city of edgewater

An Electric Vehicle Action Plan for Edgewater

June 2023

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PARTNERS IN ENERGY

An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

Xcel Energy's Partners in Energy offering is a two-year collaboration to develop and implement a community's energy and electric vehicle (EV) goals. With its Energy Action Plan and this EV Action Plan, the City of Edgewater is part of a network of more than 35 other Colorado communities that have developed and implemented EV and Energy Action Plans through Partners in Energy. The content of this plan is derived from a series of focus groups and planning workshops hosted by Partners in Energy. For more information about the planning process, see Appendix A: Planning Process. Thank you to the following individuals who contributed many hours of service to developing this EV Action Plan. This group is collectively referred to as the EV Planning Team.

EV Planning Team

Bill Stines	City of Edgewater, Public Works Supervisor
Bob Brink	City of Edgewater, Edgewater Police Sergeant
Brett Rogers	Republic Services
Courtney LaBrie	City of Edgewater, Sustainability Board Member
Dan Maples	City of Edgewater, City Manager
Eric Sonstegard	City of Edgewater, Edgewater Chief of Police
Gisela Mediavilla	Property Manager, LPC
Grant Babb	Business Owner, Joyride Brewing
Hannah Gay Keao	City of Edgewater, City Council
Jaime Krutz	Edgewater Resident
Jennifer Schartz	City of Edgewater, Permit Specialist
Jocelyn Mills	City of Edgewater, Community Development Director
Joel Newton	Edgewater Collective
Kimber Preece	Jefferson County Public Schools
Kit Lammers	City of Edgewater, City Services
Mark Best	Property Manager, LPC
Mark Petrovich	Republic Services
Mercedes Valdez	City of Edgewater, Sustainability Board Member
Nathan Bevers	Republic Services
Paige Johnson	City of Edgewater, Sustainability Coordinator
Steve Conklin	City of Edgewater, City Council
Xerxes Steirer	City of Edgewater, Sustainability Board Member

Xcel Energy Team

Daniel Trujillo	Xcel Energy Service Manager
Jason Randall	Xcel Energy, Clean Transportation
Kynnie Martin	Xcel Energy, Account Manager (former)
Makaela Turner	Xcel Energy, Partners in Energy Liaison
Sofia Troutman	Xcel Energy, Partners in Energy Program Manager
Tami Gunderzik	Xcel Energy, Senior Product Manager
Zach Owens	Xcel Energy, Clean Transportation
Andrea McCarthy	Partners in Energy, Community Facilitator
Cary Weiner	Partners in Energy, Community Facilitator
Sarah Kaye	Partners in Energy, Community Facilitator

This EV Plan was funded by and developed in collaboration with Xcel Energy's Partners in Energy. Partners in Energy shall not be responsible for any content, analysis, or results if the City of Edgewater has made modifications to the plan.

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City of Edgewater Electric Vehicle Action Plan

About This Plan

This EV Action Plan is a roadmap to guide Edgewater toward achieving its desired EV future. This plan was developed collaboratively over a 10-month time frame from August 2022 to June 2023 through a series of project management team meetings, two stakeholder workshops, and three focus group discussions.

Our Electric Vehicle Vision

The City of Edgewater prioritizes sustainable and affordable electric mobility solutions and community collaboration in order to create an equitable, thriving, and resilient community.

Our Roadmap for Achieving this Vision

To achieve this vision, the City of Edgewater EV Action Plan is divided into four focus areas:

Residential
Advancing the equitable adoption of electric vehicle technology for all of Edgewater's residents.

Businesses and Institutions
Partnering with businesses and institutions to advance installation of charging for public and private use, and to encourage the adoption of EVs by employees.

Municipal
Leading by example by electrifying the City fleet.

Policy and Public Infrastructure
Advancing EV adoption by implementing EV-ready codes and identifying opportunities to fill charging gaps through public investment.

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Our Strategic Priorities

To achieve our energy vision, the Energy Action Plan is divided into four focus areas:

Focus Areas	Strategies
Residential	**R-1:** Connect residents with information about EVs and available incentives
	R-2: Support charging at rental and multifamily properties
	R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility
Businesses and Institutions	**BI-1:** Identify willing partners to install fleet, workplace, and/or public charging
	BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles
Municipal	**M-1:** Establish a City fleet vehicle and charging infrastructure procurement plan
	M-2: Engage in peer learning for adopting emerging EV technology
	M-3: Adopt policy to support the implementation of the City's EV replacement plan
Policy and Public Infrastructure	**P-1:** Educate developers and the public on the City's EV codes and resources to support code compliance
	P-2: Identify City-owned properties to install public charging infrastructure

Elevating Equity: Edgewater believes that every resident deserves to benefit from transportation electrification. As such, equity was identified as a critical lens to frame this planning process. Income, housing type, renter status, and English-proficiency were identified as potential barriers to EV adoption. Strategies flagged with this equity icon directly address one or more of these equity lenses.

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INTRODUCTION

What Is an EV Action Plan?

This EV Action Plan is a roadmap to guide Edgewater toward achieving its desired EV future. The components of Edgewater's EV Plan are detailed below.

Introduction Explores Edgewater's motivations for developing an EV Action Plan.

Where Are We Now? Outlines the relevant characteristics of Edgewater's EV landscape.

Where Are We Going? Describes Edgewater's EV vision.

How Are We Going to Get There? Identifies focus areas and strategies to achieve the defined vision, along with targets to quantify success in each focus area.

How Will We Stay on Course? Outlines how Edgewater will track progress toward this plan's targets and vision, and how it will adapt to a changing landscape during implementation.

Appendices Provides additional information about the planning process, EV basics, and current Xcel Energy Programs.

Elevating Equity

Edgewater believes that every resident deserves to benefit from transportation electrification. As such, equity was identified as a critical lens to frame this planning process. Income, housing type, renter status, and English-proficiency were identified as potential barriers to EV adoption. Strategies flagged with this equity icon directly address one or more of these equity lenses.

Why an EV Action Plan?

The City of Edgewater (City) created this plan to support its Sustainability Plan goals, which include reducing greenhouse gas emissions, improving air quality, and reducing transportation fuel and maintenance costs. The following sections provide a deeper look at how these benefits and more are achieved through EV adoption.

Transportation is tied for the most greenhouse gas emissions in Edgewater.

The 2018 Intergovernmental Panel on Climate Change (IPCC) report states, "The transport sector must reduce its final energy use by 30 percent and must supply the majority of energy with low carbon fuels like electricity, hydrogen, and biofuel by 2050 in order to limit global warming to less than 1.5°C and mitigate the worst impacts of climate change" (IPCC, 2018). In 2017, Edgewater completed a greenhouse gas (GHG) emissions inventory that estimated transportation contributed 31 percent of overall emissions (City of Edgewater, 2019).

Currently, 39 percent of Xcel Energy's energy mix is carbon-free with a goal of enabling all vehicles to run on 100 percent carbon-free electricity by 2050. As the fuel mix for electricity continues to decarbonize, EVs will provide a clear pathway to reduce GHG emissions in Edgewater.

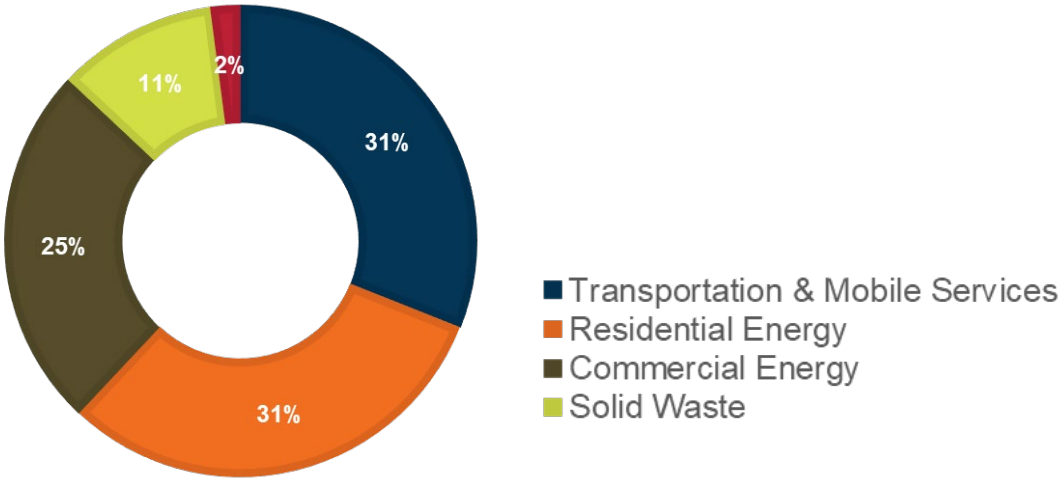


Figure 1. 2017 Edgewater Greenhouse Gas Emissions

Edgewater experiences poor air quality; electrifying transportation can help.

Improving local and regional air quality was identified as a critical outcome in Edgewater's Sustainability Plan. In addition to contributing a significant portion of GHG emissions, the transportation sector produces pollutants such as particulate matter (PM), NOx, CO, and VOCs. Pollutants like NOx and VOCs contribute to ground-level ozone, which in addition to PM and CO, are harmful to respiratory health. Jefferson County has been considered a non-attainment zone for 8-hour Ozone since 2012 and was downgraded to severe in 2022. The American Lung Association assigned Jefferson County a grade of "F" for high ozone days (Figure 2).

Local air pollution disproportionately impacts low-income communities and communities of color (American Lung Association, 2022). EVs produce fewer tailpipe pollutants than their gas- and diesel-powered counterparts, providing immediate air quality benefits even for those who don't drive an EV (Office of Energy Efficiency & Renewable Energy, 2020).

"Our health, well-being and way of life will not be sustained and available for future residents if we do not value the critical importance of the air we breathe…" – Edgewater Sustainability Plan, 2019

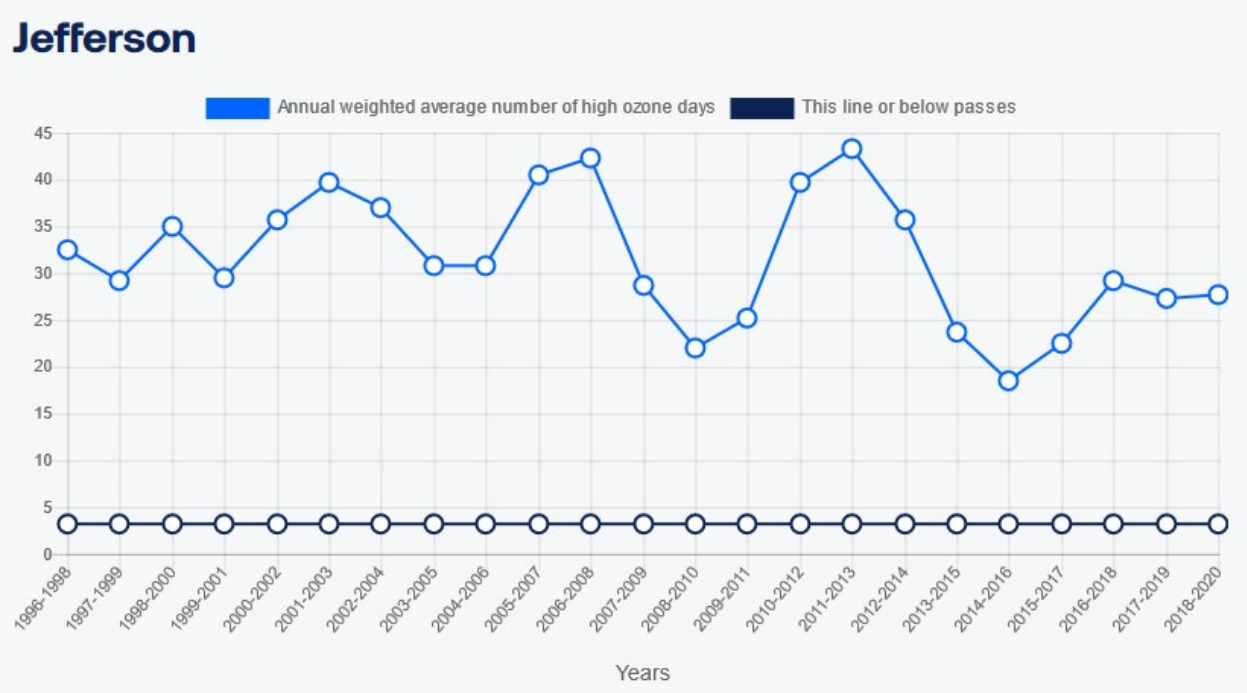


Figure 2. Annual weighted average number of high ozone days in Jefferson County has not "passed" since 1996 (Source: American Lung Association)

Electric vehicles boast lower fuel & maintenance costs.

While cost savings vary by vehicle type, driving patterns, and geographic region, the average driver spends about half as much money in fuel and maintenance costs by driving an EV compared to a traditional gas- or diesel-powered vehicle (Office of Energy Efficiency and Renewable Energy, 2019). The average US household spends about 13 percent of its annual income on transportation costs, while low-income households spend an average of 29 percent of their annual income on transportation costs (Institute for Transportation And Development Policy, 2019). By comparison, the average Edgewater resident spends about 17 percent of their income on transportation (Center for Neighborhood Technology, 2022). The cost savings associated with driving an EV is a significant opportunity to reduce transportation costs for Edgewater residents (see Appendix B: Electric Vehicles 101). Lower operating costs are also a significant motivating factor for electrifying public fleet vehicles.

WHERE WE ARE NOW

Factors such as population growth, demographics, housing, and transportation costs help contextualize current and future opportunities for targeted outreach and partnerships. To better understand the opportunities for EV adoption in Edgewater, relevant community characteristics are outlined below.

A small community, well suited for EVs.
Edgewater's size, location, and commuting characteristics present an excellent environment for EV adoption.

Edgewater's small size and regional connectivity are ideal for current EV ranges.
Edgewater is a one-square-mile, home rule municipality tucked into the urbanized eastern end of Jefferson County. Edgewater is home to over 5,000 residents in over 2,400 households. Sheridan Boulevard serves as the eastern boundary to the community, and West Colfax Avenue lies just south of the City's boundary**.** Edgewater's small size and connection to the larger Denver Metro Region makes it an ideal location to advance electric mobility opportunities.

The mean travel time to work is about 25 minutes (U.S. Census Bureau, 2021). EVs may be an attractive option to the 68 percent of residents who drive to work, especially because all EVs currently on the market can easily accommodate this commute time (several models have ranges closer to 400 miles) (U.S. Census Bureau, 2021). Those who use public transportation (5%), bike to work (3%), or are within a reasonable distance to work may be interested in mobility solutions such as electric bikes and scooters for their full commutes or for the first or last leg of their commutes (U.S. Census Bureau, 2021).

Edgewater has room to accelerate EV adoption within the community.
EV adoption is escalating nationwide, as shown by monthly sales of battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in the U.S. (Figure 3).

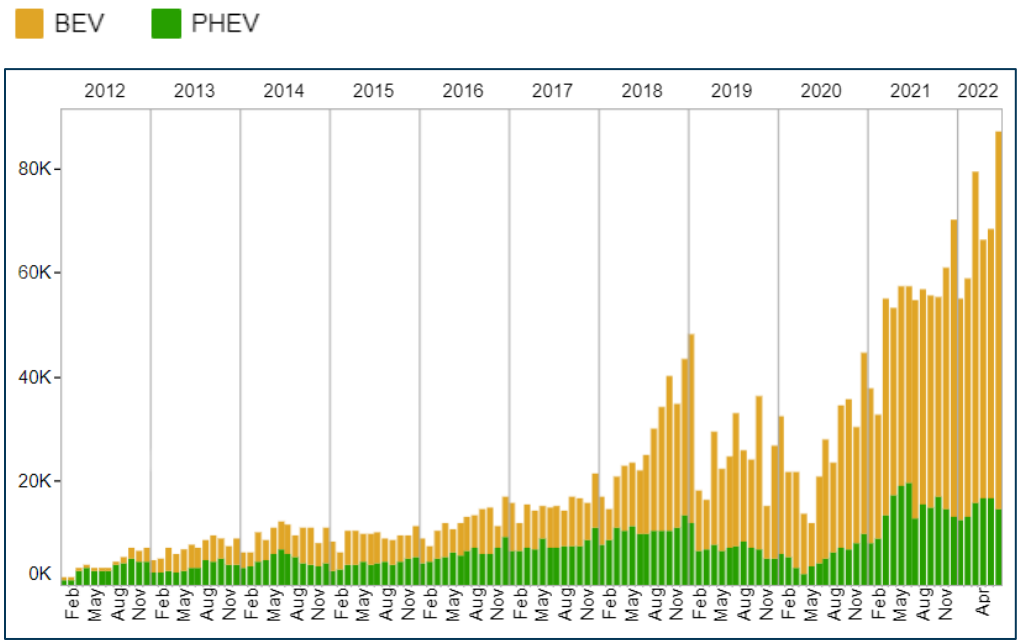


Figure 3: Monthly EV Sales in the United States,
(Alliance for Automotive Innovation, 2022)

EV sales are also escalating rapidly in Colorado, comprising 10.5 percent of all new car sales in the state in 2022, compared to 6.5 percent in 2021 (Colorado Sun, 2023). EVs make up one percent of the market share in Edgewater's zip code 80214, just shy of the State's rate of 1.5 percent (Atlas Public Policy, 2022).

Edgewater has a head start on public charging opportunities.
Availability of public charging can help individuals feel more comfortable driving an EV by providing options for charging on the go. Public charging stations in Edgewater are shown in Figure 4. As of this writing, there are four Level 2 ports at the Civic Center (orange) and fourteen Level 3 (DC fast charging) ports in the city (blue). Six of the Level 3 charging stations are located at Target; the remaining eight Level 3 charging stations are Tesla charging stations located at Edgewater Public Market. Currently only Tesla vehicles can use Tesla charging stations. While Edgewater has a good foundation of public charging opportunities, there may be additional opportunities that could help accelerate EV adoption.

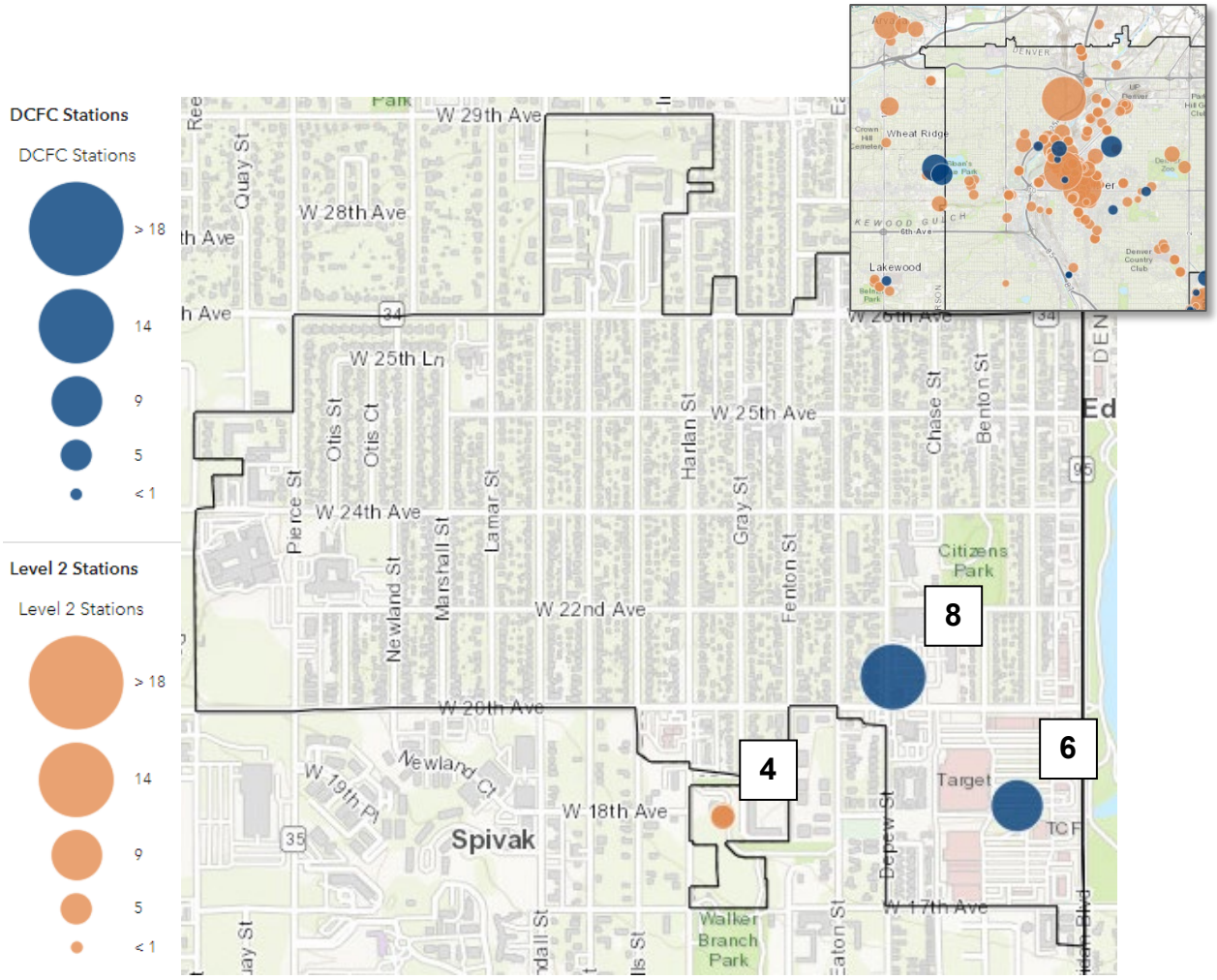


Figure 4. Public Charging Infrastructure in Edgewater (Source: NREL)

Identifying synergies among multiple planning efforts.

This planning effort joins several other Edgewater-specific and Statewide plans that support the advancement of EV adoption. This plan seeks to build on these planning efforts without duplicating.

Edgewater Energy Action Plan

The City's Energy Action Plan was completed in 2020 and focused on connecting residents and businesses with Xcel Energy programs to reduce barriers to saving energy and investing in renewable energy. The City saw marked success in increasing participation in energy assessments for both residents and businesses. Renewable energy program participation also climbed during the implementation period. Lessons learned from these efforts will be used to support successful implementation of this EV Action Plan.

Edgewater Sustainability Plan

The City's 2019 Sustainability Plan provides a broad, updated set of goals and actions to reduce GHG emissions and overall environmental impact. The Sustainability Plan includes the following goals supported by this plan.

- Improve public health outcomes through better air quality.
- Design and maintain infrastructure in an economic, equitable, and ecological manner.
- Increase access to multimodal transportation options and ensure most needs are met within a travel distance of 15 minutes.

Colorado EV Plan 2023

The Colorado EV Plan 2023 is an update to the State's 2018 and 2020 plans and continues to accelerate adoption of EVs of all types in Colorado. The plan builds on the existing goal established of 940,000 light-duty EVs by 2030 and a long-term vision of 100 percent electric light-duty vehicles and 100 percent zero emission medium-duty vehicles. It establishes goals and new actions in four focus areas:

1. **Light-Duty Vehicles and Infrastructure:** Light-duty vehicles refer to vehicles 8,500 pounds or less, and primarily include privately owned passenger cars, SUVs, and lighter pickup trucks, as well as fleet vehicles such as rental cars and ride-hailing fleets.

2. **Medium- and Heavy-Duty Vehicles and Infrastructure:** Medium- and heavy-duty vehicles are vehicles over 8,500 pounds and include everything from large pickup trucks and vans to school buses and semi-trucks. Many of these vehicles are commercial fleet vehicles, although a substantial proportion of medium-duty vehicles are privately owned.

3. **Electric Mobility (electric micro-mobility and shared electric modes):** Electric mobility refers to the broad and growing range of personal transportation options that are powered fully or in part by an electric motor, beyond privately owned electric vehicles. For the EV Plan, it includes personally owned electric micro-mobility options (e.g., e-bikes, e-scooters), and shared options such as electric bikeshare networks, electric carshare networks, and electric vanpool services.

4. **Cross-Cutting Initiatives:** This area focuses on initiatives that affect multiple parts of the transportation system, including strategies or considerations that span multiple sectors, rather than just a single type of vehicle or mode of transportation. These include leading by example, equity and engagement, planning, and workforce development.

WHERE WE ARE GOING

Vision Statement

The EV Project Management Team developed the following vision statement to guide the planning process as a reflection of what Edgewater's EV future should look like.

The City of Edgewater prioritizes sustainable and affordable electric mobility solutions and community collaboration in order to create an equitable, thriving, and resilient community.

To achieve a community-wide commitment to transportation electrification, the EV Planning Team identified four focus areas to prioritize strategies and resources. Collectively, the focus areas provide a work plan of actionable steps to achieve Edgewater's EV vision.

Residential

Business and Institutions

Municipal

Policy and Public Infrastructure

Focus Area 1. Residential

Advancing the equitable adoption of electric vehicle technology for all of Edgewater's residents.

- R-1: Connect residents with information about EVs and available incentives
- R-2: Support charging at rental and multifamily properties
- R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility

Focus Area 2. Businesses and Institutions

Partnering with businesses and institutions to advance installation of charging for public and private use, and to encourage the adoption of EVs by employees.

- BI-1: Identify willing partners to install fleet, workplace, and/or public charging
- BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles

Focus Area 3. Municipal

Leading by example by electrifying the City fleet.

- M-1: Establish a City fleet vehicle and charging infrastructure procurement plan
- M-2: Engage in peer learning for adopting emerging EV technology
- M-3: Adopt policy to support the implementation of the City's EV replacement plan

Focus Area 4. Policy and Public Infrastructure

Advancing EV adoption by implementing EV-ready codes and identifying opportunities to fill charging gaps through public investment

- P-1: Educate developers and the public on the City's EV codes and resources to support code compliance
- P-2: Identify City-owned properties to install public charging infrastructure

Multiple strategies may work toward a single goal. Look for the "plan link" symbol to explore the interrelationship between strategies.

HOW WE ARE GOING TO GET THERE

Focus Area 1: Residents

Edgewater's location and geography make it an ideal place to own an EV, but there are several barriers to ensuring the equitable adoption of EVs. Some residents may not have a personal vehicle to electrify and while EVs can be less expensive to own and operate over time, upfront cost is still a barrier for many residents. Older homes may present challenges with installing at-home charging, especially if wiring and panel upgrades are necessary. Renters and multifamily residents may face additional infrastructure barriers, since residents have less authority to install at-home charging.

The following strategies were identified to address the unique barriers and opportunities in Edgewater's residential sector.

- Strategy R-1: Connect residents with information about EVs and available incentives
- Strategy R-2: Support charging at rental and multifamily properties
- Strategy R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility

Strategy R-1: Connect residents with information about EVs and available incentives

At the time of this writing, there are unprecedented amounts of funding to support the adoption of EVs. This includes funding and incentives for leasing or purchasing EVs and installing home charging infrastructure. Despite this influx of information, many residents may not be aware of these incentives, or how they can stack together to bring down costs.

This strategy focuses on connecting residents —– including homeowners and renters — with information about the benefits of EVs and the resources available to support EV adoption. Edgewater's median household income is 20 percent lower than the State's (U.S. Census Bureau, 2021). Additionally, 41 percent of households only have one vehicle, and almost 6 percent of households have no vehicle at all (U.S. Census Bureau, 2021). It will be important to promote electric micro-mobility options, EV leasing options, financial incentives, electric range capabilities, and the lower fuel and maintenance costs of EVs when engaging the community on EV adoption. Finally, more than 22 percent of Edgewater residents speak a language other than English. To prevent a language barrier, outreach materials will be made available in English and Spanish to expand the reach of our efforts (U.S. Census Bureau, 2021).

Audience

- Renters
- Homeowners
- Spanish-speaking residents

Target

- Increase electric vehicle registration in 80214 zip code above 2023 baseline (231) by the end of 2024

Timeline

- **Q2 2023 – Q3 2023**
    - Research the need for potential electrical panel upgrades in Edgewater homes.
    - Research best practices for renter adoption of EVs.
    - Research relevant EV incentives to inform opportunities to reduce cost barriers.
    - Coordinate with comprehensive plan outreach to gauge interest in EVs and e-bikes, and to inform City-led programs, such as stacking incentives, bike share, carshare, or local transit.
- **Q3 2023**
    - Develop an outreach plan based on research conducted in Q2/Q3.
        - Leverage existing resources such as Xcel Energy's website, videos, and state and regional websites,
        - Host or leverage one regional Ride and Drive.
        - Develop summary materials and community highlights to help residents navigate available incentives. Helpful approaches include:
            - Ensuring language is accessible and easy to understand.
            - Ensuring incentive timing and requirements are clear.
        - Share materials that align with existing efforts, through impactful channels as identified during Q2/Q3 2023. Sample channels include:
            - Metro Denver Green Home Tours

    - City events (e.g., Eco Edgewater, Hometown Festival, Sustainability Seminars)
    - Nearby community events (e.g., Jammin' on the Jetty)
    - HOA meetings and communication channels
    - Renter meetings and communication channels
- **Q3 2024 – Q4 2024**
    - Execute outreach plan.
    - Measure success of outreach.

Outreach should be conducted to inform Strategy R-2 and R-3

Roles and Responsibilities

- **City of Edgewater:** Co-lead the development of the resident Comprehensive Plan outreach materials, lead development of the outreach strategies, and inform the development of educational and promotional materials.
- **Partners in Energy:** Conduct best practices and electrical panel research, co-lead the development of Comprehensive Plan outreach materials, develop educational and promotional material, and provide Spanish translation of key outreach materials.

Available Resources

- Front Range Beneficial Electrification Network Standardized Information Workgroup
- EV CO statewide educational campaign
- Xcel Energy home charging programs and EV purchase/lease rebate
- Drive Clean Colorado resources
- CDOT E-Mobility Education and Awareness grants
- Federal and State EV and EV charging tax credits
- *(Anticipated)* Colorado Energy Office (CEO) Community Access Enterprise
    - Service Panel Upgrade + Residential Resources (SPURR)
    - Vehicle Investment for Sustainable Transportation Access (VISTA)

Strategy R-2: Support charging at rental and multifamily properties

Single family homeowners are more able to install EV charging because they do not need to seek permission of the property owner to do so and they are the direct recipient of any resulting increase in property value. Alternatively, renters and multifamily residents may not have permission from the property owner to install charging infrastructure and may be reluctant to invest in improving property they do not own. More than 60 percent of Edgewater residents rent, underscoring the importance of working with rental property owners and providing alternative options for renters (U.S.

Census Bureau, 2021). Promoting Level 1 charging may also be an opportunity to accommodate EV charging at single-family and duplex rental homes.

Rental property owners may be more open to EV infrastructure investments if they know investments are desired and will add value to their renters. This strategy builds on strategy R-1 to focus on renter and property owner outreach. The purpose of this outreach is to better understand renter demand for EV charging, willingness of both property owners and renters to invest in EV charging, and financial incentives available to support EV charging for renter and multifamily properties.

Avoiding Unnecessary Upgrades
Installing a dedicated at home charger may not be necessary. A Level 1 charger can add approximately 5 miles/hr. to a vehicle's existing battery range. If charged from 9pm-6am, this would add about 50 miles of range to a vehicle. Additional benefits of Level 1 charging are that they do not generate as much electricity demand, potentially circumventing the need for panel upgrades.

Audience

- Rental property owners (including single family, duplex, and multifamily)

Target

- Engage with a minimum of 10 rental property owners and renters to raise awareness of renter interest in EV adoption and options for installing Level 2 charging at rental properties.

Timeline

- **Q3 2023**
  - Conduct outreach to property owners and renters in conjunction with residential outreach campaign from Strategy R-1.
- **Q4 2023**
  - Based on resident survey results and research into potential electrical panel upgrades, develop a high-level outreach plan for property owner engagement.

Roles and Responsibilities

- **City of Edgewater:** Identify the most efficient and effective ways to engage rental property owners (including multifamily) and conduct outreach to these property owners.
- **Partners in Energy:** Identify best practices and resources for Level 2 charging installation at rental properties and develop materials to engage property owners.

This strategy was developed separately from R-1 to emphasize the importance of rental and multifamily property-owner outreach. To avoid duplication of efforts, outreach plans for R-1 and R-2 may be combined.

Available Resources

- Xcel Energy Multifamily EV Solutions programs
- City's mailing list of rental properties
- Landlord registration process
- CEO Charge Ahead Colorado grants
- Federal EV charging tax credits
- *(Anticipated)* CEO Community Access Enterprise

The implementation of EV codes (Strategy P-1) will help increase EV infrastructure access at future multifamily and single family, properties.

Strategy R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility

Upfront cost is often the primary barrier to adoption of electric micro-mobility (e.g., e-bikes and e-scooters). Edgewater can reduce these barriers by developing and administering an electric micro-mobility program, such as an e-mobility library or a rebate program. E-mobility libraries allow residents to "check out" e-bikes or e-scooters for a specified period of time. Alternatively, rebates can help lower the cost of purchasing new or used electric micro-mobility devices. While an e-mobility library could be structured to be free to all residents, a rebate program could be structured to provide more substantial rebates to income-qualified residents.

Audience

- Residents
- E-bike and e-scooter dealers

Target

- Develop an electric micro-mobility program, such as an e-mobility library or rebate program.

Timeline

- **Q2 2023**
  - Research and identify best practices for electric micro-mobility programs.
- **Q3 2023**
  - Develop plan and budget for an electric micro-mobility pilot program.
- **Q4 2023 – Q2 2024**
  - Launch electric micro-mobility program.

Roles and Responsibilities

- **City of Edgewater:** Lead development of an electric micro-mobility program.
- **Partners in Energy:** Research and identify best practices for electric micro-mobility programs.

Available Resources

- E-bike rebate program examples and experience from other communities
- *(Anticipated)* CEO Community Access Enterprise
    - e-bike rebates
    - Vehicle Investment for Sustainable Transportation Access (VISTA)

Additional Strategies for Future Consideration

The following strategies were identified to consider for implementation over a five- to ten-year horizon.

- Explore opportunities to install safe bike storage paired with e-bike charging.
- Explore developing a City-led program to reduce barriers to electric mobility (e.g., bike share, e-bus, infrastructure rebates for rental properties, regional group buy for EVs, etc.).

Focus Area 2: Businesses and Institutions

Edgewater's commercial sector presents unique challenges and opportunities for EV adoption. Edgewater's small businesses are proud members of the community and willing partners to support outreach efforts, but often lack private parking to support EV charging. Edgewater's larger businesses and anchor retailers (e.g., Target, King Soopers, and ACE) may present more fruitful opportunities to explore and expand EV charging, though getting permission to make improvements can present a challenge. These larger businesses may also be good candidates for employee education; in some cases, employees already have access to workplace charging (e.g., Target). Institutions like schools and faith-based organizations may also present opportunities to partner for EV infrastructure and outreach.

The following strategies were identified to address the unique barriers and opportunities in Edgewater's business sector.

- Strategy BI-1: Identify willing partners to install fleet, workplace, and/or public charging
- Strategy BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles

Strategy BI-1: Identify willing partners to install fleet, workplace, and/or public charging.

Very few parking lots are publicly owned in Edgewater and advancing access to EV infrastructure will require partnership with other organizations. These partnerships may reveal opportunities to advance fleet, workplace, and/or public charging. There may be opportunities for infrastructure to achieve more than one objective. For instance, an EV charger may serve public charging during the day and support fleet charging at night. This strategy is focused on cultivating a few targeted partnerships rather than taking a broad-based approach.

Leading By Example
The City of Edgewater has already modeled multi-purpose charging stations. There are currently 4 EV charging ports at the Edgewater Civic Center. These charging stations support public and workplace charging during the day, and fleet charging for the City's two electric fleet vehicles at night.

Audience

- Owner-occupied businesses and institutions
- Property management companies

Target

- Connect with at least 3 businesses, institutions, and/or property management companies

- 1 new public charging station in Edgewater

Timeline

- **Q3 2023**
  - Develop a list of all property managers and owner-occupied businesses with private and public parking lots (e.g., Edgewater Inn, 25th and Gray St, 25th and Fenton, 25th and Sherridan).
- **Q4 2023**
  - Map locations to identify alignment with equity priorities (e.g., near areas with high renter rates or multifamily housing).
  - Prioritize locations based on ability to advance Edgewater's EV vision (see strategy R-1).
- **Q1 – Q2 2024**
  - Connect property managers and businesses with information to support the addition of public, workplace, or fleet EV charging. Include information about fleet electrification as applicable.
  - Connect Jefferson County Public Schools with a fact sheet summarizing resources available to support EV infrastructure investment, focused on addressing cost barriers related to installation and maintenance.

Public charging infrastructure should seek to address infrastructure access barriers highlighted in Strategy R-2.

Roles and Responsibilities

- **City of Edgewater:** Identify list of property managers and businesses, lead prioritization of locations, and lead outreach to selected businesses and property managers.
- **Partners in Energy:** Lead mapping to support prioritization of property managers and businesses for outreach. Share summary information about Xcel Energy EV programs and advisory services.

Available Resources

- Xcel Energy EV Supply Infrastructure (EVSI) program
- Xcel Energy Critical Peak Pricing Program
- CEO Charge Ahead Colorado grants
- IIJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure
- CEO Fleet Zero-Emission Infrastructure Program
- Federal EV charging tax credits
- *(Anticipated early 2023)* U.S. EPA Diesel Emission Reduction grants

Strategy BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles

Every weekday, nearly 1,400 people commute into Edgewater for work. Partnering with local employers is a great way to share information with the local workforce and support EV adoption. Studies show that employees who work for businesses with workplace charging are more likely to purchase an EV. This strategy should be paired with Strategy BI-1 to leverage workplace charging as an incentive for EV adoption among employees. As a local and regional employer, the City of Edgewater can lead by example by providing education opportunities specifically for City employees.

Audience

- Employees of medium to large businesses or institutions (e.g., Target, ACE, King Soopers)
- City employees

Target

- Develop one e-flyer each for general businesses and City employees, to incorporate into broader outreach materials.
- Participate in one regional, employee-oriented Ride-and-Drive.

Timeline

- **Q1 2024**
  - Draft a flyer or other educational materials to share with businesses and City employees.
- **Q3 2024**
  - Explore the feasibility of introducing a low-carbon transportation incentive to support the adoption of EVs and other modes of travel for City employees.
- **Q2 – Q3 2024**
  - Share educational flyer with business partners.
  - Organize and host an employee ride and drive or EV show and tell event with local businesses and City employees.

Roles and Responsibilities

- **City of Edgewater**: Support regional coordination for employee Ride-and-Drive and connect businesses with educational materials.
- **Partners in Energy**: Draft educational materials and support regional coordination for employee Ride-and-Drive event.
- **Drive Clean Colorado**: Lead the organization and delivery of a regional Ride-and-Drive event focused on employees, in partnership with Jefferson County Public Schools, West Metro Chamber of Commerce, and Jefferson County.

Available Resources

- CO EV statewide educational campaign
- Xcel Energy home charging programs and EV purchase/lease rebate

- Drive Clean Colorado resources
- CDOT E-Mobility Education and Awareness grants
- Federal and State EV and EV charging tax credits
- *(Anticipated)* CEO Community Access Enterprise
    - Service Panel Upgrade + Residential Resources (SPURR)
    - Vehicle Investment for Sustainable Transportation Access (VISTA)

Focus Area 3: Municipal

Edgewater's small geography makes it uniquely suited to electrify their fleet, however there are several considerations to address. Edgewater has a small fleet with about 29 assets (Table 1). There is little duplication of assets and many vehicles must perform multiple duties (e.g., hauling, snow plowing). Any EV brought into the fleet must have the same or better performance. New vehicles must be reliable and easy to maintain to reduce downtime. Finally, despite the City's enthusiasm for fleet electrification, supply chain issues and upfront costs have slowed the City's electrification efforts. Still, many of the City's assets have a long lifecycle and are rotated through departments, underscoring the importance of electrifying early to reap long-term cost, air quality, and GHG benefits.

Table 1. Edgewater's 2023 Fleet Baseline

Department	# of Vehicle(s) / Equipment by Fuel Type		
	Electric	Gasoline	Diesel
Municipal Administrative	2 BEVs	1 truck 1 large passenger van	
Municipal Public Works		4 trucks	2 plow trucks 1 sweeper 1 UTV 1 skid-steer 1 backhoe 1 dump truck
Edgewater Police		14 vehicles	

The following strategies were identified to address the unique barriers and opportunities in Edgewater's municipal fleet.

- Strategy M-1: Establish a City fleet vehicle and charging infrastructure procurement plan
- Strategy M-2: Engage in peer learning for adopting emerging EV technology
- Strategy M-3: Adopt a City fleet electric-first procurement vehicle policy

Strategy M-1: Establish a City fleet vehicle and charging infrastructure procurement plan

It is imperative to plan, schedule, and budget for vehicle replacement needs and the associated charging infrastructure needed to operate fleet assets. This strategy focuses on developing an integrated EV and infrastructure fleet transition plan through Xcel Energy's Fleet Electrification Advisory Program (FEAP).

Audience

- City Fleet (Public Works, Police Department, Community Services)
- City Manager

Targets

- Short-term:
  - Participate in Xcel Energy's FEAP.
  - Develop an integrated vehicle replacement and infrastructure plan.
- Medium-term (2025):
  - Electrify one more vehicle.
  - Install one or more fleet-specific charging station.
- Long-term (2040):
  - Electrify 100 percent of fleet.

Timeline

- **Q3 2023 – Q1 2024:**
  - Participate in Xcel Energy FEAP to receive no-cost services including fleet telematics, EV replacement planning, and EV infrastructure planning.
  - Use FEAP results to inform the development of an integrated vehicle replacement and infrastructure plan, including:
    - Current vehicle type and age
    - Recommended replacement models
    - Replacement timelines (typically ~8-10 years)
    - Infrastructure needs associated with fleet electrification
    - Available financial incentives
    - Budget request timelines
- **Q2 2024**
  - Incorporate EV replacement and EV infrastructure projects into capital project planning and budgeting.
- **Q1 2024 – ongoing:**
  - Purchase EVs and install charging infrastructure in accordance with replacement plan.

Roles and Responsibilities

- **City of Edgewater:** Apply for FEAP and lead participation in process; lead development of EV replacement and infrastructure plan.
- **Partners in Energy:** Support application to FEAP and development of EV replacement and infrastructure plan.

Available Resources

- Xcel Energy FEAP and EVSI programs
- Xcel Energy Critical Peak Pricing Program
- CEO Charge Ahead Colorado grants
- CEO Fleet Zero-Emission Infrastructure Program
- Colorado Department of Public Health and Environment (CDPHE) Clean Fleet Vehicle & Technology Grant Program
- Climate Mayors' EV Purchasing Collaborative discounts

- IIJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure
- *(Anticipated early 2023)* U.S. EPA Diesel Emission Reduction grants

Strategy M-2: Engage in peer learning for adopting emerging EV technology

Transitioning a fleet to electric requires changes in fleet logistics and operations. Fleet managers and staff can learn from those that are deploying electric vehicles, associated infrastructure, and other emerging technology to gain a better understanding of challenges and best practices for a smooth transition to electric.

Audience

- City Fleet (Public Works, Police Department, Community Services)

Target

- Engage with a minimum of four fleet managers to hear their real-world experience, challenges they faced, and opportunities for fleet electrification.

Timeline

- **Q2 2023**
  - Identify relevant fleets and fleet staff to engage.
  - Reach out and determine if fleet managers are interested in participating.
- **Q3 2023 – Q2 2024:**
  - Schedule fleet manager and staff meetings. On-site meetings with different fleet staff to see the vehicles, infrastructure, and maintenance bays and to ask questions may enhance the experience.
- **Ongoing:**
  - Identify additional fleet managers to connect with to learn from or offer own fleet experience.
  - Continue to reconnect with identified fleet managers to learn about new updates, developments, or opportunities.

Roles and Responsibilities

- **City of Edgewater:** Identify key questions and topics of interest. Actively participate in peer-learning conversations.
- **Partners in Energy:** Support identification of peer fleet managers and lead scheduling and development of meeting agendas.

Available Resources

- Municipal and police department fleet managers from around the state and region that are deploying electric vehicles and infrastructure.
- Drive Clean Colorado fleet resources.

Strategy M-3: Adopt policy to support the implementation of the City's EV replacement plan

Edgewater can support the implementation of the integrated EV replacement and infrastructure plan by adopting policies to prioritize EV procurement. For instance, EV-

first policies can stipulate that new vehicle purchases must be EVs unless a waiver is obtained based on high cost or other substantive reasons. Procurement policies apply whenever an electric option is readily available and meets the needs, and where the incremental cost associated with total cost of ownership is cost-effective. Further, it can specify vehicle types or applications, expanding in scope over time as more models become available. Depending on FEAP recommendations, an EV-first policy may apply only to light duty vehicles or to all fleet vehicles.

Audience

- City Fleet (Public Works, Police Department, Community Services)
- City Council

Target

- Adopt an electric-first vehicle procurement policy by the end of 2024.

Timeline

- **Q2 2024 – Q4 2024**
  - Research policy language from other organizations.
  - Draft policy language.
  - Present policy to City Council for approval.

Roles and Responsibilities

- **City of Edgewater:** Lead policy review and refinement and City Council adoption.
- **Partners in Energy:** Provide policy language examples, facilitate discussion with City staff, and draft sample policy.

Available Resources

- Example electric-first procurement policies from other communities

Additional Strategy for Future Consideration

The following strategy was identified to consider for implementation over a five- to ten-year horizon.

- Conduct employee education/training to build support for additional fleet electrification.

Focus Area 4: Policy and Public Infrastructure

In addition to electrifying City fleet, the City of Edgewater will play an important role in advancing EV adoption through the adoption of EV-ready codes and their continued investment in public infrastructure.

With support from Colorado's Energy Office, the City of Edgewater developed EV infrastructure requirements for adoption in July 2023. These recommendations align with the Boulder County Code Cohort.

These codes will improve access to EV infrastructure as the city redevelops. In the meantime, Edgewater can continue to support equitable access to EV charging by providing centralized opportunities for residents to charge their vehicles. The charging stations at the Civic Center are well utilized, which may indicate sufficient demand for additional charging stations on City-owned property. Importantly, the City recognizes that parking in Edgewater is limited, and will strive to balance EV charging access with equitable parking access for residents and visitors.

The following strategies were identified to address the unique barriers and opportunities in Edgewater's residential sector.

- Strategy P-1: Educate developers and the public on the City's EV codes and resources to support code compliance
- Strategy P-2: Identify City-owned properties to install public charging infrastructure

Strategy P-1: Educate developers and the public on the City's EV codes and resources to support code compliance

Edgewater is planning to adopt 2021 IECC regulations and supplemental EV ready code language in Q3 2023. This strategy is focused on helping developers and the broader community understand the reason for this new code, major changes, and resources available to support the implementation of the new requirements.

Audience

- Developers and development partners
- General public

Target

- Development of one flyer and one video summarizing code changes and resources to support implementation.

Timeline

- **Q3 2023**
  - Adopt IECC 2021 and EV code language in July 2023 (note, new code may not go into effect until September 2023).
  - Develop a fact sheet summarizing key code changes and resources to support implementation, to add to resource guide for developers.

    - Develop a short video to share with developers or residents summarizing key code changes and relevant resources.
- **Q4 2024 – Ongoing**
    - Share out educational flyer and video.

Roles and Responsibilities

- **City of Edgewater:** Review educational content and share out deliverables with target audience.
- **Partners in Energy:** Develop educational video and flyer.
- **CEO:** Support delivery of educational information regarding broader IECC updates.

Available Resources

- CO Department of Local Affairs (DOLA) Code Cohort EV-ready code language, factsheet, and customizable PowerPoint slides
- Existing resources on EV-ready code from Southwest Energy Efficiency Project (SWEEP)
- Town of Superior IECC code, EV-ready, solar-ready, and electric preferred fact sheet
- Xcel Energy EVSI program (multifamily and new development)

Strategy P-2: Identify City-owned properties to install public charging infrastructure

The City of Edgewater already offers free public charging at the Civic Center. The City can continue to lead by example by identifying additional opportunities to install EV charging on City-owned property. This could include additional charging stations at the Civic Center.

Audience

- City of Edgewater

Target

- Install at least one additional charging station on public property.

Timeline

- **Q3 2023**
    - Inventory City-owned property.
    - Assess utilization data for existing charging stations at Civic Center.
- **Q4 2023**
    - Prioritize properties for EV infrastructure investment in accordance with strategy R-2.
- **Q1 2024**
    - Pursue investment in one or more public charging stations on City property.

City-led investment in public charging infrastructure should seek to address infrastructure access barriers highlighted in Strategy R-2. There may also be opportunities to coordinate fleet-specific charging identified in M-1 with public charging.

Roles and Responsibilities

- **City of Edgewater:** Provide an inventory of City-owned property, share utilization data for current public chargers, and lead budget request for infrastructure.
- **Partners in Energy:** Facilitate discussion between City staff and Xcel Energy to identify most suitable locations and to share information about relevant utility programs to reduce the cost of infrastructure installation.
- **Xcel Energy:** Xcel Energy's EV Supply Infrastructure program can help offset some of the charging infrastructure required to power the public charging stations.

Available Resources

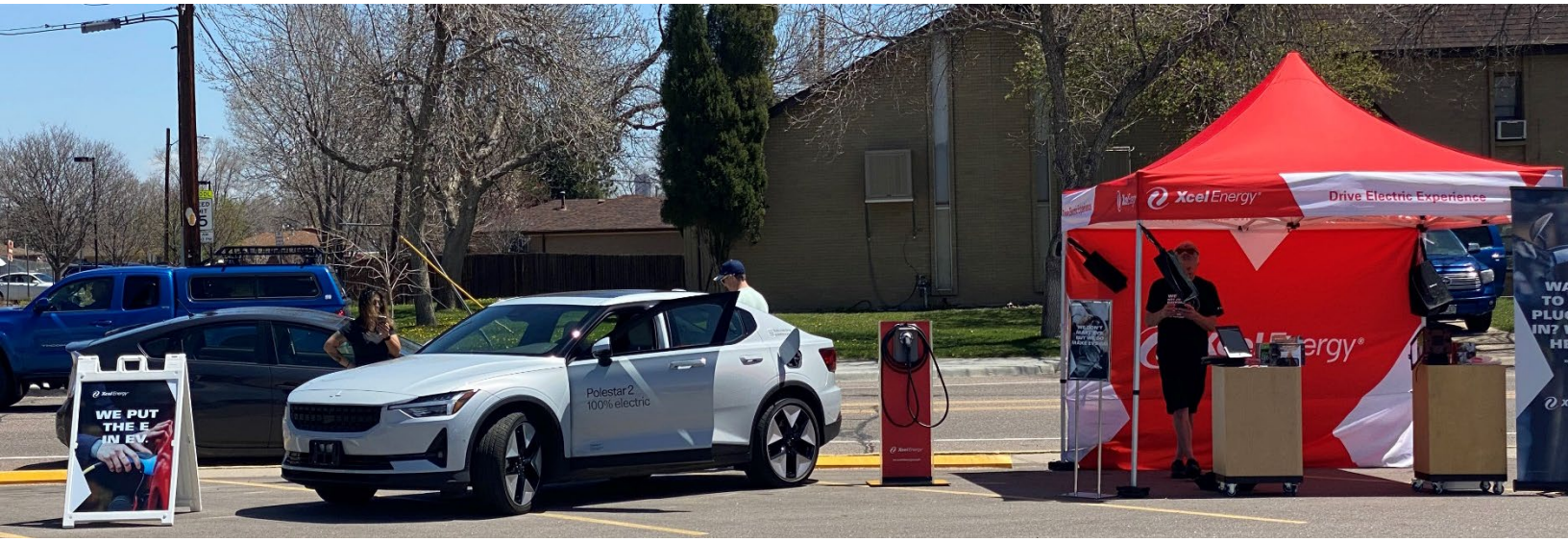
- Xcel Energy EVSI program
- Federal and state tax incentives
- CEO Charge Ahead Colorado grants
- IIJA – US DOT competitive Discretionary Grant Program for Charging and Fueling Infrastructure
- *(Anticipated)* CEO Community Access Enterprise

Additional Strategies for Future consideration

The following strategies were identified to consider for implementation over a five- to ten-year horizon.

- Explore on-street public charging opportunities.
- Explore regional coordination opportunities to support the electrification of refuse services in Edgewater.

HOW WE STAY ON COURSE



Successfully implementing plan strategies and achieving plan goals will require close coordination between the City and its partners, along with regular tracking and reporting to ensure we stay on course.

Implementation of the plan will be divided into two main roles as described in Figure 5.

Project Management Team

Participants: City's Sustainability Coordinator, City's Sustainability Board Chair, Partners in Energy community facilitators, and Xcel Energy staff

Responsibilities: Coordinating strategy implementation and tracking progress toward goals

Meetings: Monthly

EV Action Team

Participants: Project Management Team and interested members of the EV Planning Team (see Acknowledgements); additional members may be identified through implementation

Responsibilities: Implementing strategies and sharing unique perspectives and resources with the team

Meetings: Quarterly or as needed

Figure 5: Implementation Team

Table 2 illustrates an anticipated timeline for when the EV Action Team will implement plan strategies.

Table 2: Strategy Implementation Timeline

Strategy	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024
Strategy R-1: Connect residents with information about EVs and available incentives							
Strategy R-2: Support charging at rental and multifamily properties							
Strategy R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility							
Strategy BI-1: Identify willing partners to install fleet, workplace, and/or public charging							
Strategy BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles							
Strategy M-1: Establish a City fleet vehicle and charging infrastructure procurement plan							
Strategy M-2: Engage in peer learning for adopting emerging EV technology							
Strategy M-3: Adopt policy to support the implementation of the City's EV replacement plan							
Strategy P-1: Educate developers and the public on the City's EV codes and resources to support code compliance							
Strategy P-2: Identify City-owned properties to install public charging infrastructure							

Tracking Progress

The Project Management Team will track and report metrics for plan targets on an annual basis (Table 3). The results will be used by the Project Management Team and EV Action Team to understand the impact of strategy implementation and adjust course as necessary. These results may also be shared with City Council and the wider community to provide transparency about the implementation process and recognize the collaborative efforts of those involved.

Table 3: Target Metrics

Strategy	Target
Strategy R-1: Connect residents with information about EVs and available incentives	• Increase electric vehicle registration in 80214 zip code above 2023 baseline (231) by the end of 2024.
Strategy R-2: Support charging at rental and multifamily properties	• Engage with a minimum of 10 rental property owners and renters to raise awareness of renter interest in EV adoption and options for installing Level 2 charging at rental properties.
Strategy R-3: Develop and administer a pilot program to lower the upfront cost of electric micro-mobility	• Develop an electric micro-mobility program, such as an e-mobility library or rebate program.
Strategy BI-1: Identify willing partners to install fleet, workplace, and/or public charging	• Connect with at least 3 businesses, institutions, and/or property management companies. • Create 1 new public charging station in Edgewater.
Strategy BI-2: Educate employees on the benefits and opportunities for electrifying personal vehicles	• Develop one e-flyer each for general businesses and City employees, to incorporate into broader outreach materials. • Participate in one regional, employee-oriented Ride-and-Drive.
Strategy M-1: Establish a City fleet vehicle and charging infrastructure procurement plan	• Engage with a minimum of four fleet managers to hear their real world-experience, challenges they faced, and opportunities for fleet electrification.
Strategy M-2: Engage in peer learning for adopting emerging EV technology	• Engage with a minimum of four fleet managers to hear their real world experience, challenges they faced, and opportunities for fleet electrification.

Strategy M-3: Adopt policy to support the implementation of the City's EV replacement plan	• Adopt an electric-first vehicle procurement policy by the end of 2024.
Strategy P-1: Educate developers and the public on the City's EV codes and resources to support code compliance	• Develop one flyer and one video summarizing code changes and resources to support implementation.
Strategy P-2: Identify City-owned properties to install public charging infrastructure	• Install at least one additional charging station on public property.

Adapting to a Changing Landscape

An effective plan is cyclical in nature and the EV plan strategies involve rapidly changing technologies and industry standards. It will be important to evaluate and update strategies throughout implementation to reflect advancements and new offerings from the transportation industry, Xcel Energy, and state and federal resources. The Xcel Energy Partners in Energy EV Toolkit can be a good resource for identifying new strategies to address unexpected barriers that may arise. Any adjustments will be documented and shared with the broader group and community as they occur.

While the strategies in this plan are scheduled for the next 18 months, most of the goals are set for 2030. In 2025, it is recommended the City reassess its EV goals and develop new strategies that align with other City planning efforts, incorporate technology advances, and leverage new regional, state, and federal resources.

APPENDIX A: PLANNING PROCESS

About Xcel Energy's Partners in Energy

Xcel Energy is an electric and natural gas utility that provides the energy that powers millions of homes and businesses across eight Western and Midwestern states. Each community Xcel Energy serves has its own unique priorities and vision for its energy future. The energy landscape is dynamically changing with communities leading the way in setting energy and sustainability goals. To continue to innovatively support their communities, Xcel Energy launched Partners in Energy in the summer of 2014 as a collaborative resource with tailored services to complement each community's vision. The program offerings include support to community energy or electric vehicle (EV) planning, tools to help implement the plan and deliver results, and resources designed to help each community stay informed and achieve their outlined goals.

Plan Development Process

The content of this plan was derived collaboratively over a 10-month timeframe, through a series of project management team meetings, two stakeholder workshops, and three focus group discussions. Project management team meetings were held every other week, from August 2022 through June 2023, with representatives from City staff and Xcel Energy Partners in Energy. The project management team developed the plan's core vision, identified preliminary focus areas, and selected stakeholders to help inform strategies and action plans for each focus area. Stakeholders included additional City staff, business owners, nonprofits, City council members, property managers, and residents.

The project management team, stakeholders, and Xcel Energy representatives came together to serve as the EV Planning Team. The EV Planning Team kicked off strategy brainstorming across three focus groups. These focus group discussions served to identify barriers and opportunities within the residential, business, and municipal sectors. All EV Planning Team members then came together to review proposed strategies and build out action plans across two workshops, held in March and April of 2023. The draft plan was presented to City Council for feedback and reviewed by the full EV Planning Team.

Plan Implementation

Partners in Energy provides 18 months of support for implementation of an EV action Plan. This support is designed to supplement both technical analysis and support available through Xcel Energy's other EV offerings. Services offered through the Partners in Energy team include but are not limited to project management, communication assistance and resources, tracking and measurement, and celebration and recognition of successes. Plan development is followed by the creation of a Memorandum of Understanding outlining implementation support provided by Partners in Energy, along with the City's commitment to implementation.

Partners in Energy also supports 18 months of plan implementation in the form of marketing and communications, data tracking and analysis, mapping, program expertise, and project management. Implementation of this plan begins immediately.

APPENDIX B: ELECTRIC VEHICLES 101

Since electric vehicles (EVs) are an emerging technology that is rapidly changing, it is important to ensure that everyone has a common understanding of the technology and terminology involved. This section explains the basics of currently available types of vehicles and charging stations and the associated uses, barriers, and benefits. Note, while electric options are available for medium- and heavy-duty vehicles, the descriptions provided in this section apply primarily to light-duty vehicles, which make up most of the electric vehicle market today.

Electric Vehicle Basics

EVs refer to any vehicle that uses an electric motor. An EV can have a fully electric motor or can contain an internal combustion engine (ICE) that supports the electric motor. The travel range of each type are outlined in **Table 4** and are described in more detail in the following sections.

Table 4. Comparison of Types of Electric Vehicles

Electric Vehicle Type	Power Source	Travel Range
Battery Electric Vehicle (BEV)	Electric Motor	80 – 345 miles
Plug-in Hybrid Electric Vehicle (PHEV)	Electric Motor + Gasoline Engine	350 – 600 miles
Hybrid Electric Vehicle (HEV)	Electric Motor + Gasoline Engine	350 – 600 miles

Battery Electric Vehicle (BEV)

A BEV is an all-electric vehicle that does not require gasoline and, thus, has no tailpipe emissions. BEVs are fueled by plugging into charging stations. Energy is stored in the battery to be used when the car is running. Distances that a BEV can travel on a single charge range from 80 to 345 miles with longer distances promised in the future through continual advancements in battery technology. Recharging can take anywhere between 30 minutes to 12 hours depending on the type of charger, size of the battery, and level of depletion in the battery (Drive Change. Drive Electric., 2019).

Plug-In Hybrid Electric Vehicle (PHEV)

A PHEV provides a combination of both an electric motor and a gasoline engine and produces less tailpipe emissions than a traditional ICE. PHEVs use energy from the electric motor until the battery charge is fully depleted, which can occur between 15 to 50 miles, at which point, the gasoline engine takes over. The distance that a PHEV can travel on a single charge and full tank of gasoline ranges between 350 and 600 miles. The battery is charged similarly to the BEV through a plug, and the fuel tank is filled by traditional gas station (Drive Change. Drive Electric., 2019).

Hybrid Electric Vehicle (HEV)

Similar to the PHEV, an HEV has both an electric motor and a gasoline engine. In an HEV, the gasoline engine is used to power a generator, which powers the electric

motor. The benefit of this set up is that the ICE can run at a constant speed and greatly increase the vehicles fuel efficiency compared to traditional ICE vehicles. However, the battery cannot be charged by an external electricity source, which means that the vehicle always relies on the gasoline engine.

Charging Stations

EV charging stations are separated into three categories based on the speed at which the vehicle is charged: Levels 1, 2, and 3. Level 3 chargers are also known as DC fast chargers. The sections below detail the appropriate application for each charger type.

Residential Charging Stations

Residents have two options for charging at home. Level 1 chargers use standard 120-volt AC outlets and can take 8 to 12 hours to fully charge a depleted battery. Level 2 chargers require a 240-volt AC outlet and can fully charge a depleted battery in 4 to 6 hours. Residents can charge during off-peak hours to reduce the impact on the grid. **Table 5** provides a brief explanation along with the pros and cons of both types. All currently available EVs can use either charger type.

Table 5. Residential Electric Vehicle Charging Types

	LEVEL 1	LEVEL 2
		
Electric Current (AC)	120 volts; 20 amps	208/240 volt; 30 amps
Charging Rate (miles range per hour of charging)	4 to 6	25 to 40
Benefits	• Uses standard residential wall outlet	• Quicker charging • Some models have available Wi-Fi controls to allow residents to take

	• Little to no investment in infrastructure required	advantage of time of day electric rates • In the case of multifamily housing, the controls could be managed by a property manager.
Drawbacks	• Slower charging rate, but usually sufficient for residents who charge overnight	• Requires 240 Volt outlet or hardwired charger • Electrician likely required to install • Higher infrastructure cost investment
Estimated Costs	Low to no cost	$500 to $2,500 (US DOE, 2019)

Commercial Charging Stations

Commercial Level 2 and Level 3 chargers are most appropriate for commercial applications since the EVs are generally parked for shorter periods of time than residential applications. Level 2 chargers are the same as the residential chargers and often have the option to include two charging ports at one station. Level 3, or DC fast, chargers require an industrial DC outlet of 480 volts and can charge batteries in 20 to 30 minutes. Many commercial chargers also come equipped with software that allows the user to control when vehicles are charging and may facilitate payment in public applications. **Table 6** shows the advantages and disadvantages of Level 2 and Level 3 chargers.

Table 6. Levels 2 and 3 Charging Infrastructure

	LEVEL 2	LEVEL 3 (DC Fast Charger)
		
Electric Current	208/240 volt; 30 amps (AC)	480 volts DC
Charging Rate (miles range per hour of charging)	25 to 40	Up to 240
Benefits	• More economical than Level 3 • Safe for long-term use	• Fastest charging option available
Drawbacks	• Slower charging	• Very expensive to purchase and install

		• Can cause degradation to EV batteries with frequent use
Estimated Costs	$500 to $5,000 (US DOE, 2019)	As high as $50,000

Benefits of EVs

Benefits of EVs are both environmental and economic. By replacing ICE vehicles with EVs, transportation related GHG emissions are significantly reduced, and air quality is improved. As the need for imported petroleum to support transportation is decreased through the integration of EVs, domestically available fuel sources can shift into focus, which will result in energy independence and domestically regulated fuel prices. Furthermore, the individual consumer will experience lower fuel and maintenance costs with the transition to EVs and continued advancements in battery and charging technologies. The sections below provide additional details regarding the benefits of EVs.

Reduce GHG Emissions

EVs can significantly decrease GHG emissions associated with on-road transportation, which overtook electricity generation as the largest source of GHG emissions in the US in 2017 (Environmental Protection Agency, 2019). Compared to the average gas-powered vehicles, EVs typically produce fewer GHG emissions over the lifetime of the vehicle, even when accounting for manufacturing (EPA, 2023). The amount of emissions reduction depends on the electricity generation fuel mix of the local electricity grid. National trends suggest that electric utilities are improving the emissions from electricity generation at a faster rate than fuel economy is improving in ICE vehicles. EV charging can be paired with residential roof-top solar, commercial solar parking structures, and community solar to further reduce associated GHG emissions. Xcel Energy has goals to reduce carbon emissions 80 percent by 2030 and to be carbon free by 2050 (Xcel Energy, 2019). By transitioning to cleaner energy sources, Xcel Energy is supporting its customers reach their own community goals of achieving carbon neutrality.

Air Quality

Use of traditional ICE vehicles contribute to Ozone and fine particulate ($PM_{2.5}$) air pollutants, especially along heavily traveled routes. These pollutants have been linked to respiratory problems such as asthma, cardiopulmonary disease, and premature death for people with chronic exposure. These pollutants are significantly reduced in the case of HEVs and PHEVs and eliminated in BEVs. A study of the Houston area found that moderate to complete vehicle electrification would reduce Ozone by 1 to 4 ppb and $PM_{2.5}$ by 0.5 to 2 μgm^{-3}. This change was estimated to prevent 114 to 246 premature deaths annually, significantly reduce asthma exacerbation by 7,500 cases, and reduce school loss days by 5,500 (Pan, et al., 2019).

Energy Independence and Cost Stability

Over 65 percent of the petroleum imported to the US in 2018 was used for transportation fuel. Transitioning to EVs shifts the fuel source to more domestically available sources such as coal, nuclear, natural gas, and renewable energy. Integration of EVs is an important strategy for reducing dependence on fuel imports and isolates transportation costs from the volatile petroleum market (Office of Energy Efficiency and Renewable Energy, 2018). **Figure 6** illustrates the fluctuations in gasoline and diesel prices compared to electricity prices from 2000 to 2020.

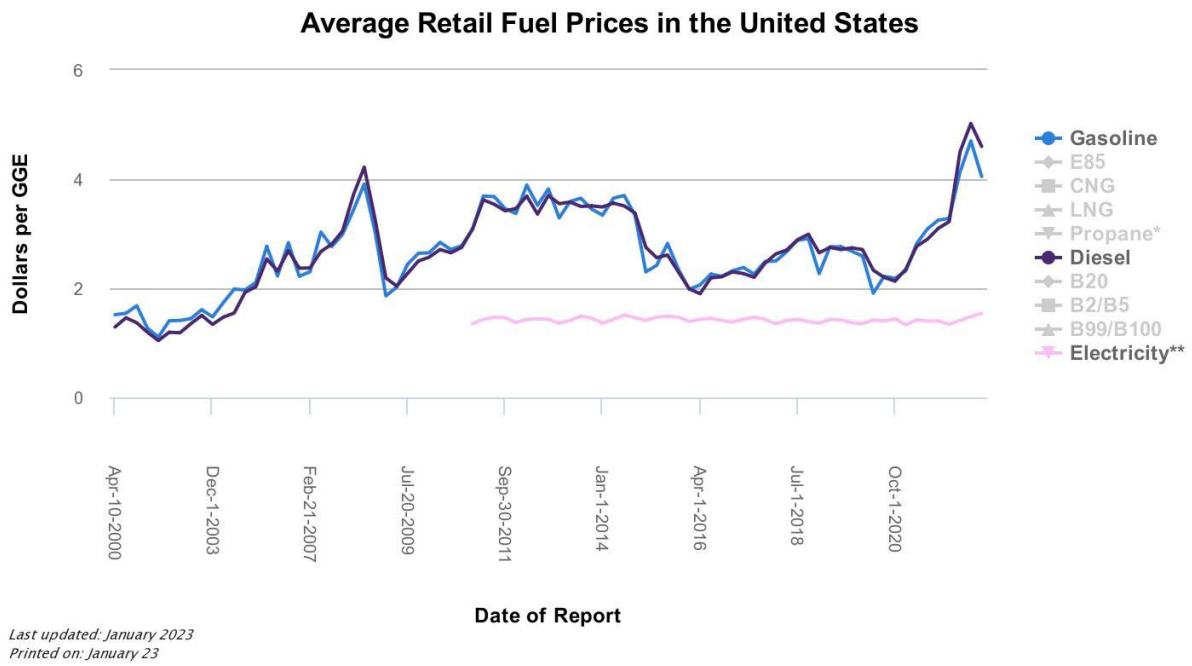


Figure 6. U.S. Average Retail Fuel Prices. Source: Alternative Fuels Data Center: Fuel Prices (energy.gov)

Lower Fuel & Maintenance Costs

While cost savings vary based on vehicle type, driving patterns, and geographic region, the average driver spends about half as much money in fuel and maintenance costs by driving an EV compared to a traditional ICE (Office of Energy Efficiency and Renewable Energy, 2019). The average US household spends about 13 percent of their annual income on transportation costs, while low-income households spend an average of 29 percent of their annual income on transportation costs (Institute for Transportation And Development Policy, 2019). The transition to EVs would result in significant savings for the individual consumer.

APPENDIX C: FUNDING RESOURCE DETAILS

There is a wide range of existing and anticipated funding opportunities and incentives to support beneficial electrification. The following sections summarize key programs, grants, tax credits, and other financial incentives available through Xcel Energy, the State of Colorado, and the Federal government.

Xcel Energy Rebates and Programs

- **Critical Peak Pricing Program** offers discounted rates for electricity used in charging electric vehicles, data insights, and monitoring.
- **EV Supply Infrastructure (EVSI) Program** offers low or no-cost installation of EV supply infrastructure, choice of pricing plan for charging, upfront consulting, and technical assistance. The program is open to fleets, workplaces, public charging stations, community charging hubs, and multifamily buildings.
- **Charger Service** is an option to pay a monthly fee for an Xcel Energy owned level 2 charger for multifamily, fleet, and workplace customers.
- **Small Business Rebate** offers a $2,500 rebate for wiring costs for small businesses.
- **New Construction Rebate** offers an allowance of $2,000 per charging port to support new multifamily construction for EV ready parking spots.
- **Income-Qualified Rebates** are available for eligible organizations. Qualifications vary depending on organization type. Rebate amounts are determined by the organization type as well as the level and number of chargers installed.
- **Residential Programs**
    - **Charger and Wiring Rebate** offers $500 or for income-qualified customers, a $1,300 - 2,500 rebate for home wiring or a level 2 charger.
    - **EV Accelerate at Home (EVAAH)** Xcel Energy installs and maintains a level 2 charger for a monthly fee on bill, with no upfront cost.
    - **Optimize Your Charge (OYC) Program** rewards customers for charging at times that benefit the grid.
    - **EV Purchase/Lease Rebate** offers income-qualified customers $5,500 for a new EV or $3,000 for a pre-owned EV.
    - **EV Network Dealers** have information on Xcel Energy programs and can provide the EV rebate at the point of sale.

Federal Incentives

Inflation Reduction Act Rebates and Program

Energy Efficient Home Improvement Credit 25C

$2,000 rebate for electric heat pumps and heat pump water heaters

HOMES Program

$4,000 to $8,000 for efficiency and electrification projects

High-Efficiency Electric Home Rebate Program (HEERA)

- Heat Pump HVAC: $8,000
- Heat pump water heater: $1,750
- Electric stove/cooktop: $840
- Heat pump clothes dryer: $840
- Breaker Box: $4,000
- Electric wiring: $2,500
- Weatherization: $1,600

Clean Heavy-Duty Vehicles Grants and Rebates

$1 billion in funding, including replacing heavy duty vehicles with EVs and associated charging infrastructure.

Diesel Emissions Reduction

Funds grants and rebates that protect human health and improve air quality by reducing harmful emissions from diesel engines.

Low or No Emission Vehicle Program

The Low or No Emission competitive program provides funding to state and local governmental authorities for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

To build and repair critical pieces of our freight and passenger road, rail, transit, and port transportation networks. Criteria for innovation include electric vehicles.

Charging and Fueling Infrastructure (CFI) Discretionary Grant Program

A competitive grant program distributing $2.5 billion over five years to strategically deploy EV charging infrastructure and other alternative fueling infrastructure projects in urban and rural communities in publicly accessible locations, including downtown areas and local neighborhoods, particularly in underserved and disadvantaged communities.

EV, Commercial Clean Vehicle, and EV Infrastructure Tax Credits

Up to $7,500 Credit for new vehicles under 14,000 pounds, and for commercial vehicles above 14,000 pounds (up to $40,000). EV chargers are eligible for a tax credit of up to 30 percent of the cost, or 6 percent in the case of property subject to depreciation (not to exceed $100,000). Consumers who purchase qualified residential fueling equipment through December 31, 2023 may receive a tax credit of up to $1,000.

State Incentives and Programs

Colorado EV Tax Credit

Up to $2,000 Credit for new vehicles

Charge Ahead Colorado
A competitive grant program offers an 80 percent match for charging station costs up to $9,000 for level 2 chargers and between $35,000 and $50,000 for DCFC chargers (depending on charger power output).

Direct Current Fast Charging (DCFC) Plazas
A competitive grant program designed to increase access to high-speed charging in communities and along highway corridors across Colorado. The program offers enhanced incentives for projects located in disproportionately impacted communities, sites incorporating battery storage and for applicants proposing 3 or more stations along corridor a given Federal Highway Administration designated EV corridor.

Fleet ZERO
Colorado's Fleet-ZERO is a competitive grant that supports charging for fleet owners and operators seeking to electrify their vehicles, as well as public and semi-public fleet charging sites and providers offering EV charging-as-a-service to fleets. The program prioritizes investments in disproportionately impacted communities and enhanced incentives for Qualifying Entities.

ZEV Workforce Development Grant
This Colorado Department of Transportation (CDOT) grant addresses multiple challenges that Colorado and the wider mobility and electrification industry are facing: talent shortages, gaps in new skillsets, and the growing need for training due to technological advances.

E-Mobility Education and Awareness
This CDOT grant is designed to expand public awareness and education around EVs and increase public understanding of their benefits, capabilities, and availability.

I-Codes Technical Assistance
The Colorado Energy Office (CEO) offers free technical assistance for jurisdictions adopting 2021 I-Codes. Questions about building I-codes, how to review or inspect for a measure, how I-codes interact, or how to comply, can be submitted to CEO's free Code Helpline.

Colorado Heat Pump Tax Credit
Valid only for 2023 and 2024, this credit provides a 10 percent tax credit and sales tax exemption (2.9%), equating to a 12.9 percent discount on the price of equipment. These also extend to electrical panel upgrades and energy storage systems. See SB22-051 for more information.

Clean Fleet Enterprise Clean Fleet Vehicle and Technology Grant Program
Created to incentivize and support the use of electric motor vehicles and other clean fleet technologies by owners and operators of motor vehicle fleets. Includes a portfolio to provide training and development of a clean transportation workforce to support the adoption of clean fleet vehicles for use in motor vehicle fleets.

Community Access Enterprise
Programs to equitably reduce and mitigate the adverse environmental and health impacts of air pollution and greenhouse gas emissions produced by motor vehicles. It includes several programs.

(Anticipated) eCargo Bike Commercial Delivery Pilot Program
A pilot grant program available to community-based organizations, local governments, bike shops, delivery fleets, and others for replacing traditional delivery fleet vehicles with eCargo bikes. Grant program anticipated to open for applications spring 2023.

(Anticipated) Vehicle Exchange Colorado
State rebate program to encourage income-qualified Coloradans to replace high-emitting vehicles with EVs and other low-emitting mobility options. Program anticipated to start summer 2023.

(Anticipated) Community-Accelerated Mobility Project
Develop mobility solutions that meet needs specific to local communities, including flexible funding that includes electric carshare, electric vanpool, community eBike share, community charging infrastructure, and others.

APPENDIX D: GLOSSARY OF TERMS

Amps: The measurement of the amount of electrical energy “flowing” through a charger. This is determined by the electrical load required by the equipment and can vary over time.

Battery Electric Vehicle (BEV): An all-electric vehicle, fueled by plugging into an external charger, that has no tailpipe emissions. Requires low maintenance costs.

Direct Current (DC): The form of electricity where the current only flows in one direction. This is the type of electricity that batteries supply and require to charge. EV chargers must convert the supplied AC electricity to DC power.

Electric Vehicle (EV): A vehicle that uses an electric engine for all or part of its propulsion.

EV-Ready Codes: Local government codes that require installation of a 40-amp, 208/240-volt dedicated branch circuit (similar to electric dryer or oven) and a circuit terminating in a receptacle, junction box, or EV charging station at certain parking facilities (Southwest Energy Efficiency Project, 2023).

Electric Vehicle Supply Equipment (EVSE): Infrastructure required to support EVs such as chargers, electrical supplies, etc.

Energy Burden: Percentage of gross household income spent on energy costs.

Fleet Electrification: Replacing internal combustion engine vehicles with equivalent electric vehicles in a public or business fleet.

Greenhouse Gases (GHG): Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Heavy-Duty Vehicles: Commercial vehicles over a minimum Gross Vehicle Weight Rating (GVRW) of 8,500 lbs.

Hybrid Electric Vehicle (HEV): Contains both an electric motor and a gasoline engine. The gasoline engine powers a generator that charges the electric motor. No external battery charger is used. Runs at a constant speed, which increases fuel efficiency.

Internal Combustion Engine (ICE): Traditional vehicle engine that uses the direct combustion of gasoline, diesel, or other fuels.

Kilowatt-hour (kWh): The amount of electricity being sent to the EV battery from the charger in one hour. This is calculated by volts times amps divided by 1,000.

Level 1 Charging Station: Uses a standard 120-volt AC outlet and can take 8 to 12 hours to fully charge a depleted battery; intended for residential use only.

Level 2 Charging Station: Uses a 220-volt or 240-volt AC outlet and can fully charge a depleted battery in 4 to 6 hours; can be used in both residential and commercial settings.

Level 3/DC Fast Charging Station: Uses an industrial 480-volt DC outlet and can charge a battery to 80 percent in 20 to 30 minutes; used in commercial settings where the anticipated charge time is limited (e.g., supermarket, gas station, etc.); will be used on Alternative Fuel

Corridors – a national network of major thoroughfares supporting EVs and other alternative fuels.

Light-Duty Vehicles: Passenger cars with a maximum Gross Vehicle Weight Rating (GVRW) of 8,500 lbs.

Micromobility: Transportation using lightweight vehicles such as bicycles or scooters, including electric bicycles and scooters, often used to travel short distances.

Plug-in Hybrid Electric Vehicle (PHEV/PEV): Contains both an electric motor and a gasoline engine. An external plug is used to fuel the electric motor. The electric motor is used until the battery is depleted, at this point the gasoline engine takes over. Lower tailpipe emissions than traditional ICE and longer ranges than most BEVs.

Range Anxiety: Fear of running out of power in an EV before reaching a charging station or desired destination.

Range Per Hour (RPH): A measurement of the miles an EV can travel on one hour of charge. This is generally applied to EV charging stations and expressed in terms of typical EV efficiency.

Vehicle Miles Traveled (VMT): A way of measuring integration of EVs and associated reduction in GHG emissions by considering electric miles that replace traditional vehicle miles.

Volts: A measurement of the force pushing the flow of energy through a charger. This measurement is determined by electricity supply. Standard household outlets provide 120 volts; outlets for dryers or other high-powered household equipment supply 240 volts.

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