JEFFERSON COUNTY COLORADO

An Electric Vehicle Action Plan for Jefferson County

December 2023

Xcel Energy®

PARTNERS IN ENERGY
An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

Thank you to the following individuals who contributed many hours of service to developing this Electric Vehicle (EV) Action Plan.

The content of this plan is derived from a series of planning workshops hosted by Xcel Energy's Partners in Energy. Xcel Energy is the main electric utility serving Jefferson County. Partners in Energy is a two-year collaboration to develop and implement a community's energy goals. For more information about the planning workshops, see Appendix A: Xcel Energy's Partners in Energy EV Planning Process

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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 Jefferson County has made modifications to the plan.

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Jefferson County Electric Vehicle Action Plan

About This Plan

Over the course of 6 months, Jefferson County and Partners in Energy brought together key County staff to create an Electric Vehicle (EV) Action Plan. The plan developed through Xcel Energy's Partners in Energy program will help Jefferson County prioritize EV adoption while promoting accessibility and equity across the county.

Our Electric Vehicle Goals

- Align with the State of Colorado goals and transition 10% of registered light-duty vehicles in the county to EVs by 2026.
- Add approximately 800 Level 2 and 200 direct current fast charging ports equitably throughout the county by 2026.

Our Electric Vehicle Vision

Through innovative and collaborative partnerships Jefferson County will strategically and equitably advance transportation electrification.

Our Roadmap for Achieving this Vision

To achieve this vision, the Jefferson County EV Action Plan is divided into four focus areas:

- Building Code & Together Jeffco
- Open Space
- Libraries
- County Facilities

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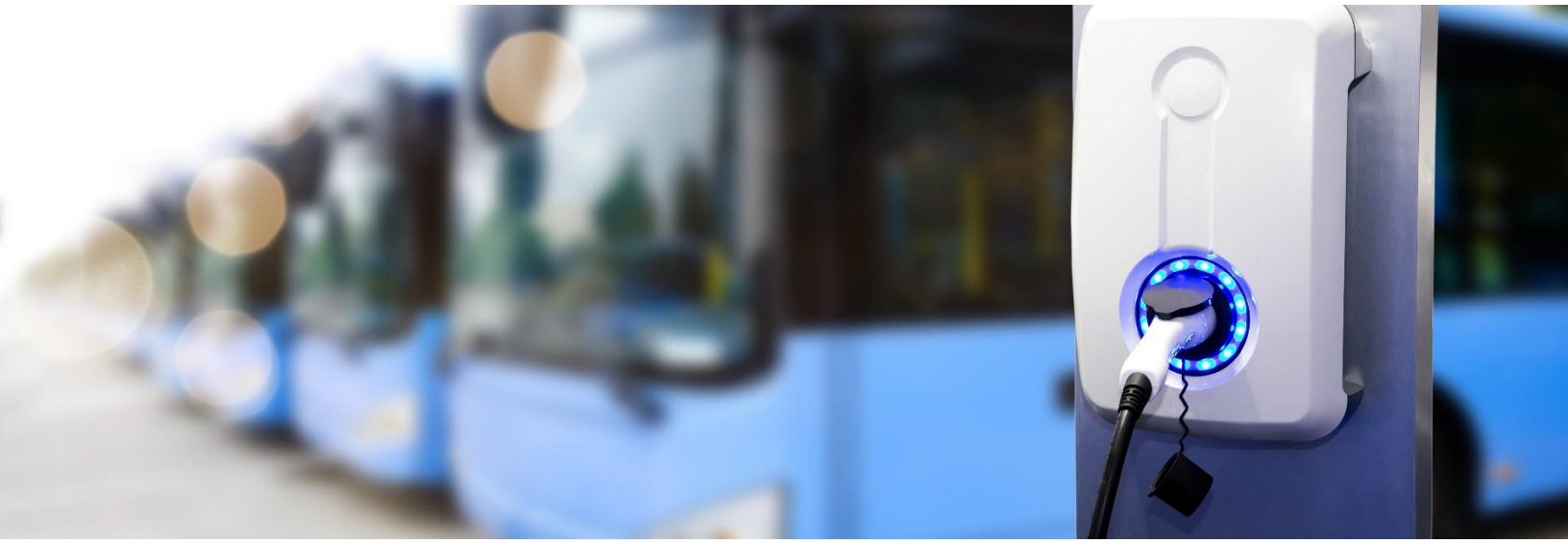
Our Strategic Priorities

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

Focus Areas	Strategies
Building Code & Together Jeffco	Strategy B-1: Update land use code to include EV-ready language.
	Strategy B-2: Explore and recommend adopting EV-ready building codes.
Open Space	Strategy OS-1: Add EV charging to trailheads as appropriate.
	Strategy OS-2: Support County fleet electrification efforts by preparing Open Space staff.
	Strategy OS-3: Support regional education strategy by sharing collateral and event information with Open Space visitors.
Libraries	Strategy L-1: Develop EV charger guidelines for considering installations at Libraries.
	Strategy L-2: Support County fleet electrification process by piloting electrification of Library fleet vehicles.
	Strategy L-3: Support regional education strategy by sharing collateral and event information with Library visitors and staff.
County Facilities	Strategy C-1: Install public charging at County facilities.
	Strategy C-2: Develop design guidelines including policies and signage to offer accessible EV charging stations.
	Strategy C-3: Examine pricing structure best practices for public charging at county facilities and provide a recommendation.
	Strategy C-4: Develop a workplace EV charging policy for employees who want to charge at work.
	Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits.

- Strategy C-4: Develop a workplace EV charging policy for County employees who want to charge at work.
- Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits.

INTRODUCTION



As one of the first Partners in Energy communities in Colorado, Jefferson County made great progress toward its greenhouse gas (GHG) and energy goals. Following the implementation of their Energy Action Plan (2017), Jefferson County has been hard at work, including developing a Climate Action Plan (CAP), (2022). This CAP outlines specific strategies and targets for electric vehicles (EVs), which are the basis for this EV Action Plan.

What is an EV Action Plan?

This EV Action Plan is a roadmap to strategically guide Jefferson County's action in a manner that supports the CAP scenario of aligning with the State of Colorado's GHG emissions reduction goal and EV adoption goal.

The EV goals and strategies outlined in this plan were developed collaboratively with a stakeholder team (EV Planning Team), through two planning workshops conducted in August and November of 2023, as well as four virtual focus groups (Appendix A: Xcel Energy's Partners in Energy EV Planning Process). Since successful deployment of many EV strategies relies on collaboration between the County and Xcel Energy, representatives from both organizations were included (Acknowledgements). The Jefferson County team included representatives from a variety of departments throughout the County organization. The Xcel Energy team included experts in electrical infrastructure, billing, and EV fleet advisory programs. The EV Planning Team coordinated throughout the process to share information and identify potential opportunities for partnership during implementation.

Jefferson County joined more than 40 other Colorado communities that have developed EV and Energy Action Plans through Xcel Energy's Partners in Energy, an offering that

provides resources for community energy planning. Partners in Energy supports plan implementation for a period of 18 months in the form of plan implementation, marketing and communications, data tracking and analysis, program expertise, and project management.

The components of Jefferson County's EV Plan are detailed below:

Introduction: Looks at Jefferson County's motivations for developing an EV Action Plan.

Where We Are Now: Outlines the relevant characteristics of the Jefferson County electric vehicle landscape.

Where We Are Going: Describes Jefferson County's EV vision and goals through a planning horizon of 2025.

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

How We Stay on Course: Outlines how the County will track progress toward targets, goals, and vision, and how it will adapt to a changing landscape during the coming 18-month implementation period.

Appendices: Provide additional information about the planning process, EV basics, and long-term strategies.

Why an EV Action Plan?

Jefferson County conducted their five-year update of the Hazard Mitigation Plan (HMP). Wildfires and flooding are the hazards that rose to the top as being especially impactful to the County as temperatures increase locally and globally. To prepare, the County introduced the first Jefferson County's Climate Action Plan that was approved by the Board of County Commissioners on December 20, 2022. The Climate Action Plan was developed to address the risk associated with climate change and build community resilience to these changes. As part of their implementation process, Jefferson County is collaborating with Partners in Energy to expand sustainability efforts into transportation.

Greenhouse Gas Emissions

Addressing climate change is a priority for the County, as outlined in the Jefferson County Climate Action Plan. Jefferson County has been tracking county-wide greenhouse gas (GHG) emissions since 2015. In 2018, the three largest sources of GHG emissions in the county were transportation (40%), electricity (36%), and fuel for heating and cooking (23%--a mix of natural gas, propane, and kerosene), (Jefferson County, 2022). By 2035, Jefferson County is seeking to reduce GHG emissions 73% from 2015 levels (Ibid). Since EVs have fewer lifetime emissions than internal

combustion engine (ICE) vehicles, EV action will reduce GHG emissions in the county (Argonne National Laboratory, 2022).

Air Quality

In addition to contributing a significant portion of greenhouse gas emissions, the transportation sector produces pollutants such as particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs). Pollutants like NOx and VOCs contribute to ground-level ozone, which in addition to PMs and CO, are harmful to respiratory health. In general, EVs produce fewer tailpipe pollutants as compared to their gasoline-powered counterparts (Office of Energy Efficiency & Renewable Energy, 2020). As the fuel mix for generating electricity continues to decarbonize, the magnitude of air quality benefits associated with electrifying transportation will increase.

Cost Stability

Integration of EVs is an important strategy for increasing stability in transportation costs by separating transportation fuel from the volatile petroleum market (Office of Energy Efficiency and Renewable Energy, 2018). Figure 1 illustrates the fluctuations in gasoline and diesel prices compared to electricity prices from 2011 to 2022.

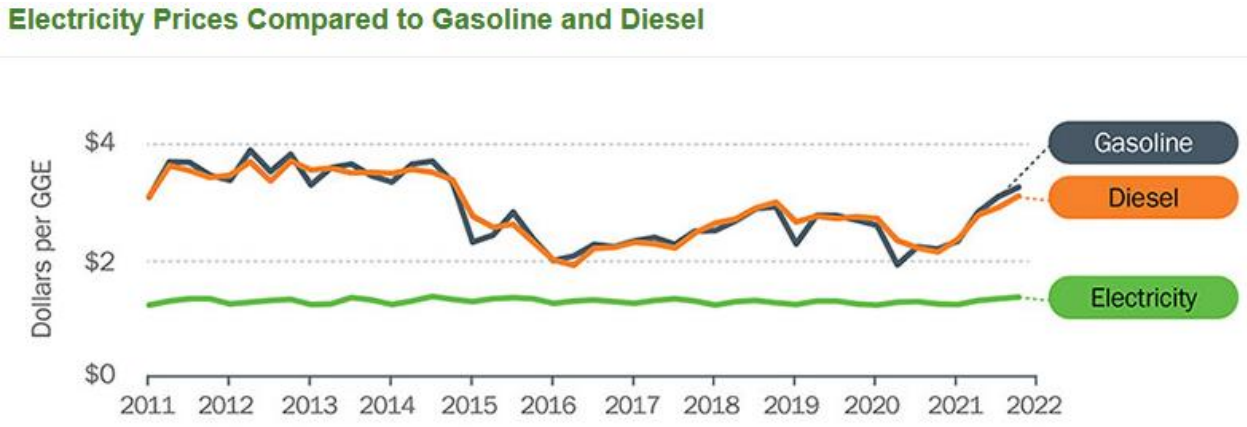


Figure 1. Average Retail Fuel Prices

State Legislation Encouraging EVs and Leveraging Funding Opportunities

Plug-in EV adoption is increasing across Colorado including Jefferson County. In 2019, Colorado adopted the Zero Emission Vehicle rule that requires automakers to sell a growing share of zero-emission vehicles each year and includes incentives to bring electric vehicles to Colorado (Colorado Energy Office, n.d.). In 2021 Colorado Department of Transportation (CDOT) approved the GHG Transportation Planning Standard that will require CDOT and the five metropolitan planning organizations to estimate the total greenhouse gas emissions expected from the transportation projects in their plans and ensure that their approved plans achieve individually set GHG reduction levels at four different time periods - 2025, 2030, 2040, and 2050 (Colorado

Department of Transportation, n.d.). In June 2023, Colorado's Energy Code Board released model electric ready code with EV ready requirements. Preparing for plug-in EVs is a key component for increasing transportation option efforts.

Significant funding is currently available for transportation electrification in support of federal, state, and utility GHG and EV goals. This plan identifies potentially applicable funding programs and will ensure that Jefferson County and its partners are poised to leverage opportunities and prepare the County and its communities to maximize the local benefits of increased EV adoption.

Lower Fuel & Maintenance Costs

While cost savings vary based on vehicle type, driving patterns, and geographic region, the average driver spends 60% less each year in fuel costs by driving an EV compared to a traditional ICE (Consumer Reports, 2020). The average US household spends about 13% of their annual income on transportation costs, while low-income households spend an average of 29% 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. Over its lifetime, an electric vehicle tends to cost 50% less to own and operate as compared to its ICE counterpart (Consumer Reports, 2020). Though the retail price of many EVs is still higher, $4,600 more than the median gas-powered vehicle, this gap is expected to decrease as production of EVs scales up and the used EV market develops (The Washington Post, 2023). Additionally, federal, state, and utility incentives are available and can help to bring down the cost of EV purchase or lease below comparable gas-powered cars for some buyers.

WHERE WE ARE NOW

To better understand the opportunities for EV adoption in Jefferson County, basic community characteristics are outlined below. Factors such as demographics, housing, and industry employers help contextualize current and future opportunities for targeted outreach and partnerships. EV-specific baseline data, such as EV ownership and infrastructure, is presented in the focus areas.

Geography

Jefferson County covers a relatively large geographic area for the Denver Metro area, spanning 774 square miles, about half the size of the entire state of Delaware. **Figure 2** shows the location for Jefferson County. Nearly 580,000 people live in the county (U.S. Census Bureau, Jefferson County Quick Facts, n.d.).

Population

In terms of median income, Jefferson County has a higher median household income ($102,731) compared to the state at $94,549 (U.S. Census Bureau, 2021). Higher income areas are seeing higher adoption rates as many EV models on the market are still considered luxury vehicles. However, ensuring that the benefits of EVs are available for all income levels is an important equity consideration. Increasing EV access for those with lower incomes is vital to decreasing cost burdens for low-income households.

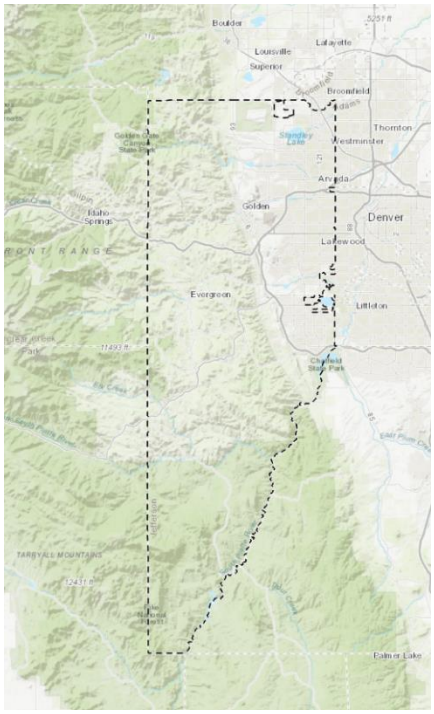


Figure 2: Jefferson County Geographic Boundary

42% of Jefferson County households have more than 2 vehicles (U.S. Census, 2019). This is noteworthy because residents may find it easier to switch one vehicle to an EV if they also have a gas vehicle available for travel.

> Jefferson County defines equity as “Actively ensuring our policymaking, service delivery, and distribution of resources account for the different histories, challenges, and needs of the people we serve. Equity is achieved when one’s identity cannot predict one’s outcomes.”

EV Adoption

In July 2023, Jefferson County had a total of 1.9% of registered light-duty vehicles as EVs creating the EV baseline (Atlas Public Policy, 2023). The data shows that the estimated number of EVs is about 10,047 in Jefferson County. As of July 2023, the county had an estimated 269 public Level 2 charging ports and 73 direct current fast charging ports (Atlas Public Policy, 2023).

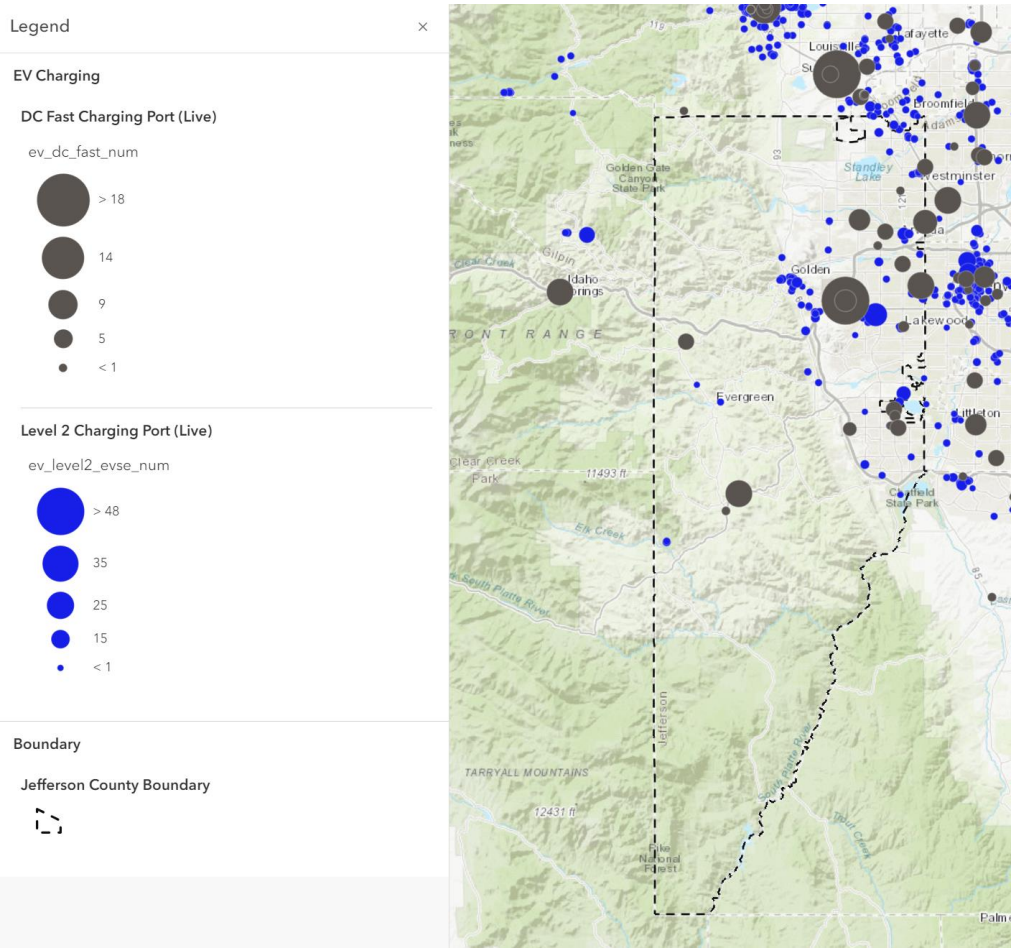


Figure 3: Jefferson County Public EV Chargers

Housing Characteristics

Jefferson County is well poised for EV growth. In the early stages of EV adoption, owning one's own residence means households can install chargers independently. About 70% of residents own their residence as opposed to rent it (U.S. Census Bureau, 2019). Additionally, single-family homes tend to be easier compared to apartments for adding charging outlets because many homes have garages. In Jefferson County, two-thirds of the housing stock are single family residences compared to multifamily homes (U.S. Census Bureau, DP04: Selected Housing Characteristics, 2019).

A total of 46% of housing was built in the last 30 years, which indicates housing has better than average electrical infrastructure and fewer barriers like panel upgrade requirements to accommodate EVs (U.S. Census Bureau, S2504: Physical Housing Characteristics for Occupied Housing Units, 2019).

Commuting Characteristics

Jefferson County has several indicators which could prompt rapid adoption of EVs. Nearly 85% of residents commuted via a car, truck, or van to work (U.S. Census Bureau, S0801: Commuting Characteristics, 2019). The mean travel time to work is 26 minutes—well within the range of all EVs.

Studies have shown that employees of workplaces with EV charging are six times more likely to own an electric vehicle than those at workplaces without EV charging (US DOE, 2016). Though most of EV charging occurs at home, supporting the adoption of EV charging at commercial facilities is an important strategy to bolster EV adoption overall.

Transportation and Housing Costs

Jefferson County residents spend 27% of their income on housing and 19% of their income on transportation (Center for Neghborhood Technology, n.d.). Since EVs have lower maintenance and operating costs than internal combustion engine vehicles, as the EV market matures and EVs are available to more of the population, Jefferson County residents who are housing and transportation cost burdened may be able to see the benefits of decreasing transportation costs.

Since Jefferson County is more dispersed, that results in a higher average household Vehicle Miles Traveled (VMT) figure of 16,231 miles. This figure demonstrates an opportunity for EV use to help decrease the costs and emissions associated with this travel, in addition to other county-wide efforts to address land use and strategic growth to reduce overall VMT.

Related Planning Efforts

Jefferson County Climate Action Plan 2022

As mentioned previously, the largest source of GHG emissions comes from transportation, approximately 40% of GHG emissions in Jefferson County (Jefferson

County, 2022). By 2035, Jefferson County is seeking to reduce GHG emissions to 73% from 2015 levels (Ibid).

The EV Planning Team aligned the goal of this EV Action Plan to Scenario B in the County Climate Action Plan, that aligns with the State of Colorado EV goal. The scenario establishes a goal to support the transition of total light-duty registered vehicles in the county to EVs and provides goals for associated charging infrastructure to support those vehicles.

Colorado EV Plan 2023

The 2023 Colorado EV Plan 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 reinforces the state's existing goal of 940,000 light-duty EVs on the road by 2030 and establishes a new goal of 2.1 million on the road by 2035. These interim goals support a vision for 100% electric light-duty vehicles and 100% zero-emissions medium-duty vehicles. The plan identifies policies and programs by which to achieve these goals. It also includes a focus on personal and shared electric mobility while pursuing cross-cutting initiatives that affect multiple parts of the transportation system such as equity.

WHERE WE ARE GOING

Our Vision Statement

During the planning process, the EV Planning Team developed a vision statement for this EV Action Plan.

This statement guided the planning process and reflects the intention of the community to create an EV Action Plan.

Through innovative and collaborative partnerships Jefferson County will strategically and equitably advance transportation electrification.

In this vision statement, the word “equitably” is used to describe the just distribution of resources and the benefits of EVs in the county. Throughout the planning process, the EV Planning Team highlighted equity as a priority, encouraging the inclusion of considerations that may impact a resident’s ability to access an EV, such as income level, language barriers, citizenship status, physical ability, and type of housing, among other factors. While this plan is focused on County operations to encourage EV adoption, ensuring that groups who have been disproportionately impacted by climate change see the benefits of EVs is a priority for the overall vision and direction of the plan.

EV Action Plan Goals

Working together, the team set near-term and long-term goals to measure plan success:

- Align with the State of Colorado EV goals and transition 10% of registered light-duty vehicles in the county to EVs by 2026.
- Add approximately 800 L2 and 200 DC fast charging ports equitably throughout the county by 2026.

Focus Areas

To achieve a community-wide commitment to transportation electrification, the EV Planning Team identified the following focus areas to prioritize strategies and resources.

Building Code & Together Jeffco

Open Space

Libraries

County Facilities

These focus areas were chosen to provide an opportunity for strategic actions to take place informed by Jefferson County staff's expertise in each focus area.

HOW WE ARE GOING TO GET THERE

For each focus area, a thorough analysis of baseline conditions was completed. Based on this analysis, the EV Planning Team identified targets and metrics to help evaluate success within the focus area. The EV Planning Team then identified potential barriers to success and developed strategies to overcome those barriers.

The following sections detail the baseline data, potential barriers, identified targets, and strategies selected to achieve those targets for each focus area. Short-term strategy details are outlined in the sections below. Longer-term strategy details are captured in Appendix D: Longer-Term Roadmap. Collectively, each focus area serves as a work plan of actionable steps to achieve Jefferson County's EV Action Plan overarching vision.

Focus Area: Building Code & Together Jeffco

Background

Jefferson County will play an important role in advancing EV adoption through exploring EV-ready codes through land use, zoning, and building codes. The County is currently updating codes and is interested in supporting EV development. The State of Colorado has also passed legislation for Building Energy Code updates that include model EV Ready code for different building types. These code updates will improve access to EV charging infrastructure across the county.

Short-Term Strategies

- B-1: Update land use code to include EV-ready language.
- B-2: Explore adopting EV-ready building codes.

Strategy B-1: Update land use code to include EV-ready language.

Description	
The land use code details the use and development of land within the county. By updating these ordinances to ensure that EV-related zoning ordinances or standards are included, Jefferson County will be prepared for increased transportation electrification.	
Key Context	

• An update to the Land Use Code is currently underway.
  ○ Module 3 of the update is most relevant to EVs, including parking, allowances for EVs, and alternative energy.
  ○ EV content could also be relevant in Module 2 zone overlays.
• The Zoning Resolution currently has no language about EVs.
• The Transportation Mobility Plan is currently being updated.	

Timeline	
• Start in Q1 2024 to align with land use code updates.	
Target Outcomes by End of Q2 2025	
• Incorporate EV considerations into Together Jeffco planning process.	
Scope Elements	
Best practices research	• **Partners in Energy** research best practices, examples, and ideas for EV parking and allowances, including examples of incentives other communities provide. Compile resources for the Together Jeffco team and consultants by Q2 2024.
Draft code review	• **Planning and Zoning** to draft code with EV-ready language.
Transportation planning efforts support	• **Partners in Energy** provide as-needed support for transportation planning efforts. Examples of support could include researching EV-related policies from peer communities.
Resources Available to Support	
Xcel Energy Resources	

- Code Support

State and Federal Resources

- Energy code training from Colorado Energy Office (CEO)
- Charge Ahead Colorado – funds eligible for going above and beyond code

Strategy B-2: Explore and recommend adopting EV-ready building codes.

Description	
The building code relates to the construction and occupancy of buildings and structures. By updating these codes to ensure that new construction meets EV-ready requirements including EV capable, EV ready, and EV installed, Jefferson County will be prepared for increased transportation electrification.	
Key Context	
• An update to the Building Code is currently underway. The County plans to adopt the 2024 ICC codes adopted by the end of 2024 and to implement them in the Spring of 2025. After the codes are adopted and implemented, the County will look to address the state model EV ready energy code. • The Colorado General Assembly passed the Building Energy Codes law (HB22-1362 Building Greenhouse Gas Emissions) in May of 2022 to improve energy use and efficiency in buildings. • This law advances progress by creating the Energy Code Board to review, approve, and recommend energy codes for new buildings and retrofits to existing buildings. • In June 2023, the Energy Code Board published a model electric ready code and solar ready code with the intent to prepare new homes and buildings for electric vehicles, rooftop solar, and high efficiency electric appliances. • Cities and counties with building codes must adopt at least the 2021 International Energy Conservation Code (IECC) when they update other building codes between July 1, 2023, and July 1, 2026. This adoption must include the electric and solar ready provisions in the model electric ready and solar ready code which includes EV-ready requirements. • House Bill 23-1233 passed in 2023 and will require all new multifamily buildings to meet EV ready requirements included in the electric ready and solar ready code beginning March 1, 2024.	
Timeline	
• Kick off Q3 2024	
Target Outcomes by End of Q2 2025	
• Develop education materials about multifamily EV ready requirements. • Provide information about the Model Electric Ready and Solar Ready Code.	
Scope Elements	
Code update information	• **Partners in Energy** connect County staff with State resources on HB23-1233.

	• **Building Safety** incorporates model codes into building code updates as appropriate.
Code update support	• **Partners in Energy** connect County staff with State educational resources. • **Building Safety** review content and provide feedback. • **Partners in Energy** update content based on feedback**.** • **Building Safety** distribute content.
Resources Available to Support	
Xcel Energy Resources • New development rebates (multifamily) for developers that construct new MF housing that exceed local and State building codes for electric vehicle accommodation. State and Federal Resources • Energy code training from the Colorado Energy Office (CEO). • Charge Ahead Colorado has funds eligible for going above and beyond code.	

Focus Area: Open Space

Background

Jefferson County Open Space manages open space parks and trails, preserves land, and contributes to city and park district projects within the County.

This focus area provides the Open Space team an opportunity to inform and support visitors and employees to properties about EVs with EV charging infrastructure and education. Because trailheads are located across the county, there is an opportunity to increase EV charging access. The County has started to install EV infrastructure and plans to continue to add more.

Short-Term Strategies

- OS-1: Add EV charging to trailheads as appropriate.
- OS-2: Support County fleet electrification efforts by preparing Open Space staff.
- OS-3: Support regional education strategy by sharing collateral with Open Space visitors.

Strategy OS-1: Add EV charging to trailheads as appropriate.

Description
Offering EV charging at trailheads allows EV drivers to access trailheads and encourages them to charge at these locations where they will be spending a significant amount of time. Incorporating EVs in the initial design decreases overall costs by avoiding the installation of electric access later.

Context	
• 2 EV chargers were recently installed at trailheads. • Jefferson County recently applied for a Charging and Fueling Infrastructure (CFI) grant and expects to be notified by the end of year. Locations included in the application were the Nature Center, Pine Valley Ranch, and Reynolds Park. • The five-year Open Space Strategic Plan process will kick off in 2024. • Trailhead Design Guidelines are updated on an as-needed basis.	
Timeline	
• Kick off Q1 2024	
Target Outcomes by End of Q2 2025	
• Include language about EV charging in Trailhead Design Guidelines update.	
Scope Elements	
Trailhead charging prioritization	• **Partners in Energy** develop a draft process for evaluating which trailheads are highest priority for installing EV charging. • **Open Space staff** review and refine draft process for evaluating trailhead charging priorities. • **Open Space staff** add EV charging to identified trailheads based on identified process (ongoing). • **Partners in Energy** and **Sustainability staff** support Open Space staff by identifying funding opportunities for EV charging infrastructure.
Trailhead Design Guidelines support	• **Partners in Energy** research and provide language for EV charging in Trailhead Design Guidelines update. • **Open Space staff** review recommended language and include in Trailhead Design Guidelines as appropriate.
Open Space Strategic Plan update support	• **Partners in Energy** work with Open Space planning team to support opportunities for EVs to be included in the Open Space Strategic Plan update.
Charging station usage data	• **Open Space staff** collect data from two existing charging stations to support future charging station conversations and understand charging needs and charger utilization. • **Sustainability staff** analyze data to explore trends in charger usage. **Partners in Energy** support data analysis by providing additional context as needed.
Resources Available to Support	
Xcel Energy Resources • Electric Vehicle Supply Infrastructure (EVSI) program supports community charging transition. State and Federal Resources	

- Electric Vehicle (EV) Charging Station Grants provided by the Colorado Energy Office (CEO) through the Charge Ahead Colorado program.
- Electric Vehicle (EV) Charging Station State Property Tax Exemption for EV charging station owners through January 1, 2030.
- Zero Emission Vehicle Infrastructure and Advanced Vehicle Grants by the U.S. Department of Transportation (DOT) Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant.
- Charging and Fueling Infrastructure Grants by the U.S. Department of Transportation (DOT).
- Electric Vehicle (EV) Charging and Clean Transportation Grants by the U.S. Department of Transportation (DOT).

Strategy OS-2: Support County fleet electrification efforts by preparing Open Space staff.

Description	
This strategy will utilize a variety of methods for engaging Open Space staff to prepare them to operate EVs in the workplace.	
Key Context	
• There are approximately 80 vehicles in Open Space, about 85% of which are utility vehicles. ○ Having data on the functionality of electric utility vehicles will be vital. • EV availability may be a factor in timing for fleet electrification. • Budgets are approved in April for the following year. • Open Space has proposed five to eight new vehicles next year, as well as replacements which are mostly one-ton diesel. Three to ten vehicles are cycled through each year.	
Timeline	
• Kick off Q2 2024	
Target Outcomes by End of Q2 2025	
• Align with the Plan goal of transitioning 10% of vehicles to electric by 2026. • Train 100% of employees who use EVs prior to them driving the vehicles.	
Scope Elements	
Employee training	• **Partners in Energy** develop materials to train employees how to operate EVs. Include information on the benefits of EVs with data, how to charge, how to operate an EV and how it differs from an internal combustion engine vehicle, and the different types of EVs and chargers. This will be in the form of a training video for staff. • **Open Space** and **Sustainability staff** review training materials and provide feedback. • **Partners in Energy** edit materials based on feedback and finalize**.**

	• **Open Space staff** determine distribution method for materials and distribute**.**
EV pilot	• **Open Space staff** coordinate with Fleet staff to understand opportunities for piloting use of EVs, ideally one passenger vehicle and one utility vehicle. ○ Ensure there is appropriate charging capability at sites where pilot vehicles are stored.
Resources Available to Support	
Xcel Energy Resources • Fleet Electrification Advisory Program helps determine the best path forward toward electrification. • Electric Vehicle Supply Infrastructure (EVSI) program supports community charging transition. State and Federal Resources • Electric Vehicle (EV) Charging Station Grants provided by the Colorado Energy Office (CEO) through the Charge Ahead Colorado program. • Advance Industries (AI) Accelerator Program Grants provided by the Colorado Office of Economic Development and International Trade (OEDIT) through the AI Accelerator Programs. • Electric Vehicle (EV) Tax Credit through the Inflation Reduction Act of 2022 (Public Law 117-169). • Fleet Alternative Fuel Vehicle (AFV) and Technology Grants administered by the Colorado Department of Public Health and Environment (CDPHE) through the Clean Fleet Enterprise. • Fleet Electric Vehicle (EV) Charging Station Grants provided by the Colorado Energy Office (CEO). • Electric Vehicle (EV) Charging Station State Property Tax Exemption for EV charging station owners through January 1, 2030. • Zero Emission Vehicle Infrastructure and Advanced Vehicle Grants by the U.S. Department of Transportation (DOT) Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant. • Charging and Fueling Infrastructure Grants by the U.S. Department of Transportation (DOT). • Electric Vehicle (EV) Charging and Clean Transportation Grants by the U.S. Department of Transportation (DOT).	

Strategy OS-3: Support regional education strategy by sharing collateral and event information with Open Space visitors.

Description
Collaborate with Sustainability staff and local and regional partners to encourage residents to purchase and drive EVs.
Key Context

• Adding EV chargers to trailheads can provide opportunities for engagement about EV adoption with visitors. • Personalizing messaging to what will resonate with Open Space users is important. For example, information highlighting the health and air quality impacts of EVs near trails, or trails visitors can utilize while charging.	
Timeline	
• Coordinate educational information with timing of adding chargers to trailheads.	
Target Outcomes by End of Q2 2025	
• Include specific Open Space outreach in communications plan, created in Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits. • Distribute one piece of collateral to 50% of Open Space visitors each quarter.	
Scope Elements	
Communications plan development	• **Partners in Energy** meet with Open Space Communications staff to understand outreach methods and collateral needs. Align with Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits. • **Partners in Energy** develop a communications plan. • **Open Space Communications staff** review communications plan and provide feedback. • **Partners in Energy** update communications plan based on feedback.
Collateral development and distribution	• **Partners in Energy** develop collateral. • **Open Space Communications staff** review collateral. • **Partners in Energy** update collateral based on feedback**.** • **Open Space Communications staff** distribute collateral.
Resources Available to Support	
State and Federal Resources • Statewide educational campaign materials from EVCO. • E-Mobility Education and Awareness Grant from CDOT.	

Focus Area: Libraries

Background

This focus area provides library staff with an opportunity to inform, support and educate visitors about EVs and EV charging infrastructure. Because libraries are in communities across the county, there is an opportunity to increase EV charging access within communities. Libraries have EV infrastructure and library staff has utilized grants and library funding to add the chargers, as well as plans to continue to add more chargers. Presently, there are EV charging stations at the Belmar Library and EV charging stations will be installed at the Evergreen Library by the end of Q4 2023.

Library staff plan to have EV charging stations installed at three of the other library locations in early 2024.

Short-Term Strategies

- L-1: Develop EV charger guidelines for considering installations at libraries.
- L-2: Support County fleet electrification process by piloting electrification of Library fleet vehicles.
- L-3: Support regional education strategy by sharing collateral and event information with library visitors.

Strategy L-1: Develop EV charger guidelines for considering installations at libraries.

Description	
Offering public and workplace charging throughout the county is an important step in encouraging EV adoption. Guidelines will be used to support a standardized process for installing EV charging at libraries as appropriate. The guidelines will also provide information about the feasibility of pairing EV chargers with solar installations.	
Key Context	
• Library facilities staff have started to install EV chargers at existing, redesigned, and new libraires. • Guidelines will help standardize both existing buildings and new/redesigned buildings. • Chargers at libraries can increase charging access especially for EV drivers who may not have home charging access while offering a welcoming destination to connect, discover, and create. • Libraries are embedded into communities providing outreach opportunities to many different populations. • Budgets are approved in April for the following year. • Consider prioritizing locations for new installations based on gaps – if one library already has chargers at an adjacent business/facility, then it should be prioritized lower on the list than one with a charging desert around it.	
Timeline	
• Kickoff in Q1 2024	
Target Outcomes by End of Q2 2025	
• Develop guidelines that are incorporated into the design process for any new or redesigned libraries and for retrofitting at existing buildings.	
Scope Elements	
Guideline development	• **Partners in Energy** research and provide draft guidelines and a recommended process for considering the addition of EV charging in guidelines and the connection to solar and wind technologies.

	• **Library Facilities staff** review and refine draft guidelines and process for evaluating installation of EV chargers at highest priority library locations. • **Library Facilities staff** add EV charging to identified libraries (ongoing).
Funding opportunities	• **Partners in Energy** identify programs and incentives to assist with EV charger installations. • **Library Facilities staff** apply for identified programs and incentives as appropriate. • **Library Facilities staff** consider budgetary requests for installations, operations, and maintenance.
Data collection	• **Library Facilities staff** collect existing EV charging station data to inform future EV charging installation. • **Sustainability staff** analyze data to explore trends in charger usage. **Partners in Energy** support data analysis by providing additional context as needed.
Resources Available to Support	
Xcel Energy Resources • Electric Vehicle Supply Infrastructure (EVSI) program supports community charging transition.	

Strategy L-2: Support County fleet electrification process by piloting electrification of library fleet vehicles.

Description
Developing a pilot program for library vehicle electrification will allow for data collection to demonstrate how the department can use EVs strategically. This strategy will prioritize a public-facing vehicle such as Library To You van or Book-Mobile vehicle and an operations vehicle, for high visible impact to the public.
Key Context
• Library fleet has some vehicles the library procures and some vehicles procured through the County fleet. • About 15 leased vehicles through the County. • Includes employee training for operating EVs • Public-facing vehicles provide an opportunity to reduce air pollution and educate communities. • EV availability may be a factor in timing for fleet electrification. • Budgets are approved in April for the following year. • EV charging infrastructure needs to be addressed with support from County fleet.
Timeline
• Kickoff in Q2 2024
Target Outcomes by End of Q2 2025

<table>
<tr><td colspan="2">

- Align with the Plan goal of transitioning 10% of vehicles to electric by 2026.
- Train 100% of employees who use EVs prior to them driving the vehicles.

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<tr><td colspan="2">Scope Elements</td></tr>
<tr><td>Employee training</td><td>

- Partners in Energy develop materials to train employees on operating EVs. Include information on the benefits of EVs with data, how to charge them, how to operate an EV and how it differs from an internal combustion engine vehicle, and the different types of EVs and chargers. Materials will be in the form of a training video.
- Library and Sustainability staff review training materials and provide feedback.
- Partners in Energy edit materials based on feedback and finalize.
- Library staff determine distribution method for materials and distribute.

</td></tr>
<tr><td>EV pilot</td><td>

- Library staff coordinate with Fleet staff in Q1 2024 to understand opportunities for piloting EVs. Library staff will champion fleet electrification in discussions with fleet staff.
  - Ensure there are appropriate charging capabilities at sites where pilot vehicles are stored.

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<tr><td colspan="2">Resources Available to Support</td></tr>
<tr><td colspan="2">

Xcel Energy Resources

- Electric Vehicle Supply Infrastructure (EVSI) program supports community charging transition.
- Fleet Electrification Advisory Program helps determine the best path forward towards electrification.
- Enhanced rebates for eligible customers

State and Federal Resources

- Electric Vehicle (EV) Charging Station Grants provided by the Colorado Energy Office (CEO) through the Charge Ahead Colorado program.
- Electric Vehicle (EV) Tax Credit through the Inflation Reduction Act of 2022 (Public Law 117-169).
- Fleet Alternative Fuel Vehicle (AFV) and Technology Grants administered by the Colorado Department of Public Health and Environment (CDPHE) through the Clean Fleet Enterprise.
- Fleet Electric Vehicle (EV) Charging Station Grants provided by the Colorado Energy Office (CEO).
- Electric Vehicle (EV) Charging Station State Property Tax Exemption for EV charging station owners through January 1, 2030.
- Zero Emission Vehicle Infrastructure and Advanced Vehicle Grants by the U.S. Department of Transportation (DOT) Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant.

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</table>

- Charging and Fueling Infrastructure Grants by the U.S. Department of Transportation (DOT).
- Electric Vehicle (EV) Charging and Clean Transportation Grants by the U.S. Department of Transportation (DOT).

Strategy L-3: Support regional education strategy by sharing collateral and event information with library visitors and staff.

Description	
Collaborate with Jefferson County Sustainability staff and other local and regional partners to encourage residents to purchase and drive EVs. This includes connecting with Library Communications staff for social media and in-person event coordination.	
Key Context	

• Adding EV chargers at libraries can provide opportunities for engagement about EV adoption with visitors.
• Adding EVs to the library fleet especially the public facing vehicles such as the Book Mobile and Library To You are traveling billboards to advertise the Libraries efforts and educate communities about EVs.
• Opportunity to present information about the library's electrification efforts. Examples include:
  ○ Present to leadership.
  ○ County has posters sharing County emission reductions; display high level statistics.
  ○ County releases newsletters.
  ○ Public Affairs staff running County's public engagement pages are great allies to share content. Connect with library communications staff to share content.	

Timeline	
• Kickoff in Q1 2024	
Target Outcomes by End of Q2 2025	
• Include specific library outreach in communications plan in Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits. • Distribute one piece of collateral to 50% of library visitors each quarter. • Add 2 EV education events per year to library programing.	
Scope Elements	
Communications plan development	• **Partners in Energy** meet with library communications staff to understand outreach methods and collateral needs. Consider options for library EV programming. Align with Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits. • **Partners in Energy** develop a communications plan.

	• **Library Communications staff** review communications plan and provide feedback. • **Partners in Energy** update communications plan based on feedback.
Collateral development and distribution	• **Partners in Energy** develop collateral. • **Library Communications staff** review collateral. • **Partners in Energy** update collateral based on feedback**.** • **Library Communications staff** distribute collateral. Host or sponsor public events and programming.
Resources Available to Support	
Xcel Energy Resources • Collateral materials about EV programs. State and Federal Resources • Statewide educational campaign materials from EV CO. • Colorado Department of Transportation (CDOT) E-Mobility Education and Awareness Grant.	

Focus Area: County Facilities

Background

County facilities offer an opportunity for the County to lead by example. The County can provide charging infrastructure for employees and visitors to County facilities, develop guidelines that will provide consistency across County facilities, and educate individuals about electrified transportation. The County can be a resource for County partners to learn from and use the same or similar guidelines. The County has begun to install EV charging stations at a few facilities including the Courts and Administration Building and plans to continue to add more.

Short-Term Strategies

- C-1: Install public charging at County facilities.
- C-2: Develop design guidelines including policies and signage to offer accessible EV charging stations.
- C-3: Examine pricing structure best-practices for public charging at County facilities.
- C-4: Develop a workplace EV charging policy for employees who want to charge at work.
- C-5: Lead regional educational EV campaign about individual and community EV benefits.

Strategy C-1: Install public charging at County facilities.

Description
Offering public charging throughout the County is an important step in encouraging EV adoption. By installing public charging at all County facilities and pairing EV

chargers with solar installations as feasible, the County can encourage employees and visitors to drive EVs.	
Key Context	
• The County has installed EV chargers at the Administration and Courts building and is planning on installing more including at the Public Health building in Lakewood. • The County applied for the federal Charging and Fueling Infrastructure Discretionary Grant Program and is awaiting an announcement about awards. • The County covers areas that include urban, suburban, and rural areas. EV charging needs in these communities differ between these areas. • Include considerations for total cost and infrastructure needs for future building electrification if desired. Consider the overall electric capacity needs for future public, employee, and fleet charging at facilities. • Consider the level of traffic at facilities to prioritize locations that are visited by the public.	
Timeline	
• Kickoff in Q1 2024	
Target Outcomes by End of Q2 2025	
• Develop process for identifying locations to install EV chargers at County facilities.	
Scope Elements	
Process development	• **Partners in Energy** research and provide a draft process for considering EV charging at County facilities. Process will include existing electrical capacity, solar, and wind considerations. • **Facilities staff** review and refine draft process for evaluating installation of EV chargers at highest priority County facilities. • **Facilities staff** add EV charging to identified County facilities (ongoing).
Funding opportunities	• **Partners in Energy** identify programs and incentives to assist with EV charger installations. • **Facilities staff** apply for identified programs and incentives as appropriate. • **Facilities staff** consider budgetary requests for installations, operations, and maintenance.
Data collection	• **Facilities staff** collect existing EV charging station data to inform future EV charging installation. • **Sustainability staff** analyze data to explore trends in charger usage. **Partners in Energy** support data analysis by providing additional context as needed.
Resources Available to Support	
Xcel Energy Resources	

- EV charger advisory services help determine the best path forward towards electrification.
- EVSE rebates.
- Critical Peak Pricing.

State and Federal Resources

- Charging and Fueling Infrastructure Discretionary Grant Program
- Charge Ahead Colorado has funds eligible for going above and beyond code

Strategy C-2: Develop design guidelines including policies and signage to offer accessible EV charging stations.

Description	
Standardizing EV charging installations will help streamline the process creating efficiencies for County Facilities staff. Additionally, accessibility is a vital step to ensuring EVs are options for all County residents. This strategy will focus on developing design guidelines that also include updating policies and signage to offer accessible EV charging stations.	
Key Context	
• The County installed EV chargers in 2019, and they used what information was available for accessibility. • In that time, best practices have evolved and need to be incorporated in EV charger guidelines. • Workshop participants mentioned that the State of Colorado released ADA standards for parking spaces at the end of October 2023. Research these standards is part of guideline development.	
Timeline	
• Kickoff in Q2 2024	
Target Outcomes by End of Q2 2025	
• Develop guidelines that support standardizing the EV charger installation process at County facilities.	
Scope Elements	
Guideline development	• **Partners in Energy** to research and provide draft guidelines including accessibility best practices. • **Sustainability staff** to coordinate accessibility guideline development with Safety Compliance Team and ADA coordinator and consult Americans with Disabilities Act to ensure compliance. • **Facilities staff** will review and refine draft guidelines. • **Facilities staff** to incorporate guidelines into discussions about EV chargers at County facilities.
Resources Available to Support	
State and Federal Resources	

- Align with the U.S. Access Board guidelines

Strategy C-3: Examine pricing structure best practices for public charging at County facilities and provide a recommendation.

Description	
There are a variety of pricing mechanisms for EV charging. By exploring best practices, current local practices, federal standards, and opportunities to provide EV charging to the public, the County can align on a pricing structure that supports its goals and makes EV charging more economically viable for residents.	
Key Context	
• The County currently levies fees to drivers to charge an EV. • The County wants to understand the current best practices and the local and regional approaches used in practice. • There is an opportunity for cross-jurisdictional exploration and discussion for a statewide income-qualified pricing program. • The City of Golden is shifting from offering all free charging to having a fee for charging that allows the City to recoup costs and enabling them to keep charging free in areas identified as disadvantaged communities.	
Timeline	
• Kickoff in Q2 2024	
Target Outcomes by End of Q2 2025	
• Compile best practices, local practices, and federal standards (for any federally funded installations) for EV charging pricing structures that include exploring income-qualified pricing.	
Scope Elements	
Pricing structure research	• **Partners in Energy** research and compile best practices, local practices, and federal standards for EV charging pricing. This may include a survey of local jurisdictions about their EV pricing structure. • **Facilities staff** review and refine materials and provide feedback.
Resources Available to Support	
Xcel Energy Resources • Critical Peak Pricing • EV electric rates	

Strategy C-4: Develop a workplace EV charging policy for County employees who want to charge at work.

Description	
The availability of vehicle charging capacity for a personal EV while at work has been demonstrated to be an important factor in employees purchasing EVs. (U.S. Departmentof Energy, n.d.)	
Key Context	
• Subsidized workplace charging could be a competitive benefit for employees. • The County currently has no incentives for employees using multimodal transportation for commuting.	
Timeline	
• Kickoff in Q3 2024.	
Target Outcomes by End of Q2 2025	
• Implement an EV charging workplace policy.	
Scope Elements	
Policy development	• **Partners in Energy** hold discussions with County **Human Resources**, **Sustainability** and **Facilities staff** on transportation benefits policies and discuss opportunity for EV charging benefit. • **Partners in Energy** research and provide draft workplace policy. • **Facilities staff** review and refine draft policy and process for evaluating installation of EV chargers at highest priority library locations.
Policy implementation	• **Facilities staff** work with **Human Resources** to incorporate policy into relevant new hire materials.
Employee education	• **Partners in Energy** develop materials to educate current employees on workplace charging policy. • **Facilities staff** or charging champion to continue educating staff.
Resources Available to Support	
Workplace Charging Resources • Federal Workplace Charging Program. • Watts at Work, a Drive Clean Colorado workplace charging initiative.	

Strategy C-5: Lead regional educational EV campaign about individual and community EV benefits.

Description
The County can be a leader in the region in encouraging residents and businesses to purchase and drive EVs and use other transportation modes such as micromobility and carshare. This strategy will include coordination with other regional and local entities.

Key Context	
• The County includes sustainability updates in their newsletter and has printed posters at public facilities to educate the public about efforts the County has undertaken. • Essential to have messages and content to share with departments and their communications staff. • Important to provide basic EV education, available incentives, addressing misconceptions, and latest information. • Campaign offers an opportunity for promoting a range of initiatives and programs from across County departments and partners such as facilities, fleet, open space, and libraries. • Campaign can include and share information and programs about other electrified transportation such as e-bikes, carshare, and rideshare. • Engagement is needed to understand the knowledge gaps and barriers to EV adoption.	
Timeline	
• Kickoff in Q1 2024	
Target Outcomes by End of Q2 2025	
• Include specific County facilities outreach in communications plan. • Distribute one piece of collateral to each user group of County residents each quarter. This will mean a total of three pieces of collateral per quarter, one for open space, one for libraries, and one for general residents.	
Scope Elements	
Communications plan development	• **Partners in Energy** meet with County staff to understand outreach methods and collateral needs. Align with Strategy L-3: Support regional education strategy by sharing collateral and event information with library visitors and staff and Strategy OS-3: Support regional education strategy by sharing collateral and event information with open space visitors. • **Partners in Energy** develop a communications plan. • **Sustainability staff** review communications plan and provide feedback. • **Partners in Energy** update communications plan based on feedback.
Collateral development and distribution	• **Partners in Energy** develop collateral. • **Sustainability staff** review collateral. • **Partners in Energy** update collateral based on feedback**.** • **Sustainability staff** distribute collateral.
Campaign impact measurement	• **Sustainability staff** to collect metrics on campaign.

Resources Available to Support
Xcel Energy Resources • Informational EV webpage with EV resources. • Collateral materials about EV programs. State and Federal Resources • Statewide educational campaign materials from CO EV website. • CDOT E-Mobility Education and Awareness Grant.

HOW WE STAY ON COURSE

This section provides an overview of the implementation period timeline supported through Partners in Energy. Over the next 18-months, Table 1 will serve as a work plan for the EV Planning Team and Partners in Energy. Over this period, the PM team will meet monthly to coordinate strategy implementation and will coordinate directly with strategy leads as needed. Identified timelines are tentative and may shift based on County schedules.

Table 1: Implementation timeline by strategy

		Timeline					
TASK	**LEAD**	**Q1 2024**	**Q2 2024**	**Q3 2024**	**Q4 2024**	**Q1 2025**	**Q2 2025**
B-1: Update land use code to include EV-ready language.							
Best Practices Research	Partners in Energy						
Draft Code Review	Planning and Zoning						
Transportation planning efforts support	Planning and Zoning						
B-2: Explore and recommend adopting EV-ready building codes.							
Model code information	Partners in Energy						
Code update support	Partners in Energy						
OS-1: Add EV charging to trailheads as appropriate.							
Trailhead charging prioritization	Partners in Energy						
Trailhead Design Guidelines support	Partners in Energy						
Open Space Strategic Plan update	Open Space Planning						
Charging station usage data	Open Space						
OS-2: Support County fleet electrification efforts by preparing Open Space staff.							
Employee training	Partners in Energy						
EV pilot	Open Space						
OS-3: Support regional education strategy by sharing collateral and event information with Open Space visitors.							
Communications plan development	Partners in Energy						
Collateral development and distribution	Partners in Energy						

		Timeline					
TASK	**LEAD**	**Q1 2024**	**Q2 2024**	**Q3 2024**	**Q4 2024**	**Q1 2025**	**Q2 2025**
L-1: Develop EV charger guidelines for considering installations at libraries.							
Guideline development	Partners in Energy						
Funding opportunities	Partners in Energy						
Data collection	Library Facilities						
L-2: Support County fleet electrification process by piloting electrification of library fleet vehicles.							
Employee training	Partners in Energy						
EV pilot	County staff						
L-3: Support regional education strategy by sharing collateral and event information with library visitors and staff.							
Communications plan development	Partners in Energy						
Collateral development and distribution	Partners in Energy						
C-1: Install public charging at County facilities.							
Process development	Partners in Energy						
Funding opportunities	Partners in Energy						
Data Collection	Facilities						
C-2: Develop design guidelines including policies and signage to offer accessible EV charging stations.							
Guideline development	Partners in Energy						
C-3: Examine pricing structure best practices for public charging at County facilities and provide a recommendation.							
Pricing structure research	Partners in Energy						
C-4: Develop a workplace EV charging policy for employees who want to charge at work.							
Policy development	Partners in Energy						
Policy implementation	Facilities						
Employee education	Partners in Energy						
C-5: Lead regional educational EV campaign about individual and community EV benefits.							
Communications plan development	Partners in Energy						
Collateral development and distribution	Partners in Energy						
Campaign impact measurement	Sustainability						

Adapting to a Changing Landscape

Even though this plan outlines strategies to promote EV adoption over the next five years, an effective plan is cyclical in nature (see Figure 4). In addition, the nature of implementation requires staging, flexibility, and course adjustment, when necessary to be successful and to sustain progress.

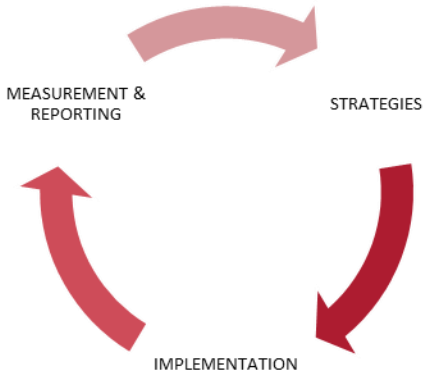


Figure 4. Actions and Tracking

Furthermore, the focus area work plans reflect the current situation for rapidly evolving technology. It will be important that strategies are evaluated and updated throughout implementation to reflect advancements and new offerings from the automotive and transportation industry and Xcel Energy. Throughout the planning process, we worked to build relationships between City staff and Xcel Energy staff that will foster the collaboration and cooperation required to successfully navigate the changing EV landscape.

APPENDIX A: XCEL ENERGY'S PARTNERS IN ENERGY EV 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 develop an energy action plan or electric vehicle plan, tools to help implement the plan and deliver results, and resources designed to help each community stay informed and achieve their outlined goals.

APPENDIX B: ELECTRIC VEHICLES 101

Since electric vehicles 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 that supports the electric motor. A plug-in electric vehicle (PEV) utilizes an external source of electricity to store electrical energy within its onboard rechargeable battery packs. The travel range of the two types of plug-in electric vehicles are outlined in **Table 2** and are described in more detail in the following sections.

Table 2. Comparison of Types of Electric Vehicles

Electric Vehicle Type	Power Source	Travel Range
Battery Electric Vehicle (BEV)	Electric Motor	200 – 520 miles
Plug-in Hybrid Electric Vehicle (PHEV)	Electric Motor + Gasoline Engine	315 – 660 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 increases 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 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 3** provides a brief explanation along with the pros and cons of both types. All currently available EVs can use either charger type.

Table 3. 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)	2 to 5	10 to 20
Benefits	• Uses standard residential wall outlet • Little to no investment in infrastructure required	• Quicker charging • Some models have available Wi-Fi controls to allow residents to take 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 $2,000 (US DOE, 2019)

Commercial Charging Stations

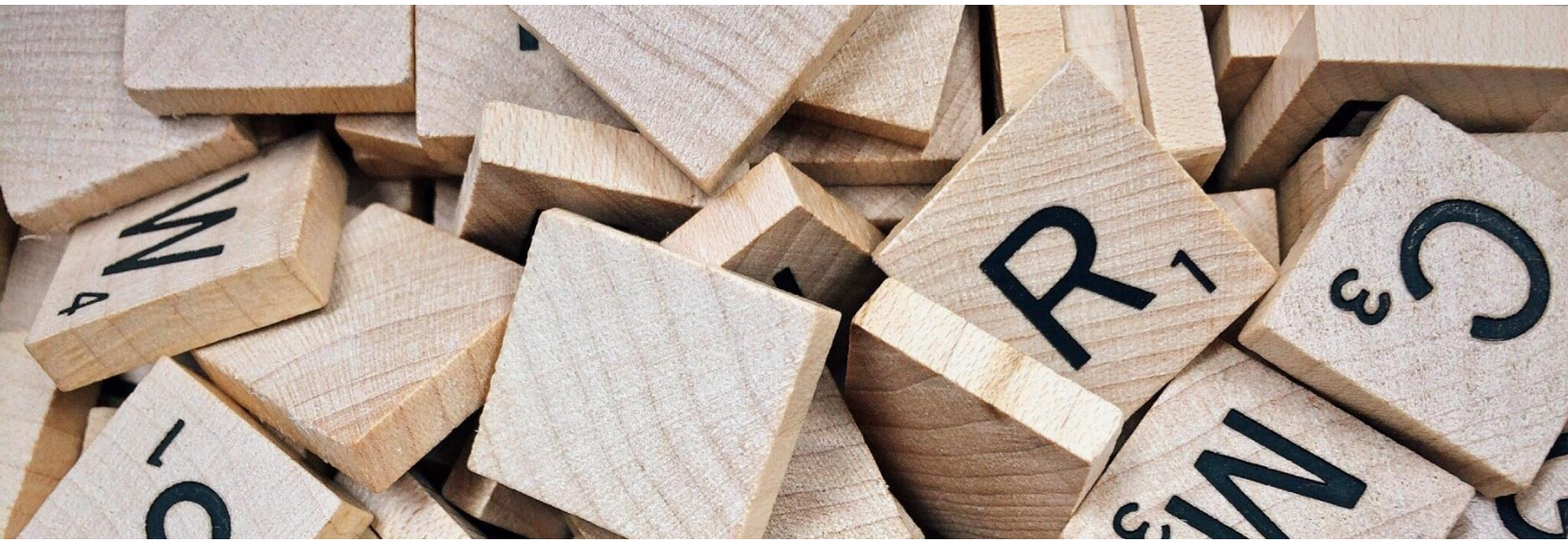
Commercial Level 2 and DC fast chargers are most appropriate for commercial applications since EVs are generally parked for shorter periods of time than residential

applications. Level 2 chargers are the same as the residential chargers and often have the option to include two charging ports at one station. 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 4** shows the advantages and disadvantages of Level 2 and DC fast chargers.

Table 4. Level 2 and DC Fast Charging Infrastructure

	LEVEL 2	DC Fast Charger
		
Electric Current	208/240 volt; 30 amps (AC)	480 volts DC
Charging Rate (miles range per hour of charging)	10 to 25	Up to 180
Benefits	• More economical than DC fast charger • 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

APPENDIX C: GLOSSARY OF TERMS



Alternating current (AC): The most common form of electricity used in homes and businesses uses alternating current where the current periodically changes direction. Batteries require DC electricity to charge, so EV chargers must convert the supplied AC electricity to DC power.

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.

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.

DC Fast Charging Station: Uses an industrial 480-volt DC outlet and can charge a battery to 80% 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.

Metric Tons of Carbon Dioxide Equivalent (MTCO2e): A unit of measure for greenhouse gas emissions. The unit "CO2e" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO2), based on the global warming potential (GWP) of the gas.

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.

Resilience: The ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.

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.

APPENDIX D: LONGER-TERM ROADMAP

This section outlines strategies that were identified as important by the EV Planning Team but were outside the timeline of the 18-month implementation period outlined in this plan. Each of the focus areas below has strategies and ideas for initial actions to make progress toward that strategy.

Building Codes and Together Jeffco

- B-3: Research impacts of EVs on existing/undermaintained roads and infrastructure.
    - Explore whether other communities and the state have pursued this type of research and understand the outcomes that they observed and process they developed.
    - Determine what level of research is needed – will a literature review suffice? Does a physical study of the impacts need to be conducted?
    - Identify who needs to be involved. Do County staff have the capacity and skills needed to complete the research?
    - Identify budgetary needs for the study.
    - Conduct research and summarize results.
    - Incorporate results into future EV planning efforts and policy.
- B-4: Include public charging recommendations in updates to building and land use code.
    - Identify timeline for the next round of building and land use code updates.
    - Research peer communities who provide public charging recommendations in codes and develop a document outlining the language used in each.
    - Analyze each example to understand what language will and will not work for Jefferson County.
    - Develop recommended language from the research.
    - Provide recommendations to staff in charge of the building and land use code updates.

Open Space

- OS-4: Advocate for an EV-first policy to electrify future Open Space vehicle purchases.
    - Reach out to Fleet staff to ensure they are included in the policy development process and that the eventual process aligns with their purchase process.
    - Research example language from peer communities.
    - Compile example language into a summary document and analyze the various options for what will and will not work for Jefferson County Open Space.
    - Develop recommended language for the policy. Include considerations specific to Open Space and utility vehicles, such as the duty cycle of the

vehicle including distance driven by the vehicle between charges, location the vehicle is domiciled, access to charging, and weight the vehicle would be transporting.

- Work with Fleet staff to refine the policy language and pursue opportunities for inclusion in updated purchasing policies.

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