, and equity and incorporating into City policy and operations; and directing the City Manager to submit the new Climate Protection and Resiliency Plan to Council by March 31, 2021.

WHEREAS, the City Council by Resolution No. 080754 on July 24, 2008, adopted goals that called for a thirty percent reduction in greenhouse gas emissions from municipal operations and a thirty percent reduction citywide by 2020 from 2000 levels; and

WHEREAS, the City in its municipal operations has not only met those climate goals but exceeded them, by achieving a forty percent reduction in municipal operations by 2017 and citywide emissions have declined twenty-one percent since 2000; and

WHEREAS, Kansas City's commitment to addressing the climate crisis is established by the 2008 Climate Protection Plan and by Resolutions 180475, calling for a transition to 100 percent community-wide renewable electricity as soon as possible, and 181000, directing the City Manager to achieve energy efficiency targets and procure carbon-free energy; and

WHEREAS, the updated greenhouse gas emission reductions for 2020 will continue to show the City of Kansas City, Missouri as a national leader on these efforts and more significantly make the City a healthier and more resilient municipality; and

WHEREAS, the City Council in previously adopted Resolution Nos. 170484, 170586, 181000, and 190233, expressed its support for the Paris Climate Agreement and its targets of a 26-28 percent reduction by 2025 from the 2005 baseline; and

WHEREAS, in November 2019, the UN released the latest Emissions Gap Report, which estimates global emissions will have to decrease by 7.6% every year from 2020 to 2030 for a total reduction of 55% below 2018 levels to have just a 66% chance to keep global warming below 1.5°C; and

WHEREAS, on June 24, 2019 more than 70 health organizations including the American Medical Association and the American Public Health Association declared climate change to be a health emergency and issued a call to action for government, business, and civil society leaders to recognize it as such; and

WHEREAS, without serious intervention on the climate crisis, Kansas City will see more extreme high temperatures, intensified heat waves, more frequent severe precipitation and flooding, as well as longer dry periods in the coming years; and

WHEREAS, these changes in Kansas City's local climate will lead to reduced air quality, degradation of water quality, population displacement, mental health problems, increased injury, greater incidence of certain infectious diseases, and death; and

WHEREAS, climate change affects all residents and businesses, but communities that already face socioeconomic and health inequities will be most severely impacted, including youth, elderly, people of color, and low-income communities, and such communities therefor require an investment in resilience that is proportionate to these more severe risks; NOW THEREFORE,

BE IT RESOLVED BY THE COUNCIL OF KANSAS CITY:

Section 1. That the City develop a comprehensive Climate Protection and Resiliency Plan that incorporates greenhouse gas reduction, climate adaptation, and carbon sequestration strategies.

Section 2. That the City reaffirms that climate protection and greenhouse gas reduction should be key factors in all decisions and actions by the City.

Section 3. That the City will work to reduce greenhouse gas emissions from City municipal operations seventy percent (70%) below 2005 levels by 2025, and a goal of being climate neutral by 2030, including a one hundred percent (100%) reduction for emissions related to electricity consumption by 2022.

Section 4. That for citywide emissions, the goal will be to reduce greenhouse gas emissions thirty percent (30%) below 2005 levels by 2025, a fifty percent (50%) reduction by 2030, and a goal of being climate neutral by 2040, including a one hundred percent (100%) reduction for emissions related to electricity consumption by 2030.

Section 5. That the City will develop plans to accomplish these goals through a transparent and inclusive stakeholder process which includes community members as well as representatives from organizations representing faith groups, youth, labor, unions, public health groups, businesses, academic institutions, homeowners' associations, housing groups, and environmental, economic, racial, gender, family and disability justice and indigenous, immigrant and women's rights organizations and other such interested parties who will be integral to the effort.

Section 6. That the City, working collaboratively with key stakeholders, will develop specific strategies to achieve these new targets and such solutions shall include, but are not limited to, building efficiency, carbon sequestration, renewables, waste reduction, electrification of vehicles, water heating, space heating, transit, walking and bicycling access, land use, tree planting, and green infrastructure, while recognizing that all appropriate or required strategies may not yet be known.

Section 7. That the City Manager is hereby directed to develop and submit to the Council by March 31, 2021 the new Climate Protection and Resiliency Plan that reflects these goals in consultation with key community stakeholders.

Appendix B: KCMO City Council Resolution 190838 (Re: Emerging Technology Board)

Establishing the Emerging Technology Board to replace and expand on the work of the Smart City Advisory Board.

WHEREAS, through Smart City and other endeavors, Kansas City has embraced human-centered uses of emerging technology, inter-connectivity, and efficient, data-driven governance and decision making to improve the delivery of public services and the well-being of residents and visitors; and

WHEREAS, uses of emerging technology can advance achievement of goals relating to health care, education, quality of life and climate, safe environments, the creation of opportunities for innovation, entrepreneurship, and economic development, and other goals identified in City planning, including in the City-wide business plan; and

WHEREAS, at the same time, emerging technology experiments and deployments by the City, by businesses seeking to operate in the City, and by public- private partnerships, present new challenges and risks of adverse impacts on individual rights, the public commons, and governmental services and processes which the City should be prepared to assess and address with diligence, care, transparency and accountability; and

WHEREAS, the development of appropriate policies and practices to facilitate the desired generation of public benefits from innovative uses of emerging technology without undue costs and risks requires gathering and utilizing well-informed, timely, diverse, and meaningful input from subject matter experts, residents, and other stakeholders, and from well-coordinated, collaborative efforts across City departments and agencies; and

WHEREAS, the Council believes because of the rapidly accelerating complexity of interactions with emerging technologies, City government should adhere to the following "core principles" to guide its procurements and deployments of new technologies, negotiation of related public-private partnerships, and well-balanced regulation of and interactions with emerging technology-based businesses:

(i) The City should seek to ensure that (a) City air, water, land, food, and affordable housing are of sufficiently high quality and accessibility so all individuals in our communities can have healthy, fulfilling, and dignified lives; (b) public commons and privacy rights of individuals are protected; and (c) there are equitable opportunities for education, life-long learning, health and wellness, and economic prosperity for all residents; and

(ii) The City should employ existing mechanisms, and where necessary or appropriate, develop new mechanisms to gather well-informed, timely, diverse, and meaningful input from subject matter experts, residents, and other stakeholders in deliberations on emerging technology matters

involving significant decisions affecting residents' and visitors' individual rights, equitable outcomes, governmental accountability, transparency, and responsiveness ("Significant Emerging Technology Decisions"); and

WHEREAS, Committee Substitute for Resolution No. 150289 created a Smart City Advisory Board, which since 2015 has focused its work primarily on Smart City endeavors in the Smart Corridor along the Streetcar line; and

WHEREAS, on August 15, 2019, a workshop organized as an activity related to an interdisciplinary Law, Technology and Public Policy course, was held at UMKC to gather feedback on a preliminary abstract of a proposal for the City to establish an Emerging Technology Board; and

WHEREAS, a report on the feedback gathered at the workshop was submitted to the City's Chief Innovation Officer on September 6, 2019; and

WHEREAS, feedback from the nearly 50 workshop participants, including leaders of several neighborhood associations, City staff, educators, community organizations, representatives of business and technology entrepreneurs, and others, compiled and analyzed in that workshop report supports the conclusion that the Emerging Technology Advisory Board should be established; NOW, THEREFORE,

BE IT RESOLVED BY THE COUNCIL OF KANSAS CITY:

Section 1. That the Emerging Technology Board (the "Board") is hereby created and established and charged with the following:

(i) fostering a system of collaboration among City departments and agencies on significant emerging technology decisions;

(ii) providing City decision makers with well-informed advice on significant emerging technology decisions involving City uses of emerging technology, City regulation of new technology uses by private entities and by public-private partnerships, consistent with the core principles set forth above; and

(iii) regularly engaging community stakeholders to help inform such advice.

Section 2. The Board shall have seven voting (7) members ("Voting Members") appointed by the Mayor, subject to the following terms and conditions:

a. One (1) Voting Member may be the City's Chief Innovation Officer, who may serve as the Board's Chair.

b. One (1) co-Chair Voting Member, who is not a City employee, who should have substantial experience in engaging with community or neighborhood groups; and

c. Five (5) Voting Members shall be individuals who are not City employees, consisting of individuals with expertise and experience in the following fields: technology innovation; business and entrepreneurship; law and policy development; anthropology or sociology; and public affairs.

Section 3. The Board shall have five (5) *ex officio* (non-voting) members *("Ex Officio* Members") appointed by the Mayor, who are heads of or senior staff in departments with responsibilities that cut across all or substantially all City departments and agencies.

Section 4. All Voting and *Ex Officio* Members of the Board shall serve without compensation and be appointed for two (2) year terms (with no limit on the number of times they may be reappointed); provided, any Board Member may be removed and replaced as such by the Mayor at any time.

Section 5. The Board will meet no less frequently than quarterly. The Board has the power to adopt rules governing its own procedures and determinations of the time and place of its regular and special meetings, subject to the general requirement that it seek to adhere to the core principles in its work, and subject to the following specific requirements:

a. On all significant emerging technology decisions coming before the Board for its advisory input to City decision makers, the Board will be required to gather well-informed, timely, diverse, and meaningful input from residents and other community stakeholders, and include in its reports and recommendations on such decisions disclosure of the substance of that input and manner it was sought and obtained;

b. In developing its advice and recommendations on each significant emerging technology decision, the Board shall seek input from individuals without conflicts of interest who collectively possess all the subject matter categories of relevant expertise listed below the Board Chair deems relevant, whether or not such individuals are Board Members, and suggest collaborations among and information gathering from City departments as the Board Chair deems relevant to any decision. For purposes hereof, "relevant expertise" means expertise in one or more of the following subjects:

1. Business management
11. Cyber security
iii. Data sharing agreements
1v. Efficiency/business processes
v. Engineering and science of emerging technologies

vi. Ethics
vii. Finance
v111. Government administration
Ix. Laws pertaining to information and privacy
x. Political Science
XI. Transparency and plain language
xu. Technology contracts (hardware and software)

c. The Chair and Vice Chair shall collaborate on setting the agenda for each Board meeting, with the understanding that significant emerging technology decisions may be brought before it by City personnel or by community stakeholders;

d. Unless otherwise required by applicable law, all Board meetings shall be open to the public, with appropriate notice (including a meeting agenda) posted in advance of each meeting. Minutes of each Board meeting shall be posted on the City's website.

e. No later than the 1st of August of each year, the Board shall submit an annual report to the Mayor's Office, the City Council members, and the City Manager summarizing its work and achievements and communicating its performance metrics and costs incurred, if any, and, with regard to input gathered by community stakeholders, that report must include the extent to which community stakeholder input was considered when arriving at the Board's advice to applicable City decision makers, and further, to the Board's knowledge, taken into account in the deliberations by such decision makers.

Section 6. The City shall provide the Board with funding, and staff support, as the City Manager deems reasonable and appropriate to carry out its functions as contemplated by this Resolution.

Section 7. As an initial activity, the Board shall engage subject matter experts from diverse fields and perspectives to train its Members in planning adherence to core principles in advising City decision makers on City interactions with emerging technologies, and then, subject to meeting the other requirements set forth in Section 5 above, develop and adopt operating rules, guidelines, and a code of conduct consistent with that training, including, without limitation, rules regarding avoidance of conflicts of interest on matters that come before the Board.

Section 8. The Smart City Advisory Board created by Committee Substitute for Resolution No. 150289 is hereby dissolved and terminated.

180838

Authenticated as Passed

Quinton Lucas, Mayor

Marilyn Sanders, City Clerk

OCT 17 2019

Date Passed

Appendix C: List of Interviewees

i. Community Mentor

- David Bodde – Professor and Senior Fellow, Clemson University

ii. ES&I Mobility Solutions

- Calvin Wiley – Senior Consultant

iii. Mid-America Regional Council (MARC)

- Amanda Graor – Chief Innovation Officer
- Ryan Umberger – Transportation Planner
- Karen Clawson – Transportation, Air Quality, Climate
- Selina Zapata Bur – Performance Management, Key Mobility Efforts

iv. Environmentally Responsible Transportation Center (ERTC)

- Dr. Jia Li – Associate Professor in Transportation, Washington State University
- Dr. Tiankai Wang – Associate Professor in Health, Texas State University

v. City of Kansas City, MO Staff

- Diana Radzevich – Executive Assistant for Councilman O'Neill
- Jill Lawlor – Executive Fellow Office of the Mayro, Grant Development and Management
- Larissa Westenkirchner – Regulatory Compliance Manager
- Mahmoud Hadijan – City Engineer
- Jason Waldron – Director of Transportation
- Dan Williams – Fleet Division Manager for KC, MO
- Blake Butler – Fleet Asset Manager

vi. Evergy

- Julie Dietrich – Fleet Electrification Manager

vii. KCATA

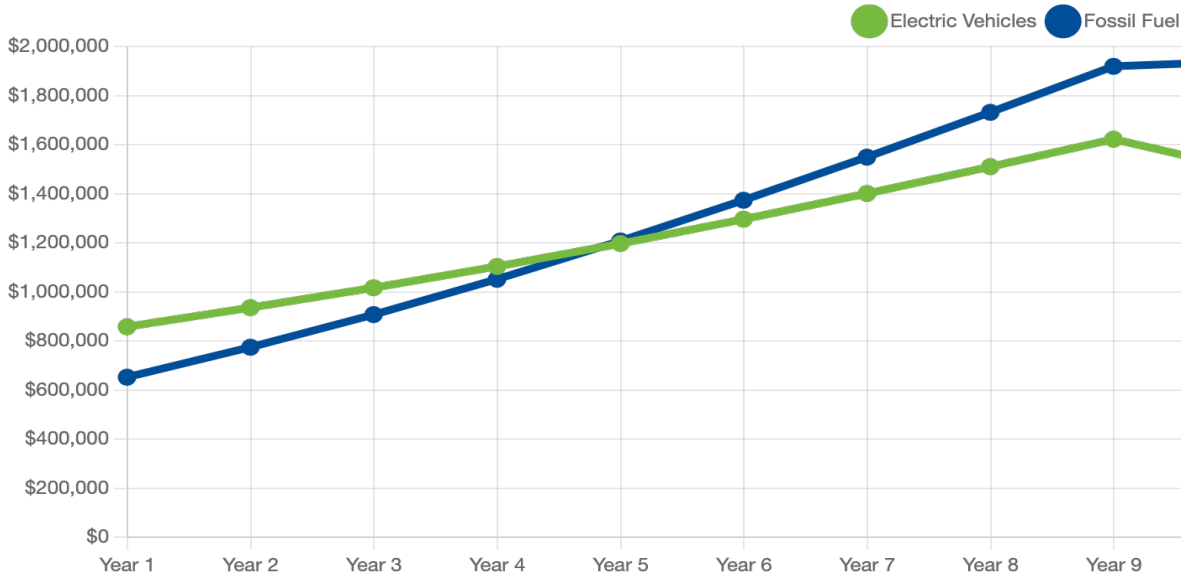
- Dick Jarrold – Vice President of Regional Planning and Development
- Bill Yord – Senior Project Manager

Appendix D: Evergy Fleets Calculator

After 5 years
The cumulative cost of electric vehicles becomes cheaper than the cost of an equivalent fossil fuel 5eet.

You're looking at $430,406 in savings over the life of the vehicles.

Cumulative Costs Over Time

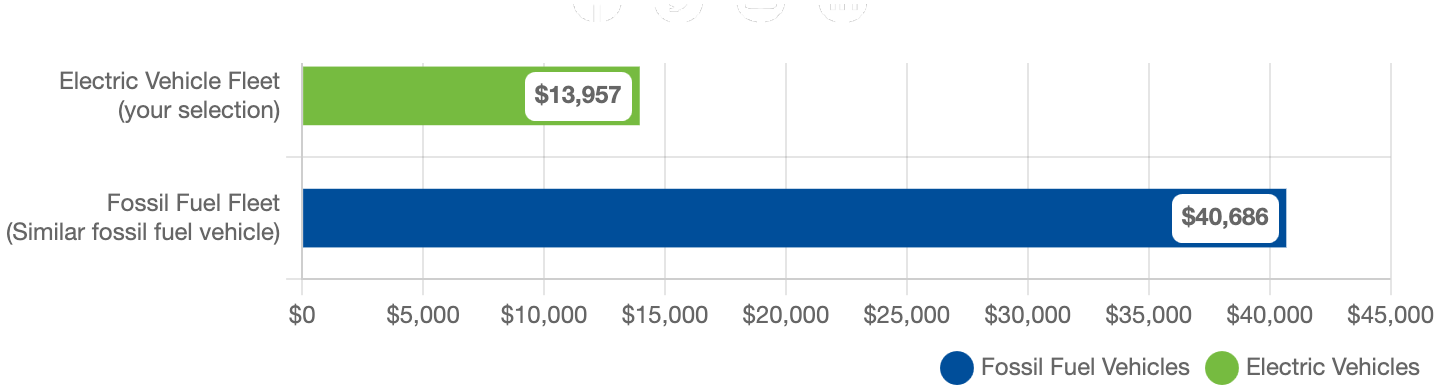


Total Costs

BAR CHART | WATERFALL

Annual Fuel Costs

Based on your selections, your electric 5eet will cost **$26,728** less per year than its fossil fuel equivalent.



Fossil Fuel Vehicle Fleet

Vehicle Set	Count	Efficiency (MPG)	Miles	Fuel Cost ($/Gal)	Cost
Pickup Truck light duty	10	19	260,893	$2.96	$40,686
Annual Total					**$40,686**
Vehicle Lifetime Total					**$406,856**

Gasoline Price Source: AAA

Electric Fuel Vehicle Fleet

Vehicle Set	Count	Efficiency (MPGe)	Miles	Fuel Cost ($/kWh)	Cost
All Vehicle Sets	10	N/A	260,893	N/A	$13,957
Vehicle Lifetime Total					**$139,571**

Electric vehicle fueling costs are calculated in aggregate for the site, and can not be separated by vehicle set.

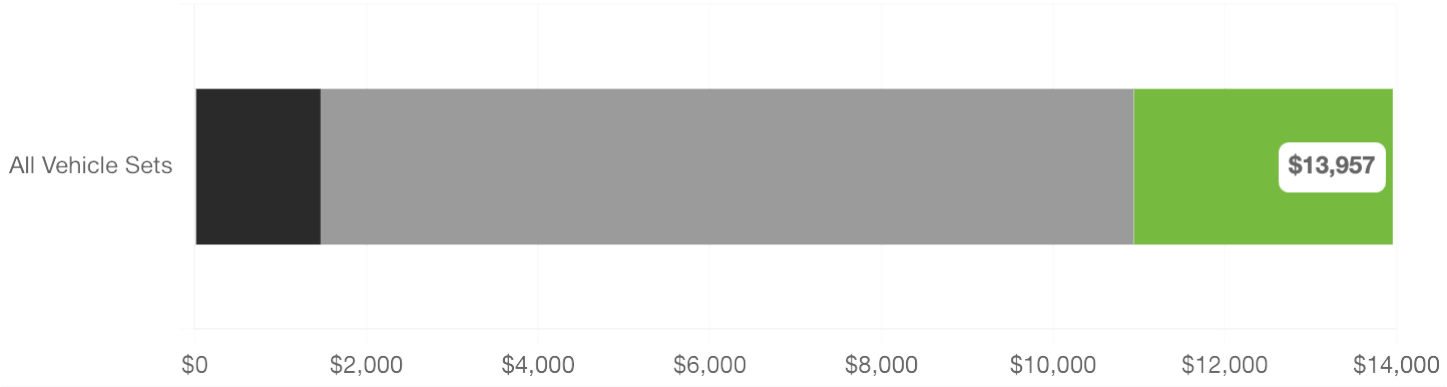
Electricity Rate Source: Evergy

Fleet Electricity Costs

Total annual electricity costs of **$13,957** are calculated from the load pro_le on the Electricity Tab and the **Business EV Charging Service (BEVCS)** Plan explained below.
The prices do not include taxes, Energy Cost Adjustment (ECA) Property Tax Surcharge (PTS) Transmission Delivery Charge (TDC). To see all the details of the Electric Vehicle Plan, please reference detailed tariffs

Our Business EV Rate Plan can help you lower your energy bills and further reduce your carbon footprint. When you avoid charging during **peak times (M-F 2pm-8pm)** we'll pass on the savings to you. On **weekends and holidays**, you always save.

Estimated annual average cost



Electricity

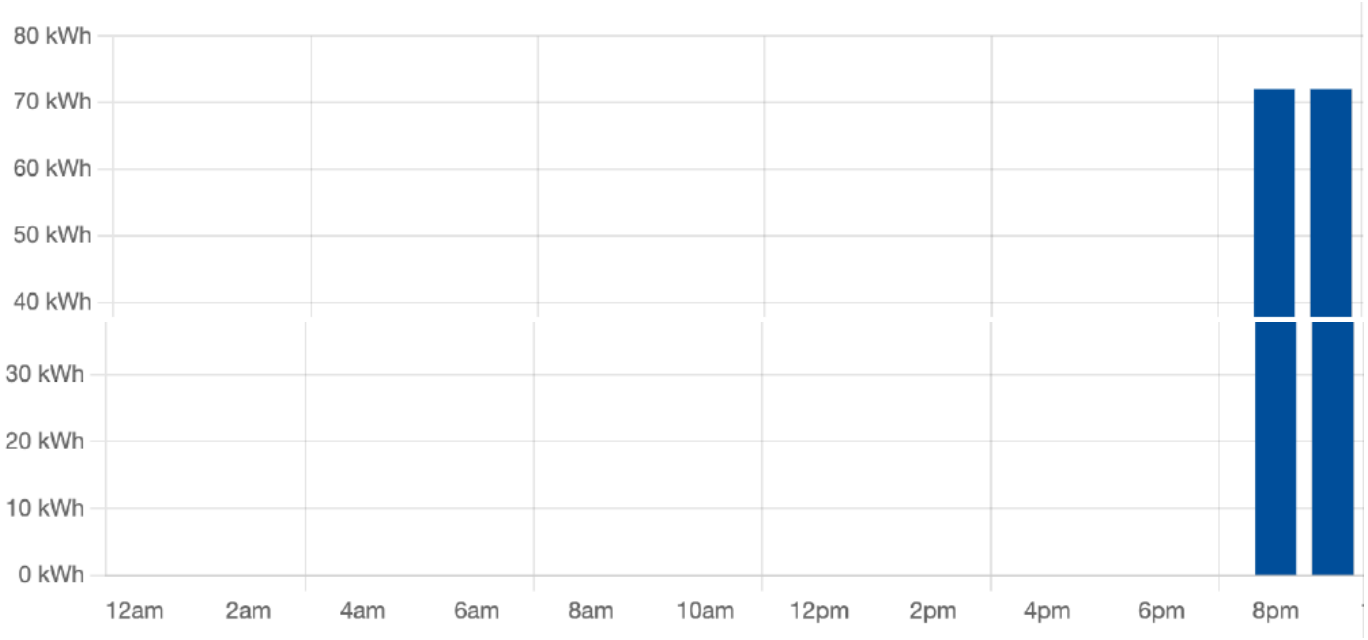
Fixed Energy Demand Other

Your 5eet will draw an estimated peak of **72** kW and use an estimated **10,868** kWh of electricity per month.

Weekly Battery Schedule

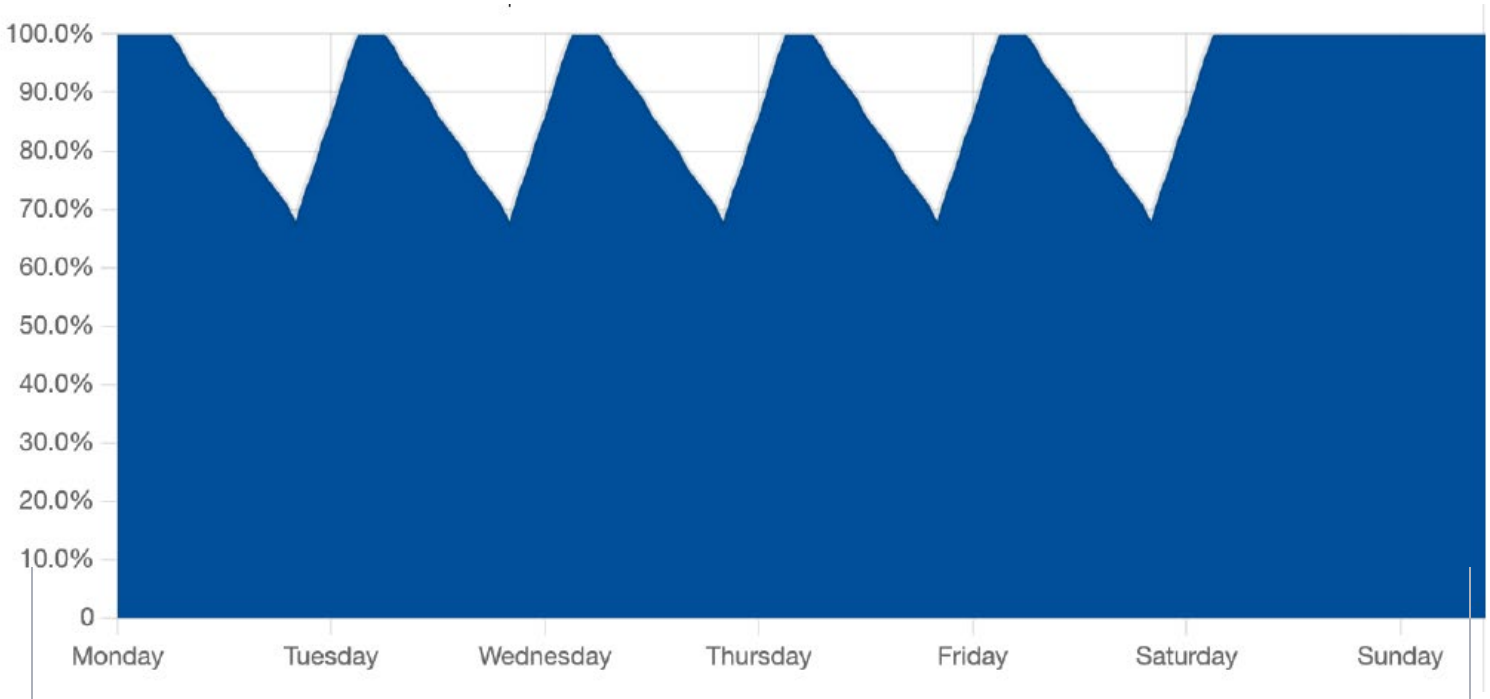
Day of the Week

Site Load Profile (KWh) Monday



Note that the peak usage occurs on Tuesday, Wednesday, Friday, and Sund

Weekly Battery Schedule



Incentives

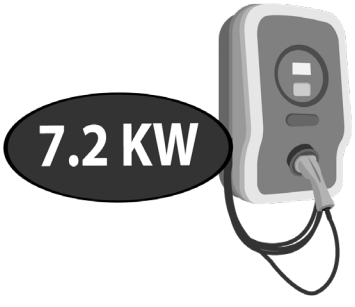
Charging

Charging and Facility Needs

Total estimated charger cost **$66,160**

Generic Level 2 - 7.2 KW

Single Port



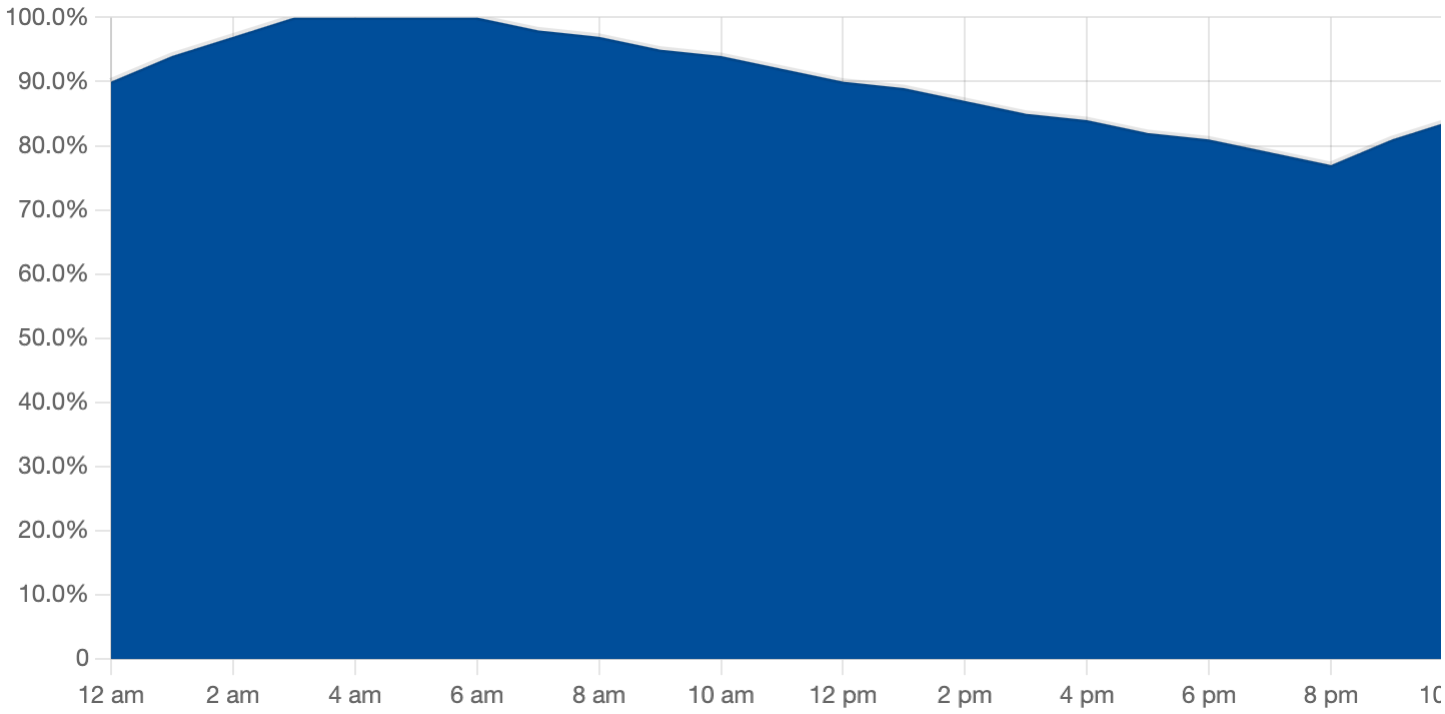
Connectivity

Estimated Cost	$350
Port kW	7.2 kW
Amps	30 amps
Plug Type(s)	J1772
Cable Length	25 ft³
Ports	1
Form Factor	Wall mounted
Outlet(s)	N/A
OCPP	N/A
OSCP	N/A
Vehicle to Grid	No
Warranty	3 Year(s)
Certifications	UL, cUL

Charger Assignment

Charger Type	Time
Generic Level 2 - 7.2 KW | Single Port | Minimum Req: 10	8pm - 6am

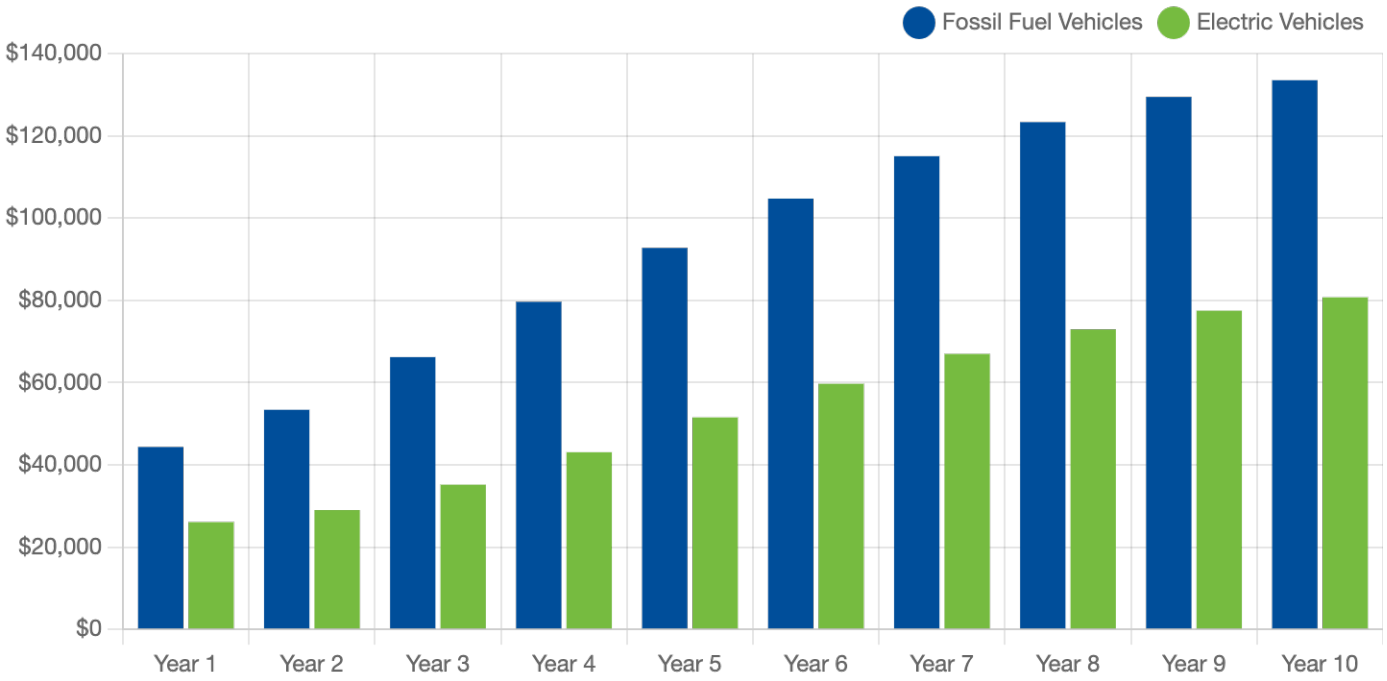
Charging Over Time



Note: The graph assumes daily mileage is averaged across all hours of the day when the vehicle is not available to charge. Actual mileage and battery state will differ.

Maintenance costs include routine periodic maintenance. Excludes battery replacement.

Annual Maintenance Costs



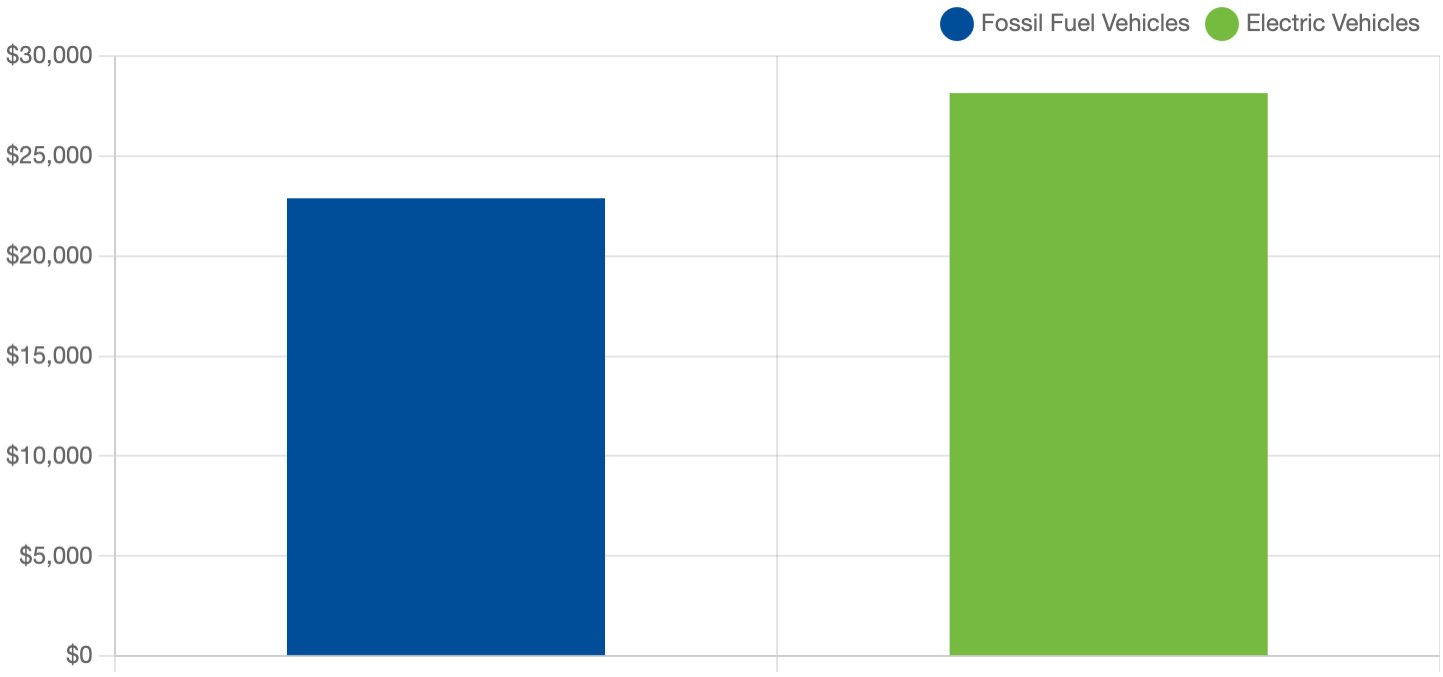
Electric Vehicle Fleet

Average Maintenance Cost Per Mile	$0.21
Maintenance Cost Per Year	$54,270
Total Maintenance Cost	$542,696

ICE Vehicle Fleet

Average Maintenance Cost Per Mile	$0.36
Maintenance Cost Per Year	$94,236
Total Maintenance Cost	$942,356

Annual Insurance Costs



Vehicle Comparison

Select a vehicle set below to compare costs, incentives and speci_cations of fossil fuel and EV equivalents.

2023 Generic Light Duty Pick-up Truck

Electric

Annual Electricity Cost	$13,957
Electric Efficiency	67.19 MPGe
Electricity Cost Per Mile	$0.05
Total Miles Per Year	260,893 mi

Specs

Cargo Volume	N/A
Seating	N/A
Headroom	N/A
Legroom	N/A

2023 Generic Light Duty Pick-up Truck

Gas

Annual Fossil Fuel Cost	$40,686
Fossil Efficiency	19 MPG
Gasoline Cost Per Mile	$0.16
Total Miles Per Year	260,893 mi

Specs

Cargo Volume	N/A
Seating	N/A
Headroom	N/A
Legroom	N/A

11 tons

of CO potentially saved per year

114 tons

of CO potentially saved over vehicle lifetime

474

trees planted per year

4,743

Trees planted over vehicle lifetime

Item	Diesel	Gasoline	Notes
Annual Miles	0 miles	260,893 miles	The total number of miles
Fossil Fuel Volume	0.00 Gal	13,731.20 Gal	For each vehicle set, we applied each vehicle's mpg to the annual miles driven.
Fossil Fuel CO_2 Emissions	22.45 Lbs CO /Gal	17.86 Lbs CO /Gal	Source: U.S. Energy Information Administration
CO_2 Emissions by Fossil Fuel	0 Lbs	245,239 Lbs	"Fossil Fuel Volume" * "CO Emissions In Lbs/Gal"
Total CO_2 Emissions	245,239 Lbs CO		"Diesel CO Emissions" + "Gasoline CO Emissions" + "LPG CO emissions"
Electricity Equivalent	130 MWh		The amount of electricity required to replace the selected 5eet of fossil fuel vehicles one-to-one with electric vehicles.
Electricity CO_2 Emissions	1,706 Lbs/MWh		Source: U.S. Energy Information Administration
CO_2 Emissions from EV charging	222,472 Lbs CO		"Electricity Equivalent" * "California Electricity CO Emissions"
CO_2 Emissions Reduced	22,767 Lbs CO		"Total Emissions from Fossil Fuels" - "CO Emissions for Equivalent EVs"
Trees Planted (Equivalency)	474 trees		Assumes a tree absorbs 48lbs of CO per year. Source: European Environment Agency

Appendix E: RFPs Comparison Chart

General Information				Funds				
RFP Title	**Lead Entity for Disbursement**	**RFP or Proposal Link**	**Project Location (City/ State/ County)**	**Funding Source**	**Award Amount (if specified)**	**Maximum Federal Share?**	**Minimum Match?**	**Other Match Incent.**
Charge Up Kansas -- NEVI RFP	Kansas Department of Transportation	https://ikewebstorage.blob.core.windows.net/files/NEVI-RFPs/KDOT_NEVI_RFP_Bid_Application_fillable-PDF.pdf	KS	NEVI Formula Funds	$39.5 million dispersed to awardees, amount dependent on project	80%	Minimum 20% local cash match	N/A
Infrastructure Plan for Fleet Electrification	City of Elk Grove, CA	https://www.elkgrovecity.org/sites/default/files/city-files/Departments/Purchasing/Request%20For%20Proposals/2022/RFP_Fleet%20Infrastructure_Final.pdf	Elk Grove, CA	Municipal	$1,000,000.00	N/A	NO	NO
RFP Public Agency Electric Vehicle Fleet Transition Assistance	Peninsula Clean Energy	https://www.peninsulacleanenergy.com/solicitation/rfp-public-agency-electric-vehicle-fleet-transition-assistance/	San Mateo County, CA	Municipal	$400,000.00	N/A	NO	NO
Fleet Study (RFQ)	City of Sammamish Department of Parks, Recreation, & Facilities	https://www.sammamish.us/media/p2lbhhfp/city-of-sammamish-fleet-electrification-rfq.pdf	Sammamish, WA	Municipal	Detailed scope and fee to be negotiated upon selection	N/A	NO	NO
To Prepare a Zero Emission Vehicle Transition Plan for the County of Nevada [CA]	The Nevada County Transportation Commission (NCTC)	https://www.nctc.ca.gov/documents/RFPs/Addendum-1-NC-Zero-Emission-Vehicle-Transition-Plan-RFP-Jan-2023.pdf	Nevada County, CA	Federal	$230,000	NO	NO	NO
RFQ: Fleet Electrification Strategy	The City of Bainbridge Island (City), WA	https://www.bainbridgewa.gov/bids.aspx?bidID=121&PRINT=YES	The City of Bainbridge Island (City), WA	Municipal	$100,000.00	NO	NO	NO
Oshkosh MPO Electric Vehicle (EV) Readiness Plan	East Central Wisconsin Regional Planning Commission	https://www.ecwrpc.org/2023/05/08/rfp-oshkosh-mpo-electric-vehicle-ev-readiness-plan/	Oshkosh, WI	NEVI Formula Funds	Unknown	NO	NO	NO
NCPA RFP Fleet Electrification Plan	The City of Lodi, CA	https://www.ncpa.com/wp-content/uploads/2022/03/City-of-Lodi-Fleet-Electrification-RFP-3.25.22.pdf	Lodi, CA	City of Lodi Electric Utility	Unknown	NO	NO	NO
Electric Vehicle Charging Infrastructure, Electric Vehicle Car Share and Related Operations Services	City of New Rochelle, NY	https://www.newrochelleny.com/DocumentCenter/View/12679/RFP-NR--5335?bidId	New Rochelle, NY	None	NO	NO	NO	NO
Request For Qualifications for the Creation of an Electric Vehicle Master Plan	City of Overland Park, KS	This link is no longer available.	Overland Park, KS	Municipal	Not specified	NO	NO	NO
Electric Vehicle Charger Installation for Public Use at City Facilities	City of Dayton, OH	https://www.daytonohio.gov/DocumentCenter/View/12711/RFP-No-22-034CMO-Electric-Vehicle-Charger-Installation-for-Public-Use-at-City-Facilities?bidId	Dayton, OH	Municipal	Not specified	NO	NO	NO
Level 2 Electric Vehicle Supply Equipment (EVSE)	Santee Cooper, SC	https://www.peakload.org/assets/news/Santee%20Cooper%20Level%202%20EVSE%20RFP.pdf	South Carolina Public Service Authority	Public Utility	Not specified	NO	NO	NO
Request for Information for Networked EV Charging Stations	Philadelphia, PA	https://www.phila.gov/media/20211013170934/OTIS-Networked-EV-Charging-Stations-RFI-20211014.pdf	Philadelphia, PA	Municipal	None	NO	NO	NO
Electric Vehicle Infrastructure Master Plan	Marysville, OH	https://www.marysvilleohio.org/bids.aspx?bidID=119	Marysville, OH	Municipal	Not specified	NO	NO	NO

General Information	Deadlines		Additional Info.	
RFP Title	**Proposal Deadline**	**Award Annouce.**	**Other Notes**	
Charge Up Kansas -- NEVI RFP	7/21/2023	9/1/2023	https://ikewebstorage.blob.core.windows.net/files/EV-Charging-Infrastructure-Call-for-Projects-Webinar-Slides.pdf	https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-680
Infrastructure Plan for Fleet Electrification	2/11/2022	N//A	Scope of work and considerations may be helpful for tech portions of model RFP and context memo.	
RFP Public Agency Electric Vehicle Fleet Transition Assistance	2/8/2022	1/4/2022		
Fleet Study (RFQ)	8/11/2023	9/18/2023	This is just the RFQ. RFP was not released to my knowledge. Many terms to be negotiated upon award.	
To Prepare a Zero Emission Vehicle Transition Plan for the County of Nevada [CA]	2/7/2023	2/24/2023	Robust RFP for county-level	
RFQ: Fleet Electrification Strategy	10/24/2022	11/28/2022	Gap analysis	
Oshkosh MPO Electric Vehicle (EV) Readiness Plan	5/8/2023	5/30/2023	Public Engagement, which should follow ECWRPC's Equity in Engagement Toolkit and Guidebook	
NCPA RFP Fleet Electrification Plan	4/22/2022	March 25, 2022	Gap analysis	
Electric Vehicle Charging Infrastructure, Electric Vehicle Car Share and Related Operations Services	8/19/2020	Unknown	Analysis of sites and infrastructure needs	
Request For Qualifications for the Creation of an Electric Vehicle Master Plan	10/24/2022	None specified	Analysis of existing conditions for EV adoption and infrastructure installation, Assessment and Gap Analysis, Recommendations, Implementation (Strategies, Roles/ Responsibilities, Timeline, and Cost Estimates)	Consultant shall identify barriers to and methods of increasing EV usage by City Fleet vehicles and general public, identify opportunities such as smart charging, renewable energy, and battery storage to optimize grid capacity, analyze innovative charging options, and investigate opportunities for partnerships to increase EV usage and opportunities. Examples of a parking ordinance and signage to prevent non-electric vehicles from parking at EV chargers should be provided and an Overland Park-specific version recommended.
Electric Vehicle Charger Installation for Public Use at City Facilities	10/7/2022	11/1/2022		
Level 2 Electric Vehicle Supply Equipment (EVSE)	7/13/2020	None specified	Fleet electrification, Understanding of benefits and risks of installing charging infrastructure, Advocating for the purchase of electric vehicles by employees and Customers, Employee satisfaction	
Request for Information for Networked EV Charging Stations	11/29/2021	None specified		
Electric Vehicle Infrastructure Master Plan	8/5/2022	9/1/2022	Implementation strategy	Zoning changes to support and incentivize electric vehicle charging infrastructure

General Information	Requirements			
RFP Title	**Eligible Entities**	**Justice40 (40% Benefit)?**	**"Distressed" or Minority-owned bus. incent./ require.(Outside of Justice 40)**	**Buy-America Waiver?**
Charge Up Kansas -- NEVI RFP	Private businesses; Non-profits; Educational institutions; Metropolitan planning organizations; Units of local governments; Indian tribes; Authorities, agencies, or instrumentalities or entities owned by, one or more entities listed above; Groups of entities listed above	YES - Required	NO	YES - Applies to federally funded AC Level 2 and DCFC EV chargers
Infrastructure Plan for Fleet Electrification	Contractor (Consultant)	NO	NO	NO
RFP Public Agency Electric Vehicle Fleet Transition Assistance	Contractor (Consultant)	NO	General Order 156 (GO 156) is a California Public Utilities Commission ruling that requires utility entities to procure at least 21.5% of their contracts with majority women-owned, minority-owned, disabled veteran-owned and LGBT-owned business enterprises' (WMDVLGBTBEs) in all categories. Qualified businesses become GO 156 certified through the CPUC and are then added to the GO 156 Clearinghouse database.	NO
Fleet Study (RFQ)	Contractor (Consultant)	NO	NO	NO
To Prepare a Zero Emission Vehicle Transition Plan for the County of Nevada [CA]	Contractor (Consultant)	NO	"DBE and other small businesses, as defined in Title 49 CFR, Part 26 are encouraged to participate in the performance of agreements financed in whole or in part with federal funds"	NO
RFQ: Fleet Electrification Strategy	Contractor (Consultant)	NO	NO	NO
Oshkosh MPO Electric Vehicle (EV) Readiness Plan	Contractor (Consultant)	NO	YES	NO
NCPA RFP Fleet Electrification Plan	Contractor (Consultant)	NO	NO	NO
Electric Vehicle Charging Infrastructure, Electric Vehicle Car Share and Related Operations Services	Contractor (Consultant)	NO	NO	NO
Request For Qualifications for the Creation of an Electric Vehicle Master Plan	Contractor (Consultant)	NO	NO	NO
Electric Vehicle Charger Installation for Public Use at City Facilities	Contractor (Consultant)	YES - but not Required	AAA affirmative action alliance certified	NO
Level 2 Electric Vehicle Supply Equipment (EVSE)	Contractor (Consultant)	YES - but not Required	NO	NO
Request for Information for Networked EV Charging Stations	Contractor (Consultant)	NO	NO	NO
Electric Vehicle Infrastructure Master Plan	Contractor (Consultant)	NO	NO	NO

General Information	Requirements		
RFP Title	**Community/ Stakeholder Engagement, e.g., forums, surveys, campaigns, etc.**	**Tech. Requirements**	**Post-Award Reporting Requirements?**
Charge Up Kansas -- NEVI RFP	NO	- Minimum of 5 years in service at 97% uptime - Buy America compliant, UL certified equipment installed by certified techs (EVITP or continuing ed. certificate f/ registered apprenticeship) - Must provide a contactless payment method - Price for charging must be displayed before initiating a charging transaction and be based on the price per kWh - Data sharing to third-parties through free APIs	Quarterly data submission for 5 yrs
Infrastructure Plan for Fleet Electrification	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	NO - part of project scope is to provide technical considerations and guidelines	Not specified
RFP Public Agency Electric Vehicle Fleet Transition Assistance	In coordination with Peninsula Clean Energy staff, facilitate outreach and engagement with local agency staff and other stakeholders, as necessary, to gather baseline information (e.g. fleet inventories, "as built," current electrical infrastructure layout, panel schedules, and capacity, etc.), determine near-term and long-term fleet transition policies and planning, scope specific projects with selected agencies, and provide ongoing support during pre-construction planning.	Construction engineering documents that the agency can use in a public bid to hire contractors for installation services. These documents will include: a. Project description and any relevant specifications b. Architectural renderings (a.k.a. "as built") of the parking areas and other facilities, as relevant c. Electrical single-line diagrams d. Other documents, as required by the public agency, to bid these charging station installation projects or receive permits	Provide a final report for public distribution that includes an executive summary, challenges encountered and lessons learned, best practices for other public agency fleets, case studies, etc.
Fleet Study (RFQ)	- To work with "Staff Work Group, " which may include City Manager's Office, Community Development, Public Works, Parks and Rec - To present findings at 6 City Council meetings	NO - part of project scope is to provide technical considerations and guidelines	Not specified beyond working with and sharing updates with the Staff Work Group and presenting findings at Council meetings
To Prepare a Zero Emission Vehicle Transition Plan for the County of Nevada [CA]	Visit facilities and discuss infrastructure needs, capacity, etc.	Local electric utility provider (PG&E and Liberty Utilities in Truckee) requirements	Deliverables of task areas include summary reports; the final report is the plan
RFQ: Fleet Electrification Strategy	PSE and City Staff	Detail cost assessment tool and guidance	Performance benchmarks
Oshkosh MPO Electric Vehicle (EV) Readiness Plan	local government staff, local stakeholder, and residents to better understand emerging transportation technology and position Oshkosh to be aligned	GIS enabled final product	None
NCPA RFP Fleet Electrification Plan	Input from city staff for final implementation plan	Charging infrastructure tools and grid analysis	None
Electric Vehicle Charging Infrastructure, Electric Vehicle Car Share and Related Operations Services	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	Privately considered car share program to benefit contractor	Not specified
Request For Qualifications for the Creation of an Electric Vehicle Master Plan	Evergy (Utility), city and programs present and future	NO - part of project scope is to provide technical considerations and guidelines	Final EV Master Plan will be an attractive and graphically rich document.
Electric Vehicle Charger Installation for Public Use at City Facilities	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	NO	None
Level 2 Electric Vehicle Supply Equipment (EVSE)	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	Capturing EV interval charging data • Analyzing data to understand charging habits in a workplace setting	None
Request for Information for Networked EV Charging Stations	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	Hardware, software, and communications capabilities	None
Electric Vehicle Infrastructure Master Plan	NO - RFP does not include public or stakeholder engagement in the scope of work or list of considerations	None	None

Appendix F: EV Toolkit

TOOLKIT FOR ELECTRIC VEHICLE CONVERSION

Matt Walker, Meredith Morrison, Janelle Sjue

Law 8921

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INTRODUCTION

Climate change is complicated. Each region and city must wrestle with the tension of the burden that their operations which provide citizens the essential business of a city, and the progress which invigorates and stimulates economies with the effects the commerce and services places on the Greenhouse Gases produced. Cities across the nation are looking to practices and technologies which may allow the continuation of growth with ecologically benefiting practice. Electric Vehicles have been shown to represent one of the technologies which may allow a city to reduce their carbon footprint without compromise on growth. We would like to acknowledge three realities in this application space, 1) power used for EV vehicles is still primarily sourced from carbon and in that way not eliminating the effects to the degree that we would like to see. We need to continue to seek green sourced energy. 2) Technologies in EV is progressing at greater speeds, so why deploy now? The argument could always be made that we should wait to adapt for the technology that is on the horizon. The problem with that scenario is that we would never move the arrow, and time is of the essence in the adaption to greener practices. 3) Other methods to reduce GHG in Kansas City would be more effective. To this I say, “yes, and.”

DATA TOOLS

Research into tools with features and functions which could be helpful in foundational application, equity and technology and capacity. What are the key milestones for revenue, profits, growth, and customers?

- **Foundational**: Foundational application tools are software programs that help with the management and assessment of fleet vehicles and charging infrastructure. When it comes to electric vehicle supply equipment (EVSE) and fleet management, these tools can be used to gather and analyze data on fleet usage patterns, charging needs, and other factors that can impact the efficiency and sustainability of your fleet. To complete a fleet assessment for EVSE and input for fleet management, you can use these foundational application tools to gather data on a range of key performance indicators (KPIs), such as charging time, energy usage, and overall fleet utilization rates. By analyzing this data, you can gain insights into the specific needs and challenges of your fleet, and develop strategies to optimize vehicle usage, reduce costs, and improve overall performance. For example, you might use a fleet management software program to track vehicle usage patterns and identify opportunities to shift to electric vehicles or optimize routes to reduce fuel consumption. You could also use a charging management tool to monitor charging infrastructure usage and ensure that EVSE is being used as efficiently as possible. Overall, these foundational application tools provide the data and insights needed to make informed decisions about fleet management and EVSE, helping organizations to reduce costs, improve sustainability, and meet their transportation needs more effectively.
- **Equity**: Equity tools used in fleet electrification may include things like targeted outreach to disadvantaged communities to promote and incentivize the adoption of electric vehicles, the installation of charging infrastructure in underserved areas, and the implementation of financial assistance programs for low-income individuals and organizations. Additionally, some equity tools may involve prioritizing the electrification of fleets that serve communities with high levels of air pollution or that are disproportionately impacted by the impacts of climate change. These tools are important to ensure that the benefits of fleet electrification are accessible to all, regardless of income or geography.
- **Capacity (Infrastructure)**: Infrastructure capacity tools in fleet electrification implementation may include things like assessing the existing electrical grid capacity to ensure that it can support the increased demand for electricity, identifying optimal locations for charging infrastructure based on factors like traffic patterns and fleet utilization, and designing charging infrastructure systems that are scalable and adaptable to future changes in fleet size and electric vehicle technology. Additionally, infrastructure capacity tools may involve working with utilities to identify opportunities to implement renewable energy solutions like solar or wind power to power charging stations, which can help to reduce emissions and improve the sustainability of the fleet electrification process. These tools are important to ensure that the charging infrastructure is robust and reliable enough to meet the needs of a growing fleet of electric vehicles.
- **Capacity (Finance)**: Finance tools in fleet electrification implementation may include things like providing financial incentives or grants to organizations to help offset the higher upfront costs of electric vehicles and charging infrastructure, offering low-cost financing or lease options for electric fleet vehicles, and implementing time-of-use pricing structures to incentivize charging during off-peak hours when electricity rates are lower. Additionally, finance tools may involve working with financial institutions to create specialized financing products for fleet electrification, or developing public- private partnerships to leverage private capital to finance charging infrastructure. These tools are important to help overcome the financial barriers that can prevent organizations from adopting electric vehicles and charging infrastructure, and to make the transition to electrification more financially feasible for fleets of all sizes.

I. FOUNDATIONAL

Missouri Department of Transportation Includes guidelines on suitable locations, funding, charger and power standards, etc.

- https://www.modot.org/sites/default/files/documents/FINAL%20MoDOT%20NEVI%20Deployment%20Plan%202022-09.pdf (https://legiscan.com/MO/bill/SB275/2023)

MISSOURI:

- https://afdc.energy.gov/fuels/laws/ELEC?state=MO (https://afdc.energy.gov/fuels/laws/ELEC?state=MO)
- Alternative Fuels Commission: https://boards.mo.gov/userpages/Board.aspx?211 (https://estar.kcc.ks.gov/estar/ViewFile.aspx/S20200108144309.pdf?211)

Statutes:

- RSMo 414.420: Created an Alternative Fuels Commission to promote the use of alternative transportation fuels. Annual report submitted to the governor with recommendations.
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.420&bid=23746&hl=
- RSMo 414.365; RSMo 414.407: 75% of state vehicle fleet and heavy equipment that use diesel must use biodiesel (B-20) if commercially available. “Biodiesel Fuel Revolving Fund” established to set aside state funds for purchasing biodiesel.
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.407&bid=23741&hl=
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.365&bid=23737&hl=
- RSMo 414.400; RSMo 414.410; RSMo 414.415; RSMo 414.417: Plan developed to reduce fleet fuel consumption and promote alternative fuels. At least 50% of fleet vehicle purchases (for fleets of 15+ vehicles) must be AFVs. Criminal Law Enforcement vehicles are exempt.
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.400&bid=36067&hl=
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.410&bid=23742&hl=
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.415&bid=23744&hl=
  - https://revisor.mo.gov/main/OneSection.aspx?section=414.417&bid=36070&hl=
- RSMo 142.803; RSMo 142.869: State motor fuel tax does not apply to passenger vehicles, certain buses, or commercial vehicles if the vehicle obtains an AFV decal.
  - https://revisor.mo.gov/main/OneSection.aspx?section=142.803&bid=49698&hl=
  - https://revisor.mo.gov/main/OneSection.aspx?section=142.869&bid=49701&hl=
- RSMo 643.315: AFVs are exempt from motor vehicle emissions inspection requirements
  - https://revisor.mo.gov/main/OneSection.aspx?section=643.315&bid=31195&hl=
- RSMo 142.1000: “Electric Vehicle Task Force” created within the department of revenue created to make recommendations to the state to fund transportation infrastructure for more widespread adoption of EVs. Task force expired at end of 2022
  - https://revisor.mo.gov/main/OneSection.aspx?section=142.1000&bid=49702&hl=
- RSMo 135.710: Tax credit program for purchasing AFVs or installing AFV infrastructure. Expired at end of 2018
- RSMo 386.020: Owning or operating an EV charging station is not considered an electric corporation.
  - https://revisor.mo.gov/main/OneSection.aspx?section=386.020&bid=47823&hl=
- RSMo 386.805: Electric vehicle charging stations are permitted expansions to locations where electric utilities are lawfully providing service to a structure outside their respective service area.
  - https://revisor.mo.gov/main/OneSection.aspx?section=386.805&bid=47827&hl=%22electric+vehicle%22%u2044

Pending Legislation:

- HB184/ SB233: Any local government that requires installation of EV charging stations must pay all costs associated with the installation, maintenance, and operation of the charging stations. Cannot require more than 5 EV stations per parking lot.
    - https://legiscan.com/MO/bill/HB184/2023
    - https://legiscan.com/MO/bill/SB233/2023
- SB275: Provides sales tax incentive for production of electricity
    - https://legiscan.com/MO/bill/SB275/2023 (https://legiscan.com/MO/bill/SB516/2023)
- SB516/ SB583: Tax credit for EV / PHEV purchases
    - https://legiscan.com/MO/bill/SB516/2023
    - https://legiscan.com/MO/bill/SB583/2023

2. EQUITY

- A tool that helps with visualization of characteristics of population and communities in social determinants https://www.socialexplorer.com/
    - Department of Transportation Disadvantaged Business Enterprise tool: https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise
- KC Climate Action Plan Equity Checklist: https://kcmetroclimateplan.org/wp-content/uploads/2021/05/Equity-Guide-May-2021.pdf

3. TECHNOLOGY AND CAPACITY

- Evergy's fleet advisory tool for early implementation and strategy for planning for an electric fleet –
    - https://www.evergy.com/smart-energy/renewable-resources-link/business-electric-vehicles/?utm_campaign=fleet&utm_source=google&utm_medium=ppc&utm_term=ev%20fleet&utm_content=4280561-e1-ng-mp-c20330240374-g149492493574-a664188269422-uEAIaIQobChMIn5qsi5fVggMVDBqtBh1YKAMVEAAYASAAEgKmXfD_BwE-cat11378589- kev%20fleet-mod&gad_source=1

- Evergy Fleet Cost Benefit tool: https://evfleets.evergy.com/output/overview

4. FINANCIAL

Evergy - Commercial rebates up to $2,500 per EV charging port
https://www.evergy.com/ways-to-save/incentives-link/ev-charging-rebates/fleet-electrification

U.S. Department of Transportation Bipartisan Infrastructure Law Act access to money and funding for solutions to Greenhouse Gas emissions - https://www.fhwa.dot.gov/bipartisan-infrastructure-law/?_gl=1*ssap4g*_ga*MTUzNTM0NTIzOS4xNjgwNTMyODc1*_ga_VW1SFWJKBB*MTcwMjY2ODM3Ni4zLjAuMTcwMjY2ODM3Ni4wLjAuMA.

Bipartisan Infrastructure Bill -- Funding for Charging Fleets

The 2021 Bipartisan Infrastructure Law (BIL) contains significant funding for EV charging stations, including the USDOT's National Electric Vehicle Infrastructure (NEVI) Formula Program ($5 billion) and the Discretionary Grant Program for Charging and Fueling Infrastructure ($2.5 billion). The law also makes the installation of EV charging infrastructure an eligible expense under the USDOT Surface Transportation Block Grant formula program. The list below includes the Bill's key fleet and charging station funding opportunities:

- **The National Electric Vehicle Infrastructure Formula Program (NEVI)**: https://afdc.energy.gov/laws/12744. NEVI apportions $5 billion to states and local governments over five years (Fiscal Year 2022 - 2026), to strategically deploy EV charging infrastructure and establish an interconnected national network of station data facilitation, access, and collection. Program funds can be used for the acquisition, installation, network connection, operation, and maintenance of EV charging stations, as well as long-term EV charging station data sharing. The program allows awardees to contract with private entities and permits private entities to pay the non-Federal share of a project funded under the NEVI Formula program.
- **The Rebuilding American Infrastructure with Sustainability and Equity Grant Program (RAISE):** https://www.transportation.gov/RAISEgrants. RAISE (formerly known as BUILD and TIGER) provides an opportunity for USDOT to invest in road, rail, transit, and port projects that achieve national objectives. RAISE allows project sponsors at the State and local levels to obtain funding for multimodal, multi-jurisdictional projects that are more difficult to support through traditional USDOT programs. The program includes Federal share matches requirements for specific projects -- the Federal share of net capital project costs is 100 percent for rural projects and projects located in Areas of Persistent Poverty or Historically Disadvantaged Communities, and 80 percent for urban projects. For a full list of USDOT's clean energy infrastructure funding opportunities, refer to https://www.transportation.gov/grants.

The Inflation Reduction Act of 2022 -- Consumer Incentives

The Inflation Reduction Act of 2022 contains clean vehicle tax credits for new and used car buyers, including commercial fleets. The Act also provides direct grants to a range of heavy-duty fleets to replace their existing vehicles, such as transit and school buses, logistics trucks, drayage vehicles, and USPS vans. The list below includes the most relevant (not all) of the consumer incentives provided in the Act.

- **Commercial Clean Vehicle Tax Credit** (IRC Section 45W): The Commercial Clean Vehicle Credit helps fleets use clean light- and heavy-duty vehicles by covering the upfront purchase cost of a clean vehicle vs. an ICE alternative. Businesses and tax-exempt organizations that buy a qualified vehicle may receive a tax credit of up to $40,000, defraying up to 30 percent of the incremental cost for commercial vehicles over 14,000 lbs (larger vans, buses, refuse trucks, long haul trucks).

- **Alternative Fueling Property Tax Credit (**IRC Section 30D): This tax credit, restricted to low-income areas, helps individuals and businesses install EV charging and alternative fueling stations. Qualified individuals or entities may receive up to $100,000 for the installation of alternative fueling infrastructure at non-private residences. 5x credit is awarded to projects meeting prevailing wage and apprenticeship hour requirements.
- **Medium- & Heavy-Duty Fleet Electrification Grant**: The Act allocated $1 billion in EPA grants to encourage the private sector to purchase and deploy zero-emission Class 6 and 7 trucks. The city, as a municipal entity, would not qualify for this grant alone. There may be a private-government partnership opportunity, but I didn't have time to delve into the Funding Opportunity Announcement requirements.

For additional details (without reading the full legislative text), refer to the BlueGreen Alliance's fact sheet on the Act's Clean Vehicle Provisions: https://www.bluegreenalliance.org/resources/clean-vehicle-provisions-in-the-inflation-reduction-act/.

CONCLUSION

In conclusion, the decision of Kansas City, Missouri to convert its municipal fleet of ICE vehicles to electric vehicles is a commendable step towards promoting sustainable transportation and reducing greenhouse gas emissions. Despite the challenges faced by the city in terms of cost and infrastructure, the potential benefits of reduced emissions and lower operating costs make this project a worthwhile endeavor. Kansas City's commitment to carefully planning its deployment and charging infrastructure is a testament to its dedication to promoting environmentally friendly technology. By leading the way in sustainable transportation, Kansas City sets an example for other cities to follow suit and invest in similar projects. The benefits of this project extend beyond Kansas City, as it will contribute to a cleaner and healthier environment for all.

KEY TAKEAWAYS

Now is the ideal time to take advantage of the opportunity to begin the process of fleet conversion. With financial incentives and tools that aid in calculating cost benefit for municipalities. Take advantage of the most current tools at your disposal for managing the assessment to implementation.