



Regional Transportation Electrification Plan for Boulder County Communities

August 2022



Acknowledgements

Thank you to the following individuals who contributed many hours of service to developing this Regional Transportation Electrification Plan.

Regional Electric Vehicle (EV) Action Team	
Amanda Mansfield	Boulder Chamber, Boulder Transportation Connections
Karen Worminghaus	Boulder Chamber, Boulder Transportation Connections
Alejandro Murillo	Boulder County
Lea Yancey	Boulder County
Norma King	Boulder County Partners for a Clean Environment, Latino Chamber of Boulder County
Matt Lehrman	City of Boulder
Elizabeth Szorad	City of Lafayette
Michelle Melonakis	City of Lafayette
Lisa Knoblauch	City of Longmont
Emily Hogan	City of Louisville
Katie Baum	City of Louisville (former)
Kayla Betzold	City of Louisville
Franzia Perez	Colorado Department of Transportation
Michael King	Colorado Department of Transportation
Matt Mines	Colorado Energy Office
Bonnie Trowbridge	Drive Clean Colorado
Gabriella Perkins	Drive Clean Colorado
Christine Brinker	Southwest Energy Efficiency Project
Peter Cacek	Town of Nederland
Julia Davila	Drive Clean Colorado
Diane Ernst	Town of Erie
Tyler Kesler	Town of Erie
Kim Mitchell	Town of Lyons
Eryka Thorley	Town of Nederland
Garrett McDaniel	Town of Nederland
Alyssa Vogan	Town of Superior
Berenice Garcia Tellez	Northwest Chamber Alliance, Latino Chamber of Boulder County
Matt Frommer	Southwest Energy Efficiency Project
Xcel Energy Partners in Energy Team	
Andrea McCarthy	Xcel Energy Partners in Energy Facilitator
Brandyn Bicknese	Xcel Energy EV Product Portfolio Manager
Channing Evans	Xcel Energy Partners in Energy (former)

Iffie Jennings	Xcel Energy Area Manager
Imogen Ainsworth	Xcel Energy Partners in Energy Facilitator
Judy Dorsey	Xcel Energy Partners in Energy Facilitator
Kynn timer Martin	Xcel Energy Account Manager
Lynn Coppedge	Xcel Energy Partners in Energy Facilitator
Melody Redburn	Xcel Energy Partners in Energy Facilitator (former)
Monica Rosenbluth	Xcel Energy EV Product Portfolio Manager
Susan Davis	Xcel Energy Account Manager (former)
Tami Gunderzik	Xcel Energy Partners in Energy
Zach Owens	Xcel Energy EV Product Portfolio Manager

This Energy Action 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 Boulder County partners have made modifications to the plan.



Table of Contents

Acknowledgements	i
Introduction	3
What is a Transportation Electrification Plan?.....	3
Why a Regional Transportation Electrification Plan?	4
Where We Are Now	5
Community Characteristics.....	5
Geography & Population	5
Equitable Access	5
Housing Characteristics.....	6
Commuting Characteristics	7
Transportation and Housing Costs.....	8
Related Planning Efforts	8
Colorado EV Plan 2020	8
Community Planning Efforts	9
Xcel Energy Carbon-Free Electricity	10
Other Utility Providers.....	10
Electric Vehicle Baseline	11
Electric Vehicle Adoption Rates	11
Electric Vehicle Charging Ports	11
Where We Are Going.....	13
Our Vision Statement.....	13
Plan Goals.....	13
Focus Areas and Cross-Cutting Themes	15
Focus Areas.....	15
Cross-Cutting Themes.....	15
Plan Impact	16
How We Are Going to Get There.....	17
Focus Area: Community EV Adoption	19
Community EV Adoption Context.....	19
Community EV Adoption Strategies	19
Focus Area: Home & Work Charging	28
Home & Work Context.....	28
Home & Work Charging Strategies	28
Focus Area: Public Charging	34

Public Charging Context.....	34
Public Charging Strategies.....	35
Focus Area: Plans, Codes, & Policies.....	42
Plans, Codes, & Policies Context.....	42
Plans, Codes, & Policies Strategies.....	43
How We Stay On Course.....	46
Implementation Approach.....	46
Tracking and Reporting Progress.....	48
Beyond the Plan Horizon.....	48
Appendix A: Electric Vehicles 101.....	49
Electric Vehicle Basics.....	49
Charging Stations.....	50
Benefits of EVs.....	52
Sustainability of EV Batteries.....	54
Battery Production Emissions.....	54
Battery Production Social Impacts.....	54
Battery Lifespan.....	54
Appendix B: Xcel Energy EV Programs.....	55
Residential Programs.....	55
Multifamily Programs.....	56
Commercial Programs.....	56
Appendix C: EV-Ready Code Amendment.....	58
Appendix D: Works Cited.....	60

Regional Transportation Electrification Plan for Boulder County



About This Plan

Over the course of 11 months during 2021 and 2022, representatives from local governments within Boulder County came together with key stakeholders, including business associations, state agencies, nonprofit organizations, and Xcel Energy to develop a strategic plan to reduce greenhouse gas emissions in Boulder County through equitable transportation electrification solutions. This plan builds on existing sustainability initiatives, to show that close collaboration can accelerate a successful transition to an all-electric vehicle future.

Our Regional Vision

Boulder County communities will work with regional partners to implement solutions that support the large-scale and equitable transition to zero emission vehicles.

Our Regional Vision Goals

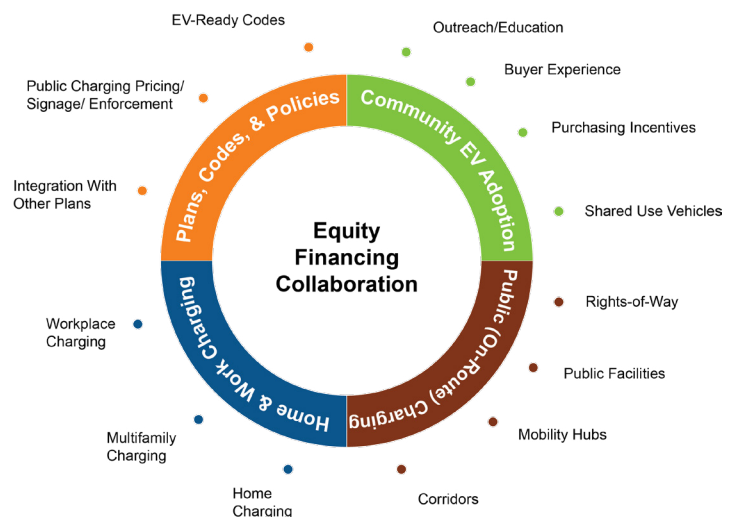
The following goals were set for the Boulder County region, in alignment with the GoEV Cities and Counties resolutions established by several communities in Boulder County:

- 1) Transition 30% of all vehicles registered in Boulder County to zero-emissions by 2030.
 - 2) By 2030, install a combined 2,380 public level 2 and DC fast charging ports equitably distributed across Boulder County.
-

Our Roadmap for Achieving Our Vision and Goals





To achieve our vision and goals, this plan is divided into four focus areas: *Community Electric Vehicle Adoption, Public Charging, Home & Work Charging, and Plans, Codes, & Policies*.

Across all focus areas, three key themes were identified – *Equity, Collaboration, and Financing* – as critical considerations for implementation of each plan strategy.



Plan Strategies

In pursuit of this vision, the plan is organized into four focus areas – Community EV Adoption, Home & Work Charging, Public Charging, and Plans, Codes, & Policies. The table below summarizes the strategies within each focus area. The planning team and other regional stakeholders will collaborate to implement these strategies over the next two years and beyond.

FOCUS AREA	STRATEGIES 2022-2024	STRATEGIES 2024-2030
Community EV Adoption 	<ul style="list-style-type: none"> CA-1: Regional Community Outreach CA-2: Residential EV Purchasing Incentives CA-3: Equitable EV Carshare Program CA-4: EV Workforce Pipeline and Training CA-5: Dealership Outreach 	<ul style="list-style-type: none"> Coordinated Ride-and-Drive Events Employee EV Training Commuter EV Vanpool Programs Equitable E-bike Programs Rideshare Fleet Electrification Equitable Electric Microtransit Equitable Service Delivery Electrification Grants
Home & Work Charging 	<ul style="list-style-type: none"> HW-1: Multifamily Charging Outreach HW-2: Equitable Multifamily Charging Incentives HW-3: Equitable Single-Family Home Charging Incentives 	<ul style="list-style-type: none"> Workplace Charging Outreach Workplace Charging Funding Workplace Charging Peer Exchanges Workplace Charging Recognition
Public Charging 	<ul style="list-style-type: none"> PU-1: Mapping Public Charging Station Locations PU-2: Regional Public DC Fast Charging Installations PU-3: Mobility Hubs PU-4: Shared Mobility/Delivery Fleets Charging 	<ul style="list-style-type: none"> Vehicle-to-Grid Charging EV Charging Station Guide Business Outreach Resources Funding Incentives for Public Charging on Private Property
Plans, Codes, & Policies 	<ul style="list-style-type: none"> PC-1: Accessibility Advocacy PC-2: Pricing Structure Best Practices PC-3: EV Charging Design Guidelines 	

Successful implementation of this plan by 2030 will result in:



84,000 EVs on the road in Boulder County (light, medium, and heavy-duty)



2,380 public charging ports equitably distributed across Boulder County, focused on multifamily and affordable housing locations



Estimated 324,900 metric tons of carbon dioxide equivalent MTCO_{2e} saved annually

Introduction



In August 2021, representatives from local governments within Boulder County came together with key stakeholders, including business associations, state agencies and nonprofit organizations, and Xcel Energy to develop a strategic plan to reduce greenhouse gas (GHG) emissions in Boulder County through equitable transportation electrification solutions. These key stakeholders will continue to collaborate, and invite additional implementation partners as needed, to bring the priority strategies identified in this plan to life over the next two years and beyond. This effort builds on existing sustainability initiatives, to show that close collaboration can accelerate a successful transition to an all-electric vehicle (EV) future.

What is a Transportation Electrification Plan?

This Regional Transportation Electrification Plan (Plan) is a strategic roadmap to guide Boulder County communities and their partners toward a shared destination: an equitable EV future.

The Plan is intended to support the safety, equitability, reliability, travel choice, and emissions reduction goals identified by communities within Boulder County. While the Plan sets a common vision for the region, it can also be used to inform community-level workplans (Figure 1).

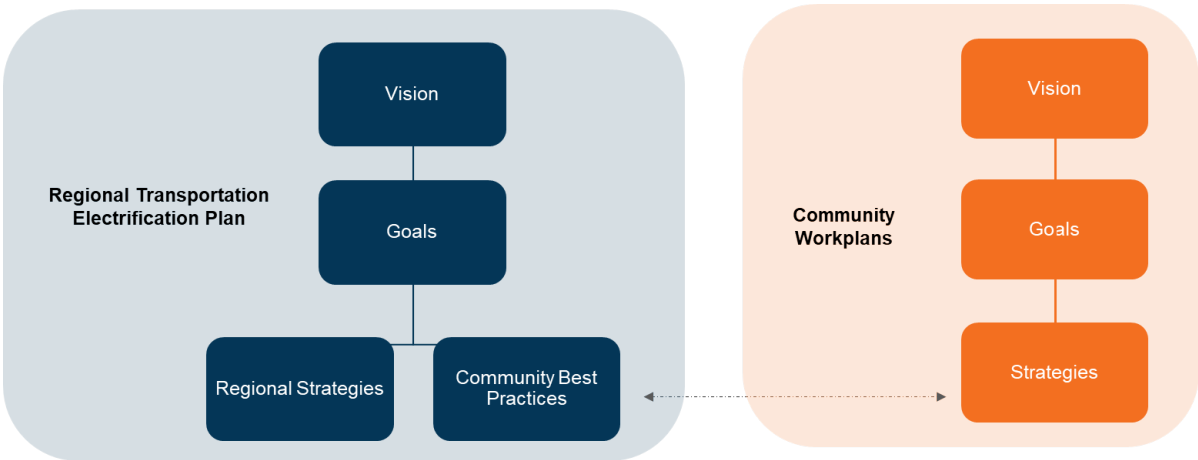


Figure 1: Regional and Community Plan Relationships

This plan was developed collaboratively with a group of stakeholders, through six planning workshops conducted between August 2021 and June 2022. Stakeholders included representatives from nine local governments, three state agencies, two business associations, two non-profits, and Xcel Energy, which provides electricity service to seven of the communities represented and natural gas service to all. See Acknowledgements for a complete list of individuals who participated. This group of stakeholders (Planning Team) coordinated throughout the process to share information and identify potential opportunities for partnership during implementation.

The Boulder County region joined more than 30 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 also supports 18 months of plan implementation, including marketing and communications, data tracking and analysis, program expertise, and project management.

The components of the Regional Transportation Electrification Plan include:

- **Introduction** A look at Boulder County communities' motivations for developing a Regional Transportation Electrification Plan.
- **Where We Are Now** Relevant characteristics of the region's current electric vehicle landscape.
- **Where Are We Going?** Plan vision, goals, focus areas, and cross-cutting themes.
- **How Are We Going to Get There?** Strategies, organized by focus area, that will be implemented within eight years to achieve the defined goals. Strategies are broken into three phases: 2-year, 4-year, and 8-year horizons, with Partners in Energy implementation support occurring in the first two years.
- **How Will We Stay on Course?** How the region will track progress toward the plan vision and goals, and how it will adapt to a changing landscape in upcoming years.
- **Appendices** Additional information about available EV programs and additional strategies to consider in the future.

Why a Regional Transportation Electrification Plan?

Each of the communities that participated in this planning process has made a commitment, developed a plan, or undertaken projects to address the climate crisis and improve their community's sustainability. Transportation electrification is a key component of these efforts because of the myriad of associated environmental and financial benefits, including GHG emission reductions, air quality improvements, and lower fuel and maintenance costs. These benefits are detailed in Appendix A: Electric Vehicles 101.

Taking a Regional Approach to Transportation Electrification

Transportation systems are large, complex, and dynamic. The movement of people and goods is inherently regional, crossing boundaries and connecting the communities where we live and work. Further, air quality impacts from transportation do not abide by jurisdictional boundaries and are felt across the region. Boulder County communities recognize that transportation electrification must be thoughtfully approached to be impactful. Taking a collaborative, regional approach to transportation electrification planning will maximize Boulder County communities' collective ability to leverage funding, avoid duplication of effort, and support the effective design and implementation of transportation solutions that work for everyone across the region.

Where We Are Now



To better understand the opportunities for transportation electrification in Boulder County, basic community characteristics are outlined below. Factors such as population growth, demographics, housing, and industry employers help contextualize current and future opportunities for targeted outreach and partnerships. All of these community characteristics influence EV-specific baseline data, such as EV ownership and infrastructure, which is summarized at the end of this section.

Community Characteristics

Geography & Population

Boulder County is located along the Colorado Front Range, the most heavily populated portion of the state. The county's 750 square miles are comprised of ten incorporated towns and cities, as well as unincorporated areas of the county. Figure 2 shows the municipalities that participated in this planning process. The county's population in 2019 was 328,827 and by 2030 is expected to increase about 8% to 354,742 (State Demography Office, 2021). This growth signals an opportunity for new development and transportation infrastructure to be EV-ready.

Equitable Access

Historically, access to EVs has not been equitably distributed. Many factors, including housing, commuting, and transportation characteristics covered below, can impact individual and community access to EVs. While many vehicle manufacturers are beginning to release lower-cost electric models, EVs and heavier-duty work vehicles still typically have a high price tag compared to gas- and diesel-powered equivalents. Paired with additional up-front costs associated with electrical upgrades to support home charging, along with a limited used EV market, this means that for many people cost is still a significant barrier to purchasing an EV. Early adoption has thus predominantly been associated with more affluent demographics. With 23% of Boulder County residents living in households that have an annual income less than or equal to twice the federal poverty level (EPA, 2022) and 9.5% of Boulder County residents living in poverty (US Census Bureau, 2021), creating solutions that address these barriers will be critical to scaling up countywide EV adoption in an equitable manner. Finally, 14.6% of Boulder County residents speak a language other than English

at home and may face linguistic barriers to accessing EV information, incentives, and programs.

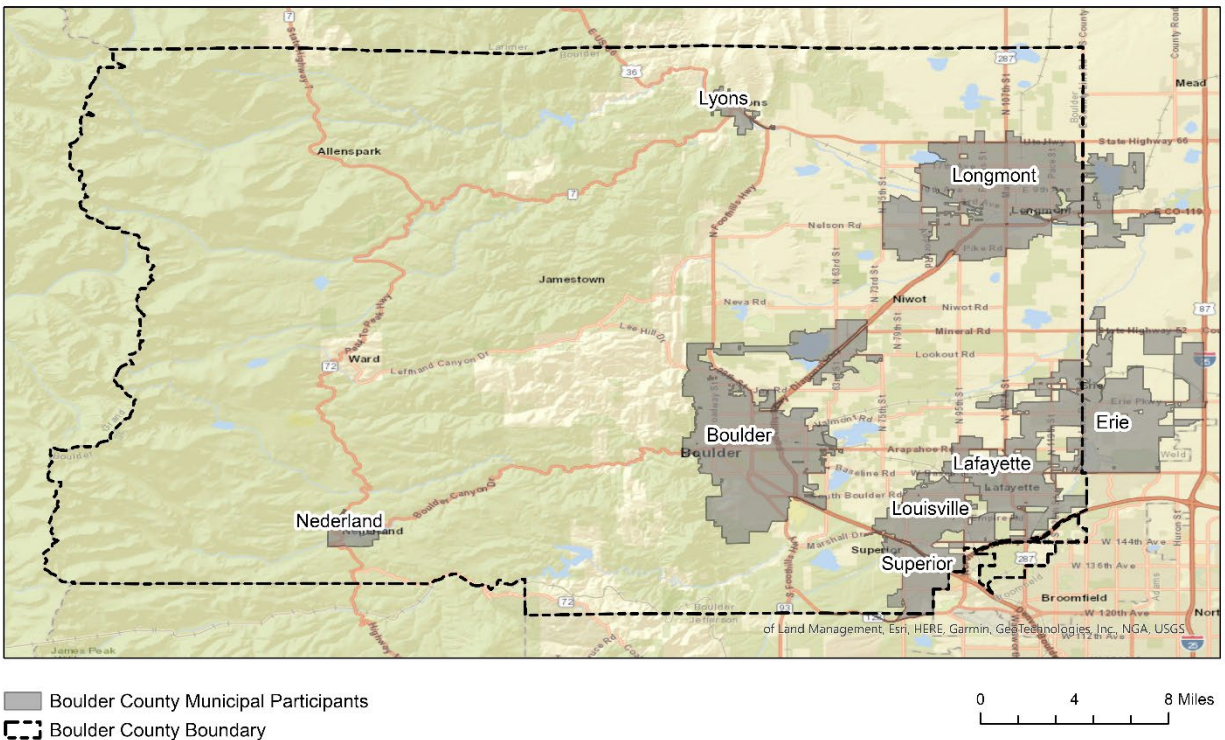


Figure 2: Municipal Participants in Planning Process

Housing Characteristics

Two major housing factors facilitate a resident’s ability to convert their personal vehicle to an EV: home ownership and parking access. Single family and townhome owners are more able to install EV charging than are condo and apartment owners or renters because they do not need to seek permission of another property owner to do so. Additionally, the investment in infrastructure will likely increase the value of their property. Conversely, renters and condo or apartment owners 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. Some renters do not directly hold and pay for electric utility accounts and are therefore less able to take advantage of utility incentives for home charging. In addition, property owners may have little financial motivation to install charging infrastructure for tenants, although the demand for charging from tenants is growing. Single-family residences are likely to have parking access with personal garage space or carports to facilitate installation of charging stations, compared to multifamily residences which often rely on charging stations in shared parking facilities or public charging sites.

In Boulder County, 62% of homes are owner-occupied and 67% of homes are single-family residences (Figure 3: Areas in Boulder County with Housing Characteristics Suitable for At-Home EV Charging). While this indicates that many households are likely to have access to charging at home, there is still a significant portion of the population who rent or live in multifamily housing and will have to overcome barriers to conveniently access charging. Additionally, those who live in single-family residences may still not have a garage or carport. One-third of housing units in Boulder

County were built before 1970 so may not have a grounded outlet in their garage, which is necessary for charging in their garage or carport (US Census Bureau, 2020).

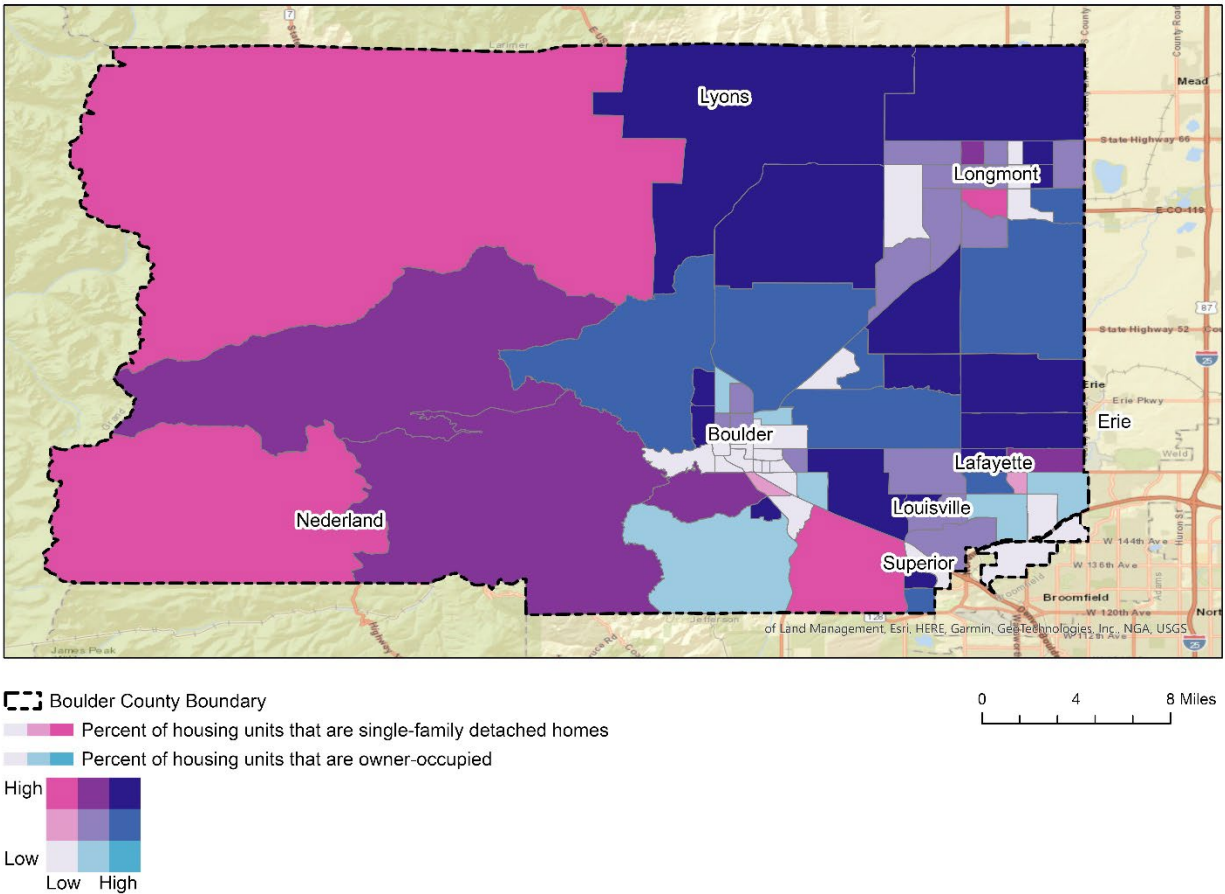


Figure 3: Areas in Boulder County with Housing Characteristics Suitable for At-Home EV Charging

Commuting Characteristics

Along with expected population growth, Boulder County’s in-county daily trips are projected to increase by 28% and regional daily trips to increase by 60% between 2015 and 2040 (Boulder County, 2020). These increases are in addition to the existing commuter traffic; in 2019, 40% of workers employed in Boulder County lived outside the county, as shown in Figure 4 (U.S. Census Bureau, 2019). The most recent data available describes commute patterns before the COVID-19 global pandemic which significantly impacted traditional workplace utilization. Updated data should be referenced once available.

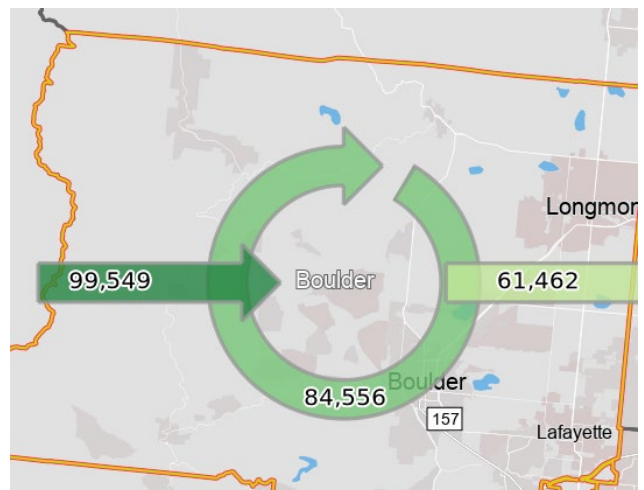


Figure 4: 2019 Boulder County Inflow/Outflow Analysis, U.S. Census Bureau

EV drivers with a longer commute are more likely to need charging away from home, increasing the demand for public and workplace charging.

Transportation and Housing Costs

Typically, homes are considered affordable when household costs, including mortgage and rental payments, property insurance, and utilities and fuels total less than 30% of a household's income. As with many other communities along the Colorado Front Range, increases in Boulder County home prices have dramatically outpaced wages and, according to the most recent American Community Survey data, 35% of Boulder County households spend more than 30% of their annual income on housing costs alone (US Census Bureau, 2020). When transportation costs are also included, the burden on households rises even higher. In 2017, Boulder County households spent an average of 46% of their annual income on housing and transportation combined (Center for Neighborhood Technology, 2017). If the high upfront cost of an EV can be offset, the fuel savings presents an opportunity to reduce a household's monthly costs and increase affordability.

Related Planning Efforts

This plan is supported by planning efforts at the state and local levels, as described below.

Colorado EV Plan 2020

The Colorado EV Plan 2020 is an update to the state's 2018 plan and sets clear EV goals and actions in support of broader GHG emissions goals and vision established in the 2021 Colorado GHG Roadmap. The plan establishes a goal of 940,000 light-duty EVs by 2030 and a long-term vision of 100% electric light-duty vehicles and 100% zero emission medium- and heavy-duty vehicles. Actions to reach the state's EV goal were identified in four focus areas:

1. **Policy, Planning and Guidance:** how the state and its partners will set the stage by developing and supporting policy, guidance and planning to electrify the transportation sector
2. **Programming and Funding:** steps the state will take to tackle adoption barriers, providing funding and programming to address market gaps
3. **Supporting Emerging EV Technology and Innovation:** how the state will connect its activities with those of Colorado research collaboratives - to support transportation electrification innovation, foster emerging EV technology development, and identify data gaps
4. **Engaging People:** approaches to communicating and educating the people of Colorado on the benefits of transportation electrification and how they can access these benefits

Other related state planning efforts include the following and can be referenced during implementation to help targeted efforts around medium- and heavy-duty vehicles and around those who are disproportionately impacted by emissions from gas-powered vehicles and other environmental burdens:

- An EV Equity Study by the Colorado Energy Office (CEO) to identify communities impacted by transportation-related pollution and assess accessibility and barriers to EV adoption. The final study will be released in 2022 and will include policy options to increase equitable access to EVs and their related benefits, along with an EV equity toolkit.
- The Colorado Department of Public Health and Environment (CDPHE) developed a Climate Equity Framework to ensure that Colorado's response to climate change is guided by principles of racial equity and economic justice. This framework is used across state agencies, including CEO, to ensure that programs and policies in place include racial equity and economic justice considerations.

- The 2022 Colorado Clean Truck Strategy is a joint effort of CEO, CDPHE, and the Colorado Department of Transportation (CDOT). The strategy includes a vision statement, goals, and actions designed to accelerate the adoption of clean medium- and heavy-duty vehicles, such as semi-trucks, school buses, snowplows, and others.
- THE CDOT 2021 Transit Zero Emission Vehicle Roadmap is an adaptable guide for transit agencies, key stakeholders, and the State of Colorado to implement transit strategies contained within the 2020 Colorado Electric Vehicle Plan.

Community Planning Efforts

This plan can interact with existing community plans that address climate, mobility, affordability, and equity issues. More directly, this plan reinforces the following plans that directly support transportation electrification.

- **Boulder County Environmental Sustainability Plan (2018):** This plan provides a blueprint for achieving the community’s environmental sustainability goals, including strategies related to fleet electrification and communitywide EV adoption. The plan was initially developed in 2012 and was updated in 2018. A second update is underway in 2022.
- **Boulder County Transportation Master Plan (2020):** This plan provides a framework to help meet and manage the demands placed on the county’s multimodal transportation system in a way that supports sustainable ways of living. It includes goals and actions related to reducing GHG emissions and electrification of the county vehicle fleet.
- **City of Boulder Transportation Master Plan (2019):** This plan provides the policy framework for providing mobility and access in a way that is safe and convenient. It includes a key initiative related to electric vehicles and other new forms of mobility.
- **City of Lafayette Sustainability Plan (2021):** This plan is a guiding framework to build a culture of sustainability in Lafayette. While it does not address transportation, it does set a GHG emissions reduction goal for the community.
- **City of Longmont Multimodal and Comprehensive Plan (2016):** This plan provides strategic guidance for Longmont over a 10–20 year timeframe. While the plan does not explicitly address electric vehicles, it does highlight reduced greenhouse gas emissions as a key element of a sustainable and resilient transportation system.
- **City of Longmont Sustainability Plan (2018):** This plan provides a set of targets and strategies to help promote sustainability for all residents and businesses, including a strategy focused on increasing electric vehicles through incentives and infrastructure.
- **City of Longmont Climate Action Recommendations Report (2020):** This report was developed by a climate action task force and a just transition plan committee and outlines priority steps towards a carbon-free, sustainable city through equity-based processes. The plan includes electric vehicle charging infrastructure as a recommendation.
- **City of Longmont Equitable Carbon-Free Transportation Plan (2020):** This plan outlines a path to equitably address transportation-related needs that also mitigates greenhouse gas emissions through strategies related to City fleet electrification, citywide EV adoption and infrastructure, active transportation, and access to public transit.
- **City of Louisville (2020):** This update to the 2016 sustainability plan sets out the city’s vision, goals, and strategies for sustainability. The plan includes the adoption of fleet electric vehicles as well as support for the public adoption of EVs as plan objectives.
- **City of Louisville Energy Futures Collaboration Work Plan (2018):** This Work Plan, developed in coordination with Xcel Energy, includes accelerated transportation electrification as a key priority.

- **Town of Erie Sustainability Master Plan (2019):** This community-driven plan is a guiding document that outlines strategies, implementation timelines, and targets for sustainability action. The plan includes a transportation chapter focused on increasing multimodal transportation options, including increasing electric vehicle adoption through incentives and the installation of public charging stations.
- **Town of Erie Energy Action Plan (2021):** After completing an initial Energy Action Plan in 2018, the Town of Erie launched a second round of planning support through Partners in Energy in 2021, focused on renewable energy and on green business and HOA program support.
- **Town of Superior Sustainability Action Plan (2022):** This plan serves as a guide for Town leadership, residents, businesses, and staff to advance sustainability in the community. A chapter dedicated to Sustainable Transportation includes strategies to electrify the Town's fleet and to implement programs, ordinances, and policies focused on EV infrastructure development and community-wide EV adoption.
- **Town of Superior Energy Action Plan (2020):** This Plan connects Superior residents and businesses with information and financial resources they can use to take meaningful energy action. The plan includes fleet electric vehicles as a strategic priority.
- **Town of Lyons Environmental Sustainability Action Plan (2019):** This plan sets out sustainability objectives and strategies, including a strategy focused on increasing electric vehicle incentives and infrastructure.
- **Town of Nederland Sustainability Action Plan (2014):** This plan, developed by the town Sustainability Advisory Board to coordinate local sustainability action, includes electric vehicle charging stations as a priority action.

Xcel Energy Carbon-Free Electricity

Transportation electrification has the potential to significantly reduce greenhouse gas (GHG) emissions. In 2021, 39% of Xcel Energy's Colorado electricity supply was generated from carbon-free sources (Xcel Energy, 2021) and that percentage is increasing. Research by the Union of Concerned Scientists showed that even in 2015, in every U.S. state, EVs resulted in lower lifecycle GHG emissions than did new gas- and diesel-powered vehicles (Union of Concerned Scientists, 2015). Xcel Energy's Carbon Reduction Plan establishes a commitment to reduce carbon emissions from electricity supplied to Colorado by 85% from 2005 levels by 2030, supplying 80% of electricity from carbon-free sources. This is anticipated to cut nearly 5 million tons of carbon emissions across 1.5 million electric vehicles (Xcel Energy, 2019).

Other Utility Providers

Platte River Power Authority (PRPA), which provides wholesale electricity to its owner communities of Longmont, Fort Collins, Estes Park, and Loveland, has established a goal of 100% non-carbon energy mix by 2030 (Platte River Power Authority, 2022).

Poudre Valley Rural Electric Association (PVREA) serves areas to the north of Boulder County and has adopted a goal to provide 80% carbon-free energy by 2030 (Poudre Valley REA, 2022).

United Power serves areas to the east of Boulder County and has identified "meeting greenhouse gas reduction policy" as an initiative in its 2022 Cooperative Roadmap (United Power, 2022). In 2022, United Power filed a Notice of Intent to withdraw membership from Tri-State Generation and Transmission and is currently evaluating future power supply options.

Lyons municipal electric receives power through the Municipal Energy Agency of Nebraska (MEAN), which has established a vision for a carbon neutral power resource portfolio by 2050 (MEAN, 2022).

Electric Vehicle Baseline

Electric Vehicle Adoption Rates

Boulder County leads the state in EV adoption rates. By the end of 2021, there were 7,560 EVs on the road in Boulder County, accounting for approximately 3% of all registered vehicles. The number of EV registrations in Boulder County has increased rapidly over the last 10 years, except for a dip in 2020 due to the Covid-19 global pandemic, as shown in Figure 5.

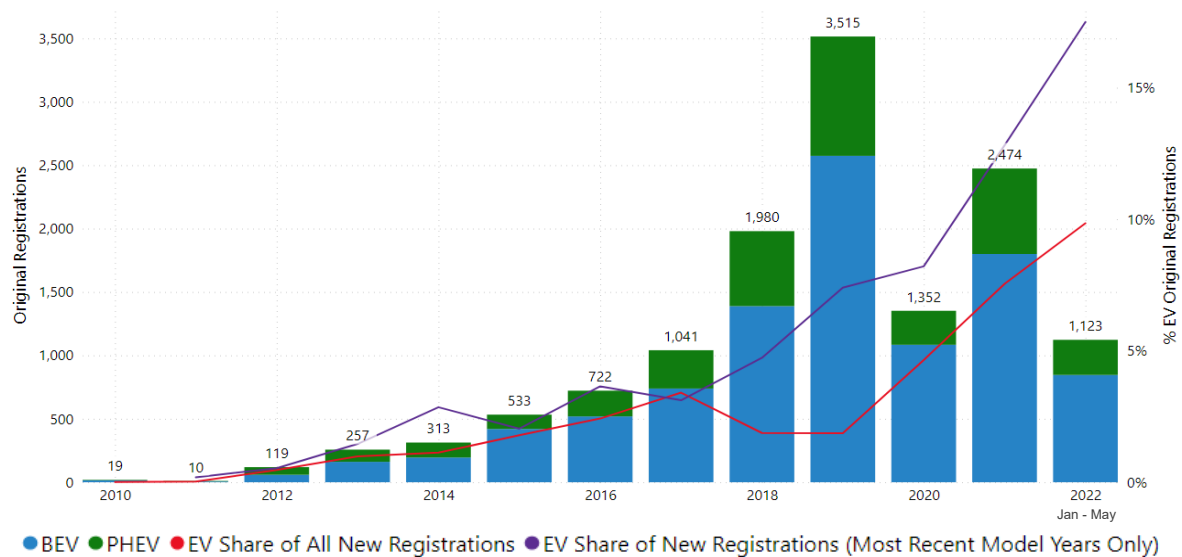


Figure 5. Original EV Registrations in Boulder County through May 2022 (Atlas Public Policy EValueCO Dashboard)

Electric Vehicle Charging Ports

The availability of public EV charging in Boulder County is currently keeping pace with the high levels of EV adoption.

While approximately 80% of EV owners do most of their charging at home, public charging stations ensure access for longer-distance commuters, visitors, those without access to home charging, and transportation services (e.g., ride hailing, delivery fleets).

There are two main types of public charging stations: Level 2 stations and DC Fast Charging (DCFC) stations. Level 2 stations typically have two charging ports, provide a slower charge and are often suitable for installation at locations where drivers stay for a period of time, such as parking lots, libraries, or recreation centers. DCFC stations typically have one charging port, can provide a full charge in 20-30 minutes and allow EV drivers to quickly fill up while they're on the go. More information on Level 2 and DCFC charging is provided in Appendix A: Electric Vehicles 101.

At the end of 2021 there were 582 public EV charging ports in Boulder County, including 532 Level 2 ports, and 50 DC Fast Charging ports (Figure 6). Boulder County exceeds the state average for number of ports per capita and number of ports per EV (Atlas Public Policy, 2022).

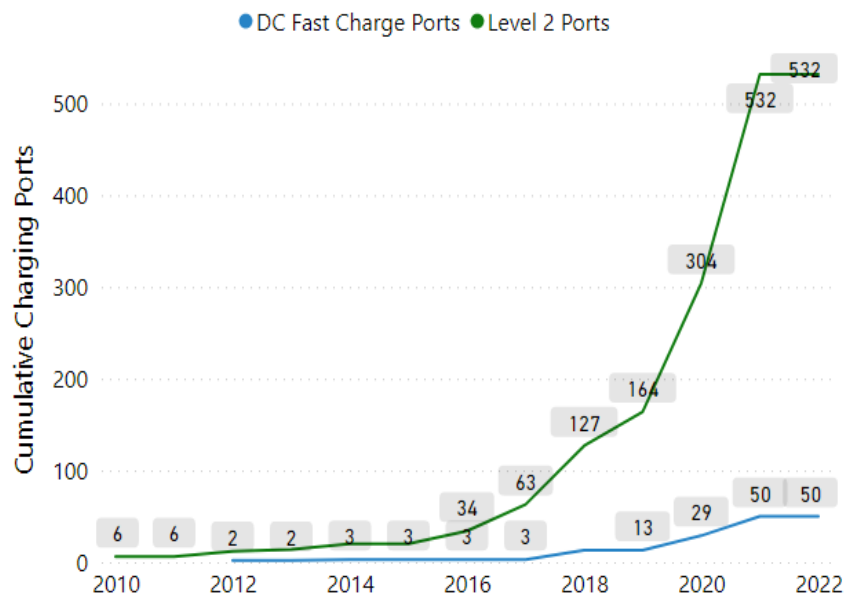


Figure 6. Cumulative Charging Ports in Boulder County (Atlas Public Policy EValuateCO Dashboard)

Where We Are Going



Our Vision Statement

To help guide the planning process and plan implementation, the Planning Team developed the following vision statement.

Boulder County communities will work with regional partners to implement solutions that support the large-scale and equitable transition to zero emission vehicles.

Plan Goals

Working together, the team set the following two goals to measure plan success.

Goal 1

Transition 30% of all vehicles registered in Boulder County to zero-emissions by 2030.

Goal 1 aligns around the GoEV Cities and Counties resolutions established by several communities in Boulder County. Goal 1 includes both battery electric and plug-in hybrid light-, medium-, and heavy-duty vehicles and results in an estimated 84,000 electric vehicles. Alignment with GoEV cities exceeds the estimated number of EVs in Boulder County, based on the State of Colorado EV Plan 2030 goal. As noted previously, current EV ownership is not equitably distributed, and skews toward higher-income residents. It is important to note that this plan focuses on increasing EV adoption by those who currently face barriers to driving and owning an EV, to work toward a scenario where the benefits of EV ownership are accessible to and enjoyed by all Boulder County residents.

While near-term strategies to achieve this goal focus predominantly on increasing adoption of light-duty vehicles, future iterations of this plan could add strategies to address medium- and heavy-duty EV adoption as more models become available.

Goal 2
By 2030, install a combined 2,380 public Level 2 and DC fast charging ports equitably distributed across Boulder County.

EV charging installations must keep pace with EV adoption. According to a 2021 study completed by the International Council on Clean Transportation (ICCT) for the Colorado Energy Office, it is estimated that Boulder County will need to significantly increase the number of available charging ports to meet projected EV adoption by 2030 (International Council on Clean Transportation, 2021). The Boulder County regional infrastructure goal (Goal 2) aligns with the high EV growth scenario in the ICCT study. The total number of ports included in Goal 2 includes public Level 2 ports as well as corridor- and non-corridor DCFC ports (Figure 7), but does not include home, workplace, or fleet charging stations that are not listed as open to the public. To contribute to equitable access and EV adoption, charging ports will also need to be equitably distributed across Boulder County, with a focus on multifamily and affordable housing locations. This regional goal (Goal 2) will be reassessed in 2025, with a better understanding of public charging station use and considerations for medium- and heavy-duty charging.

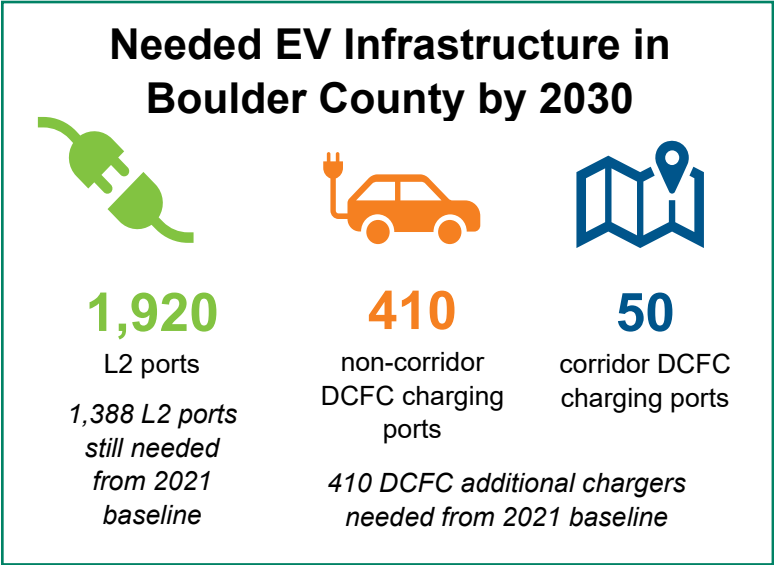


Figure 7: Boulder County Public Charging Infrastructure based on 2021 ICCT Study

Focus Areas and Cross-Cutting Themes

The Planning Team identified the following focus areas to help organize and prioritize strategies, along with three cross-cutting themes that are present throughout the plan (Figure 8).

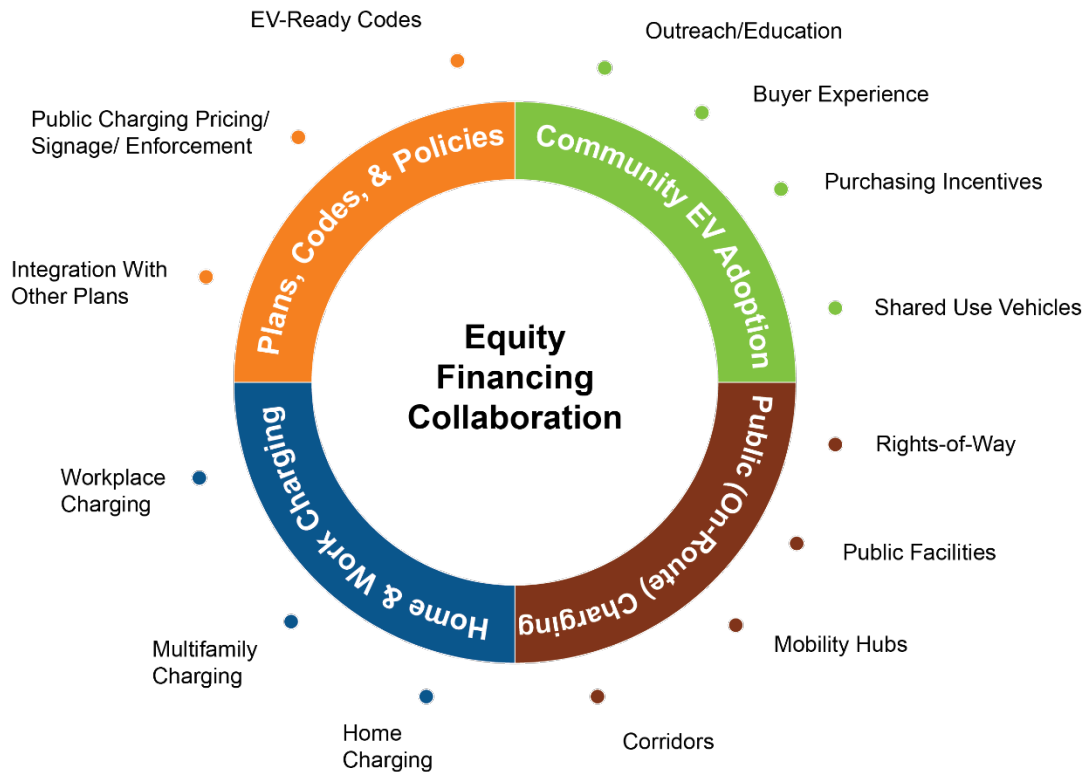


Figure 8: Focus Areas and Cross-Cutting Themes

Focus Areas

These focus areas help organize the plan strategies in order to help achieve the plan vision and goals.

- **Community EV Adoption:** Supporting the purchase, lease, or shared use of EVs for all Boulder County residents and commuters
- **Home & Work Charging:** Removing barriers for charging at home; providing workplace charging for those who need it most.
- **Public (On-Route) Charging:** Ensuring public charging is convenient and accessible for those who need it most.
- **Plans, Codes, & Policies:** Aligning regional and local plans, codes, and policies, to support the transition to an EV future.

Cross-Cutting Themes

These themes show up in each focus area as considerations taken during the planning process and as key components of implementation.

- **Equity:** Ensuring the perspectives and priorities of underserved/disproportionally impacted communities are reflected in the planning process through the participation of several

representatives and through evaluating equity-related impacts both as part of strategy prioritization and during implementation.

- **Financing:** Finding ways to fund implementation of strategies, such as supplemental funding for charging infrastructure beyond utility incentives, innovative pilot projects, and vehicle purchase incentives, especially for income-qualified customers.
- **Collaboration:** Facilitating shared learning and strategy implementation among communities and regional partners.

Plan Impact

Successful implementation of this plan by 2030 will result in:

- 84,000 EVs on the road (light-, medium-, and heavy-duty)
- 2,380 public charging ports (Level 2 and DCFC) equitably distributed across Boulder County, focused on multifamily and affordable housing locations
- Estimated 324,900 MTCO_{2e} saved annually¹

¹ Based on light-duty vehicle assumptions for grams of CO₂/mile and vehicle miles traveled (VMT). This accounts for the expected emissions factor of Xcel Energy electricity in 2030.

How We Are Going to Get There



For each focus area, the Planning Team identified the following priority strategies to implement between 2022 and 2030 in order to work toward the vision of a large-scale and equitable transition to zero-emission vehicles (Table 1). Detailed action plans were developed for strategies scheduled to be implemented between 2022 and 2024 and can be found in each focus area.

Table 1: Priority Strategies

Focus Area	Strategies
Community EV Adoption	<p><u>2022-2024</u></p> <ul style="list-style-type: none"> ▶ CA-1: Regional Community Outreach ▶ CA-2: Residential EV Purchasing Incentives ▶ CA-3: Equitable EV Carshare Program ▶ CA-4: EV Workforce Pipeline and Training ▶ CA-5: Dealership Outreach
	<p><u>2024-2030</u></p> <ul style="list-style-type: none"> ▶ Coordinated Ride-n-Drive Events ▶ Employee EV Training ▶ Commuter EV Vanpool Programs ▶ Equitable E-bike Programs ▶ Rideshare Fleet Electrification ▶ Equitable Electric Microtransit ▶ Equitable Service Delivery Electrification Incentives
Home & Work Charging	<p><u>2022-2024</u></p> <ul style="list-style-type: none"> ▶ HW-1: Multifamily Charging Outreach ▶ HW-2: Equitable Multifamily Charging Incentives ▶ HW-3: Equitable Single-Family Home Charging Incentives
	<p><u>2024-2030²</u></p> <ul style="list-style-type: none"> ▶ Workplace Charging Outreach

² Address workplace charging as needed, based on development of home and public charging infrastructure.

	<ul style="list-style-type: none"> ▶ Workplace Charging Funding ▶ Workplace Charging Peer Exchanges ▶ Workplace Charging Recognition
Public Charging	<p><u>2022-2024</u></p> <ul style="list-style-type: none"> ▶ PU-1: Mapping Public Charging Station Locations ▶ PU-2: Regional Public DC Fast Charging Installations ▶ PU-3: Mobility Hubs ▶ PU-4: Shared Mobility/Delivery Fleets Charging <p><u>2024-2030</u></p> <ul style="list-style-type: none"> ▶ Vehicle-to-Grid Charging ▶ EV Charging Station Guide ▶ Business Outreach Resources ▶ Funding Incentives for Public Charging on Private Property
	<p><u>2022-2024</u></p> <ul style="list-style-type: none"> ▶ PC-1: Accessibility Advocacy ▶ PC-2: Pricing Structure Best Practices ▶ PC-3: EV Charging Design Guidelines
Plans, Codes, & Polices	

The following sections provide contextual data for each focus area, followed by implementation details for each strategy (organized by tables, as shown in Table 2).

Table 2: Example Strategy Table

Regional Implementation Team Activities	Local Community Activities
<i>Steps the regional team will take to implement this plan. Specific leads within the regional team will be determined during implementation.</i>	<i>Optional steps individual communities can take to support the regional effort.</i>
Equity Considerations	
<i>Key considerations that should be incorporated into strategy implementation to support equitable outcomes.</i>	
Regional Stakeholders Roles and Responsibilities	
<i>Specific roles for regional stakeholders who participated in the planning process. Additional stakeholders are identified but not committed to specific roles, as they did not review this plan.</i>	
NOTE: Roles for specific county and municipal stakeholders are not listed in this plan and will be identified during implementation.	
Funding Considerations	
<i>Funding needs and available resources for strategy implementation.</i>	

Focus Area: Community EV Adoption

This focus area aims to encourage residents of Boulder County to purchase, lease, or otherwise choose to drive an EV instead of a gas-powered vehicle. While other focus areas support community EV adoption through infrastructure and policies, this focus area directly addresses barriers that prevent residents from considering an EV in the first place. Priority strategies for this focus area include broad education and outreach efforts to promote EVs, incentives to reduce the cost of EVs, carshare program development, EV workforce development, and coordination with auto dealers.

Community EV Adoption Context

Despite progress made toward electrifying vehicles across Boulder County (see Electric Vehicle Adoption Rates section), many barriers to EV adoption still exist, including the upfront cost of purchasing an EV, as well as misconceptions about EVs. In a 2020 Colorado study, 66% of respondents who drive EVs indicated that they have a fear of running out of EV charge before reaching their destinations, even though 80% drive their primary vehicle 30 miles or less per day - well within the typical EV charge range (E-Source, 2020). Education and outreach need to be paired with solutions that reduce the purchase price of EVs. The same Colorado study found that 51% of respondents expect to pay less than \$25,000 for their next vehicle, which is less than the sticker price of most available EVs; 35% of respondents expect to purchase their next vehicle from the used market, which is currently lacking in EV availability.

Widespread EV adoption relies on factors beyond the reach of local communities, including addressing supply chain bottlenecks in components such as lithium-ion batteries and in limited availability of in-demand models like trucks and crossovers, which impacts vehicle cost. As technologies evolve and markets shift to address these issues and meet growing demands, more EVs are expected to become available at competitive prices. This chicken and egg issue of encouraging EV adoption when there may not be enough EVs available to meet the demand, which may keep EVs out of reach for many, will be a challenge that the Boulder County region must factor into plan implementation.

Regional Highlights

- Using the 2020 Colorado Energy Office market research study, **Boulder County** targeted outreach efforts to households most apt to buy EVs.
- In coordination with the Colorado Energy Office and its Recharge Colorado program, **Drive Clean Colorado** leads the [Drive Electric Colorado](#) initiative aimed at educating consumers with information and facts about EVs, to increase EV adoption in Colorado.

Community EV Adoption Strategies

The following strategies were identified as priorities over the next 2 to 8 years. Detailed action plans were developed for strategies scheduled to be implemented between 2022 and 2024. Longer term strategy details will need to be developed during a plan update.

CA-1: Regional Community Outreach

Leverage CEO education and outreach materials (in development), as well as past Boulder County efforts, to launch municipal and county marketing in order to promote EVs and related resources that are segmented to address the needs and interests of different demographics.

Regional Implementation Team Activities	Local Community Activities
1. Explore the opportunity to customize State outreach materials for Boulder County and specific groups within Boulder County.	1. Explore the opportunity to customize state outreach materials for Boulder County and community specific needs.

<ol style="list-style-type: none"> 2. Distribute outreach materials through communications and outreach channels, including regional and local community partners. <ol style="list-style-type: none"> a. Boulder County will serve as the hub for all materials. 3. Manage ongoing updates to outreach materials. 	<ol style="list-style-type: none"> 2. Share outreach materials through local channels and with community partners. 3. Support collaboration with cultural brokers and climate equity specialists to ensure messaging, materials, and communication channels will serve diverse community groups.
Equity Considerations	
<ul style="list-style-type: none"> • Leverage community cultural brokers in community outreach, including identification of communication channels that can reach a diverse audience. • Engage diverse community groups, to create customized messages and materials that resonate with specific target audiences. • Ensure availability of multilingual and culturally responsive resources. 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> customization of State (CEO) outreach materials. • Drive Clean Colorado: <u>Support</u> distribution of outreach materials. • Boulder Transportation Connections and Commuting Solutions: <u>Support</u> identification of target audiences and distribution of outreach materials. • Chambers of Commerce in Boulder County: <u>Support</u> distribution of outreach materials. • Xcel Energy Partners in Energy: <u>Support</u> customization of State (CEO) outreach materials for Boulder County. • Other Potential Partners: Cultural brokers in Boulder County, community-based organizations. 	
Funding Considerations	
<u>Funding Needs:</u> <ul style="list-style-type: none"> • Funding will be required for material customization, translation, printing, and distribution. 	

CA-2: Residential EV Purchasing Incentives

Provide cash vouchers, point of sale rebates, group buys, or other incentives to stack on top of existing utility and federal rebates, as well as potential State incentives currently under consideration. These incentives would reduce the upfront cost of EVs, prioritizing low- and middle-income residents or households identified through CDPHE climate equity rankings.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Inventory existing incentives (e.g., rebates, tax credits) and identify gaps (e.g., used vehicles, low/middle-income households). 2. Research incentive tools used in other communities; explore creative incentive ideas to bridge gaps identified in Step 1 (e.g., on-bill financing, registration discounts, group buy discounts combined with maintenance vouchers, rebates for converting existing gas-powered vehicles, buy-back programs, climate tax). <ol style="list-style-type: none"> a. Explore how incentives might be applied to the used vehicle market. 3. Determine which incentive tools would be most feasible for the Boulder County region. 	<ol style="list-style-type: none"> 1. Support community engagement to design the incentive program. 2. Promote the new incentive program.

<ul style="list-style-type: none"> a. Feasibility criteria could include available funding sources, likelihood that community members will utilize the incentive, ease of implementation and use, capacity of implementation partners, or the incentive's ability to fill the identified gaps from Step 1. <p>4. Design and implement incentive program(s).</p> <ul style="list-style-type: none"> a. Conduct a community engagement process to design the program. b. Determine the required amounts of incentives and the potential sources of funding, including any budget and staffing resources that municipalities may need to request for allocation. c. Secure funding and staffing resources. d. Develop a timeline for launching the program, including education and outreach. <p>5. Coordinate with local communities to promote the incentive program.</p>	
---	--

Equity Considerations

- Leverage community cultural brokers to engage diverse community groups in order to help identify gaps (Step 1) and design effective and equitable incentives to identify those gaps
- Consider contracting with local community groups to tailor messages and materials that resonate with specific target audiences.
- Allocate specific resources to remove barriers for under-resourced groups.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support the design and implementation of incentive programs by connecting available resources.
- **Southwest Energy Efficiency Project (SWEET):** Support incentive research.
- **Drive Clean Colorado:** Support incentive research and the design and implementation of incentive program through outreach.
- **Chambers of Commerce in Boulder County:** Support design and implementation of incentive program, informed by outreach to members.
- **Boulder Transportation Connections:** Support design, implementation, and promotion of incentive program through outreach.
- **Partners in Energy:** Lead incentive inventory, gap analysis, and research.
- **Other Potential Partners:** Colorado Commercial Property Assessed Clean Energy (C-PACE), cultural brokers in Boulder County, community-based organizations, Platte River Power Authority (PRPA)

Funding Considerations

- Funding Needs:
- Funding required to design and provide incentives.
 - Consider contracting with community groups to support development of incentive programs, in partnership with technical consultants.
 - New incentive programs may require additional staff resources to manage the program.

Funding Resources:

- State Programs
 - *Coming soon* – Community Access Enterprise
 - Vehicle Investment for Sustainable Transportation Access: proposed funding identified in enterprise 10-year plan, including vehicle replacement programs targeting high-emission vehicles (Colorado Energy Office, 2022)

CA-3: Equitable EV Carshare Program

Develop a program that supports EV carshare, prioritizing locations that support underserved communities and those with existing infrastructure to ensure that the carshare service is well utilized. Potential locations could include: 1) workplaces that have a high percentage of workers who do not drive to work, 2) affordable housing properties, and/or 3) neighborhoods identified through the CDPHE climate equity rankings and other local climate risk and vulnerability maps. Program support could include sharing information on EV carshare benefits, working with Xcel Energy Partnerships, Research and Innovation (PRI) team to pilot a program in a selected area, assisting in securing funding resources to fund the carshare program, collecting feedback from residents/employees to help shape the carshare program for their community, supporting contracting with a carshare operator, and educating residents/employees about the program.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Research examples of equitable EV carshare programs and document potential benefits, funding approaches, and lessons learned. <ol style="list-style-type: none"> a. Leverage lessons from local programs. 2. Determine characteristics of successful carshare programs and identify potential sites. <ol style="list-style-type: none"> a. Leverage mapping results from Strategy PU-1 and state and local climate equity maps. b. Leverage needs assessments from Xcel Energy PRI team’s carshare pilot program. c. Leverage learnings from Partners in Energy Denver carshare project. d. Leverage studies on community patterns to inform site selection. 3. Reach out to potential sites to determine interest. <ol style="list-style-type: none"> a. Collect feedback from potential users through resident/employee surveys, focus groups, ride-n-drives, or other activities 4. Identify and work with a carshare operator that supports electrified carshare, carries insurance, and can handle customer logistics. 5. Work with interested sites to secure funding, design and launch programs, and 	<ol style="list-style-type: none"> 1. Conduct outreach to potential sites and help interested sites design and launch carshare programs. 2. Coordinate with local planning departments to understand existing and future land use and development constraints and opportunities.

educate residents/employees about the programs.	
Equity Considerations	
<ul style="list-style-type: none"> • Prioritize programs in areas and for populations (e.g., multi-family residents and renters) facing barriers to accessing personal EVs, and considering other climate equity factors as determined through best-practice research and mapping. • Engage with site users (e.g., residents) to ensure there is demand for a program and that the program is designed to meet their needs. 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> program development by connecting to available resources. • SWEEP: <u>Support</u> research. • Drive Clean Colorado: <u>Support</u> outreach to potential sites and development of programs. • Boulder Transportation Connections: <u>Support</u> identification of potential sites and outreach. • Chambers of Commerce in Boulder County: <u>Support</u> outreach to potential sites. • Xcel Energy Partners in Energy: <u>Lead</u> research and site identification; <u>support</u> program development by connecting to Xcel Energy’s PRI team and other resources. • Other Potential Partners: Housing authorities 	
Funding Considerations	
<u>Funding Needs:</u> <ul style="list-style-type: none"> • Funding will be required to design, launch, and operate a carshare program 	
<u>Funding Resources:</u> <ul style="list-style-type: none"> • Xcel Energy’s PRI Equitable EV Carshare Pilot Program • Commuting Solutions Grant Programs • State Programs <ul style="list-style-type: none"> ○ <i>Coming soon</i> – Community Access Enterprise <ul style="list-style-type: none"> ▪ <u>Community-Accelerated Mobility Project:</u> proposed funding identified in the enterprise 10-year plan, including flexible funding opportunities for Transportation Network Companies (TNCs), vanpool, carshare, and other community-identified programs (Colorado Energy Office, 2022). 	

CA-4: EV Workforce Pipeline and Training

Promote green-collar jobs that support EVs and the associated infrastructure by promoting existing workforce development offerings and supporting the development of new offerings as needed. These jobs may include mechanics and electricians that specialize in EVs and charging infrastructure. Focus on efforts that benefit disadvantaged workers, who often experience difficulty accessing workforce pipelines, and/or workers from local, under-resourced and underemployed communities.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Identify and promote any community colleges and trade schools in the Front Range and across the state that are already offering workforce training related to EVs. 2. Identify ways to support other existing workforce development efforts by regional partners, including CDOT’s Zero Emission Vehicle workforce development survey, the State’s new initiative with school districts, 	<ol style="list-style-type: none"> 1. Lead outreach to existing local workforce development programs to understand existing EV offerings and/or opportunities to incorporate EV offerings. 2. Promote existing, new, or expanded workforce development programs within the community.

<p>and Drive Clean Colorado EV education efforts in the Boulder Valley School District.</p> <p>3. Identify and reach out to other existing workforce development programs for opportunities to incorporate EV offerings.</p> <ul style="list-style-type: none"> a. Start with solar, weatherization, and other synergistic workforce development programs. b. Partner with community colleges, school districts, Workforce Boulder County, PACE, Latino Chamber of Commerce, Boulder County Corrections, Colorado Clean Tech Industries Association (CCIA), She's in Power, and others. <p>4. If additional new workforce development programs are needed, research EV workforce programs in other communities to determine best practices to inform the development of new programs in Boulder County.</p>	<p>3. Connect with auxiliary efforts that enable better access to and retention in green-collar workforce pipelines.</p>
---	--

Equity Considerations

- Use an economic inclusion model when developing new or enhancing existing workforce development programs.
- Ensure new or expanded programs are accessible to traditionally disadvantaged workers, including supportive services and multilingual programs and materials that meet specific needs for access and retention.
- Focus on empowering community members to play a leading role in new or expanded programs, noting that there is an existing lack of trust in government among residents.
- Be careful not to train more people than there are jobs available.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support development of new or expanded workforce development programs.
- **SWEEP:** Support research on workforce development programs in other communities.
- **Drive Clean Colorado:** Continue to lead outreach efforts to schools and support development of new or expanded workforce development programs.
- **Boulder Transportation Connections:** Support development of new or expanded workforce development programs.
- **Chambers of Commerce in Boulder County:** Support development of new or expanded workforce development programs.
- **Xcel Energy Partners in Energy:** Lead research on workforce development programs in other communities.
- **Other Potential Partners:** Workforce development organizations

Funding Considerations

- Funding Needs:
- Funding will be required to support the development, delivery, and promotion of workforce training programs.
- Funding Resources:
- Colorado Workforce Development Council, My Colorado Journey, and other similar organizations.
 - State Programs
 - *Coming soon* – Clean Fleet Enterprise

- Clean Fleet Vehicle Workforce Development Portfolio: to provide a range of programs including driver/operator training and technician training (Colorado Department of Public Health and Environment, 2022)

CA-5: Dealership Outreach

Provide direct outreach to local dealerships, including privately-owned used dealerships that serve low- and moderate-income households, to support EV sales, provide customer collateral, and connect them to other resources in order to increase availability of EV purchase options and improve the buyer experience. After developing relationships, encourage dealership participation in EV sales staff training, ride-n-drives, group buys, and Xcel Energy's EV Trade Partners Network.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Inventory regional dealerships and existing relationships. <ol style="list-style-type: none"> a. Indicate if dealerships have already participated in group buys or ride-n-drives or have a working relationship with Economic Development staff, Drive Clean Colorado, Xcel Energy, or other partners. b. Include dealerships beyond Boulder County. 2. Inventory resources available to support dealerships promoting EVs; determine gaps. <ol style="list-style-type: none"> a. Review market research to understand buyers' experiences. b. Reach out to dealerships to understand their needs related to EV sales. <ol style="list-style-type: none"> i. Determine demand for ride-n-drive invitations, group buy coordination, and EV staff trainings. c. Explore opportunities to include tax credits and rebates at the time of sale and in the sticker price. d. Explore opportunities to advocate for expanded tax credits for privately-owned dealerships. 3. Support dealerships based on gap analysis. 	<ol style="list-style-type: none"> 1. Work with Economic Development and other relevant staff and local sustainable business programs to begin EV outreach to local dealerships, connecting them to support from Drive Clean Colorado, Xcel Energy, or other available sources.
Equity Considerations	
<ul style="list-style-type: none"> • Prioritize the needs of privately-owned used car dealerships that serve middle- and lower-income households and do not benefit from the existing federal and state tax incentives. This may require advocacy for expanded tax credits. • Consider ways to connect dealerships to affordable financing tools for customers, such as on-bill financing through the utility. 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> dealership resources inventory and <u>lead</u> exploration of ways to include tax credits and rebates at the time of sale to lower upfront costs. 	

- **Drive Clean Colorado:** Lead dealership inventory and dealership outreach.
- **Boulder Transportation Connections:** Support dealership outreach.
- **Chambers of Commerce in Boulder County:** Support dealership outreach.
- **Xcel Energy Partners in Energy:** Support dealership inventory and dealership outreach by coordinating with Xcel Energy's Manager of Dealership Relations.

Funding Considerations

Funding Needs:

- This strategy may require funding for outreach efforts.

2024-2030 Strategies

- ▶ **Coordinated Ride-and-Drive Events:** At the end of every year, coordinate with ReCharge Colorado Coaches and other regional partners to identify opportunities for ride-n-drive events across the county for the upcoming year.
- ▶ **Employee EV Training:** Develop a standardized EV training module that can be used by governments, businesses, and other organizations to educate employees on the benefits of EVs and how to drive an EV. Work with local sustainable business programs to promote the training to employers.
- ▶ **Commuter EV Vanpool Programs:** Work with employers, Denver Council of Regional Governments (DRCOG), and Boulder Transportation Connections to set up an EV vanpool program.
- ▶ **Equitable E-bike Programs:** Work with local governments, regional partners (e.g., Boulder Transportation Connections), and state partners to provide shared, free, or significantly discounted e-bikes to underserved residents and essential workers.
- ▶ **Rideshare Fleet Electrification:** Work with ridesharing companies to organize group buys for their drivers, set up low-interest loans, and provide promotions or incentives for EV drivers.
- ▶ **Equitable Electric Microtransit:** Work with RTD or other local transit agencies and private developers to set up electric microtransit routes in neighborhoods identified through the CDPHE climate equity rankings and other local climate equity maps, and/or neighborhoods in the first/last mile radius.
- ▶ **Equitable Service Delivery Electrification Incentives:** Establish methodology to provide grant funding to electrify service delivery vehicles, incorporating air quality and equity into the criteria for recipients. Explore funding sources for this grant program, for example the Clean Fleet Enterprise.

Focus Area: Home & Work Charging

This focus area aims to increase awareness of options for and accessibility to EV charging at home and at workplaces. Strategies include outreach efforts and incentives to reduce charging installation costs.

Home & Work Context

As shown in Figure 9, charging at home and at the workplace are the primary methods of EV charging which, if unavailable, can deter potential drivers from switching to an EV.

Home charging is easiest for single-family residents and homeowners because most are able to plug their EV directly into their garage without any additional investment. An estimated 80% of EV owners do most of their charging at home. However, nearly 70% of potential Colorado EV drivers believe they can't charge at home unless they have special equipment (E Source, 2020). To encourage more drivers to switch to EVs, these misconceptions and fears must be addressed through education and outreach.

In addition, some residents, such as those living in multifamily housing developments or those without off-street parking,

frequently face additional barriers to charging at home which could dissuade them from purchasing an EV. Beyond access to parking and electrical infrastructure for parking, multifamily or on-street home charging may be challenging due to the added complexity of shared electrical metering, charger access, and the need for approval from multiple stakeholders, including homeowners, tenants, property managers, and HOAs.

To facilitate additional EV drivers on the road, this plan prioritized strategies in this focus area, to reduce real and perceived barriers to charging at home.

Home & Work Charging Strategies

The following strategies were identified as priorities over the next 2 to 8 years. Detailed action plans were developed for strategies scheduled to be implemented between 2022 and 2024. Longer term strategy details will need to be developed during a plan update.

HW-1: Multifamily Charging Outreach

Develop education and awareness campaign on multifamily EV charging programs and options as a resource for local communities to share with multifamily property owners and managers to encourage installation of EV charging stations.

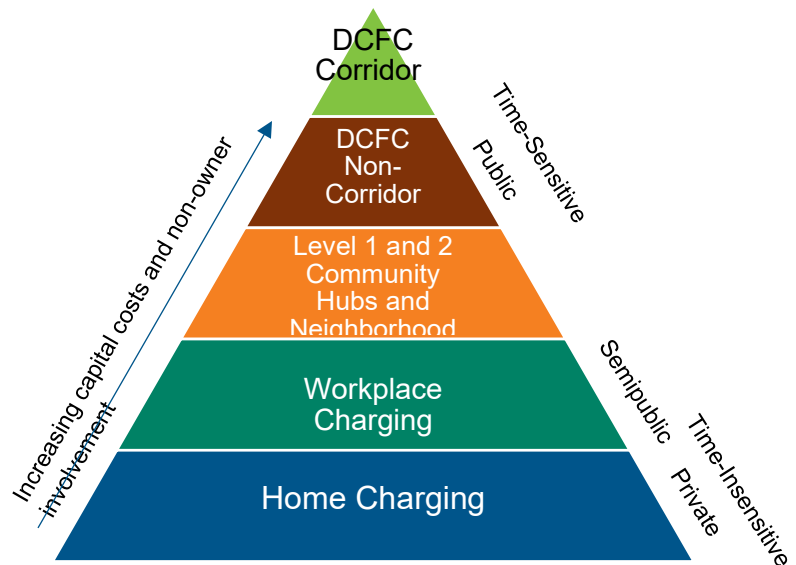


Figure 9: EV Charging Infrastructure Categories and Priorities (Winn, 2019)

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Identify and map multifamily properties through implementation of strategy PU-1. 2. Support local communities' efforts to collect feedback from property owners and managers to understand multifamily 	<ol style="list-style-type: none"> 1. Collect feedback from local property owners and managers to better understand multifamily property owners' and managers' needs and priorities and share with the Regional Team.

<p>property opportunities and barriers, including collecting feedback through 1-on-1 conversations, focus groups, and surveys.</p> <ol style="list-style-type: none"> a. Develop a resident survey template to offer to property owners and managers for distribution – for them to better understand their residents’ demand for charging. <ol style="list-style-type: none"> 3. Analyze feedback gathered by local communities to inform coordinated outreach messaging for multifamily property owners and managers. <ol style="list-style-type: none"> a. Develop case studies of multifamily property owners with existing charging stations. b. Develop scenarios for multifamily charging (e.g., number and level of charging stations, cost structures, accessibility) to help property owners determine what type of charging is right for their properties. 4. Develop outreach materials summarizing the local requirements, benefits, and resources related to installing charging stations at multifamily properties. Include talking points for multifamily tenants to use in conversation with property managers. 5. Share materials with local communities to use to conduct outreach. 6. Identify which property owners and management companies are in multiple communities and work on joint outreach. 	<ol style="list-style-type: none"> a. To collect feedback, work with those with existing relationships (e.g., community groups, community-facing departments, and programs) to understand existing needs and issues and identify effective outreach methods such as door-to-door outreach, virtual or in-person focus groups, and incentivized surveys. b. Coordinate outreach with policy updates as part of the regional codes cohort and associated efforts by local building and planning departments. <ol style="list-style-type: none"> 2. Distribute outreach materials to local multifamily property owners, managers, and tenants, in coordination with local sustainable business programs and other community-based organizations. 3. Connect multifamily property owners to Xcel Energy EV Multifamily Solutions Team. <ol style="list-style-type: none"> a. For those with other electric utility providers, share best practices information, case studies, and funding opportunities.
---	--

Equity Considerations

- Work with property owners and managers to install charging, with little to no cost impact for cost-burdened households, through subsidies, incentives, and equitable housing policies.
- While working with property owners and managers on charging, consider sharing opportunities for EV carshare or other options that increase mobility options (in coordination with CA-5).
- Help property owners conduct outreach to their residents to determine resident needs and demand for EV charging.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support case study and scenario development.
- **SWEEP:** Support case study and scenario development. Support best practices development for multifamily property owners.
- **Drive Clean Colorado:** Support outreach to property owners and managers. Lead best practices development for multifamily property owners.
- **Boulder Transportation Connections:** Support design of outreach plan and outreach to property owners and managers.
- **Chambers of Commerce in Boulder County:** Support outreach to property owners and managers.

<ul style="list-style-type: none"> • Xcel Energy Partners in Energy: Lead case study, scenario, and outreach material development. <u>Support</u> best practices development for multifamily property owners. • Other Potential Partners: Longmont Power & Communications, housing authorities, property management associations
<p>Funding Considerations</p> <p><u>Funding Needs:</u></p> <ul style="list-style-type: none"> • Funding is required to design and conduct multifamily housing outreach. <p><u>Funding Resources:</u></p> <ul style="list-style-type: none"> • Federal Programs <ul style="list-style-type: none"> ○ <i>Coming soon</i> – Competitive EV grants (apply directly) • State Programs <ul style="list-style-type: none"> ○ <i>Coming soon</i> – Community Access Enterprise • Xcel Energy Programs <ul style="list-style-type: none"> ○ Multifamily EV Solutions ○ Income-Qualified and Higher Emissions Communities rebate

HW-2: Equitable Multifamily Charging Incentives

Provide rebates, vouchers, or other incentives to help multifamily properties and households in multifamily properties install EV charging, especially low-to-moderate income households or for households located in census block groups that are in the top 50% of CDPHE climate equity rankings (or similar threshold).

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Lead feasibility study to identify incentives with the potential to increase EV adoption by multifamily residents and remove barriers for property owners. <ol style="list-style-type: none"> a. Conduct targeted outreach to inform feasibility study, such as focus groups or surveys (in coordination with HW-1 survey), to understand barriers to EV adoption and charging installation by property owners, along with potential solutions. b. Work with community organizations representing target audiences to inform feasibility. c. Work with other organizations providing complimentary incentives to inform feasibility. d. Determine anticipated participation levels, cost, and administration requirements for identified incentives. 2. Design and implement incentive program(s) based on feasibility study. <ol style="list-style-type: none"> a. Determine the required amount of incentives and potential sources of funding, including any budget and staffing resources that 	<ol style="list-style-type: none"> 1. Support feasibility study by working with existing relationships (e.g., community groups, community-facing departments) to understand needs and issues and to identify effective outreach methods. 2. Support the development and promotion of a regional incentive program.

<ul style="list-style-type: none"> <li style="margin-left: 40px;">municipalities may need to request for allocation. <li style="margin-left: 20px;">b. Secure funding and staffing resources. <li style="margin-left: 20px;">c. Develop a timeline for launching the program, including education and outreach. <p>3. Coordinate with local communities to promote the incentive program.</p>	
--	--

Equity Considerations

- Explore how charging may increase rent prices and how to address that increase for cost-burdened households through EV charging incentives and/or equitable housing policies.
- Explore how EV charging incentives can be combined with carshare or other options that increase mobility options for those without a personal vehicle.
- Help property owners conduct outreach to their residents to determine resident needs and demand for EV charging.
- Explore collaboration with other income-based programs to help offset potential costs; leverage outreach, community relationships, and funding; and streamline application/eligibility process for incentive recipients.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support feasibility study by providing information about similar incentive programs and complimentary funding opportunities.
- **SWEET:** Support feasibility study by providing examples.
- **Drive Clean Colorado:** Support outreach efforts to inform feasibility study through existing contacts, if applicable.
- **Boulder Transportation Connections:** Support outreach efforts for implementation of incentive program.
- **Xcel Energy Partners in Energy:** Support feasibility study, including outreach support, best practice research, and sharing information about complimentary funding opportunities.
- **Other Potential Partners:** Community-Based Organizations, PACE, PRPA, Longmont Power & Communications.

Funding Considerations

- Funding Resources:
- Federal Programs
 - *Coming soon* - Competitive EV grants (apply directly)
 - State Programs
 - Charge Ahead Colorado grants
 - *Coming soon* - Community Access Enterprise
 - Xcel Energy Programs
 - Multifamily EV Solutions Programs
 - Income-Qualified and Higher Emissions Communities rebate

HW-3: Equitable Single-Family Home Charging Incentives

Provide rebates, vouchers, or other financial incentives to stack on top of existing rebates from utilities and other sources, if applicable and lower the cost for at-home EV chargers for low- and middle-income households or other key audiences to be determined through implementation.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Identify who the target audience is for this strategy, for example low- and middle-income households with longer commutes who could particularly benefit from access to Level 2 charging, or those without access to off-street parking. 2. Determine feasibility of potential incentives, including expected participation, cost, and administration. <ol style="list-style-type: none"> a. Conduct targeted outreach to inform feasibility study, such as focus groups or surveys. b. Work with community organizations representing the target audiences to inform feasibility. c. Work with other organizations providing complimentary incentives to inform feasibility. 3. Based on feasibility study and community feedback, determine which incentives would be most impactful and how they will be administered. 4. If appropriate at the regional level, develop implementation plan for incentive program, including roles and timelines for marketing and outreach, administration support for participants, tracking, and review at the regional level. 5. If appropriate at the regional level, implement incentive program. 	<ol style="list-style-type: none"> 1. Support feasibility study by providing information about similar incentive programs and coordinating with community partners on outreach process. 2. Support development and promotion of incentives.
Equity Considerations	
<ul style="list-style-type: none"> • Explore how charging may increase rent prices and how to address that increase for cost-burdened households through EV charging incentives and/or equitable housing policies. • Explore ways to support EV charging access for single-family home renters, for example through landlord outreach or neighborhood charging solutions. • Contract with community groups and cultural brokers to engage target communities in the development of the incentive program. • Explore how charging may increase utility bills and how to address that increase for cost-burdened households through EV charging incentives. • Connect with other residential programs that can further reduce utility bills, such as energy and water efficiency. 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> feasibility study by providing information about similar incentives programs and complimentary funding opportunities. • SWEEP: <u>Support</u> feasibility study by providing examples. • Drive Clean Colorado: <u>Support</u> outreach efforts to inform feasibility study. • Boulder Transportation Connections: <u>Support</u> outreach for implementation of incentive program. • Xcel Energy Partners in Energy: <u>Support</u> feasibility study, including outreach support, best practice research, and sharing information about complimentary funding opportunities. 	

- **Other Potential Partners:** Community-based organizations, PRPA, Longmont Power & Communications.

Funding Considerations

Funding Resources:

- State Programs
 - *Coming soon* - Community Access Enterprise
 - Service Panel Upgrade + Residential Resources: proposed funding identified in the enterprise 10-year plan, including support for residences to upgrade electrical service and install needed infrastructure in order to enjoy the benefits of EV charging at home (Colorado Energy Office, 2022).
- Xcel Energy Programs
 - Income-qualified EV rebates
 - Home wiring rebate, increased for income-qualified residents
 - EV Accelerate at Home program

2024-2030 Strategies

- ▶ **Workplace Charging Outreach:** Coordinate peer business networking events for businesses to share their EV charging experiences with other businesses. Coordinate with local sustainable business programs and economic development partners.
- ▶ **Workplace Charging Funding:** Provide funding to workplaces for chargers. (e.g., for unfunded portion of state funding opportunities) through promotion of Xcel Energy EV charging programs and other funding opportunities.
- ▶ **Workplace Charging Peer Exchanges:** Coordinate peer business networking events for businesses to share their EV charging experiences with other businesses. Coordinate with local sustainable business programs and economic development partners.
- ▶ **Workplace Charging Recognition:** Promote workplaces that have EV charging through existing programs, social media, and other outlets. Coordinate with local sustainable business programs and economic development partners.

Focus Area: Public Charging

This focus area aims to increase the number of publicly available charging stations, especially along travel corridors, near multifamily housing and community amenities, in convenient locations for in-route transportation services, and at multimodal hubs. Strategies include mapping favorable charging station locations, installing regional fast charging, and developing mobility hubs.

Public Charging Context

Public charging stations are critical to ensuring charging access for longer-distance commuters, visitors, those without access to home charging, and transportation services (e.g., ride hailing, delivery fleets). Similar to gas stations, they provide convenient options for those who need to recharge on their route. They are a visible indicator of a community's EV commitment and may reduce range anxiety by assuring those interested in purchasing an EV that charging is easily available.

Regional Highlights

- The **Town of Erie** offers four, 24/7 public charging stations for community use, with a pricing structure that facilitates shared use by disincentivizing users for staying for extended periods of time.
- In March 2022, the **City of Boulder** and ChargePoint partnered to open four public fast charging stations in the 1500 Pearl parking garage in downtown Boulder as part of the [Colorado Energy Office Fast Charging Corridor Program](#).
- The **City of Boulder** is partnering with CU Boulder, Via Mobility, Boulder Valley School District, and Xcel Energy to develop a Regional Fleet Charging Hub and maintenance facility to support local and regional transit needs.

Figure 10 shows the locations of currently available public charging stations in Boulder County, indicating potential gaps along key corridors including US-287, US-36, CO-119, CO-7 (Arapahoe Rd.), and South Boulder Rd.

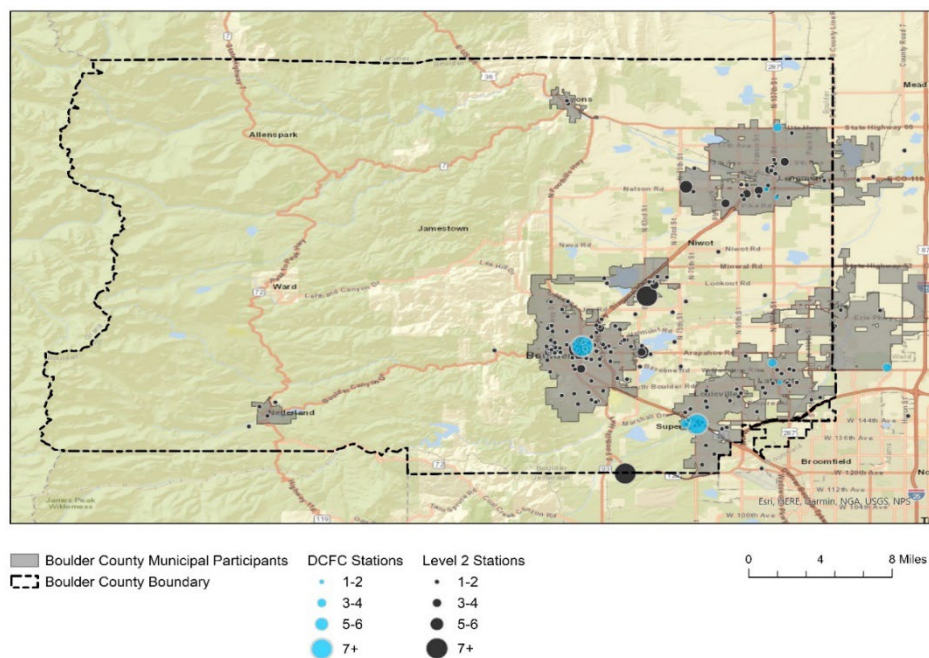


Figure 10: Map of Boulder County Public Charging Stations

Public Charging Strategies

The following strategies were identified as priorities over the next 2 to 8 years. Detailed action plans were developed for strategies scheduled to be implemented between 2022 and 2024. Longer term strategy details will need to be developed during a plan update.

PU-1: Mapping Public Charging Station Locations

Review community demographics, travel corridors, equity factors, and current best practices to identify locations where public charging would be most used and most critical for driving adoption. The produced maps can then be used in outreach to potential host sites for public charging and/or mobility hubs. This strategy will also support several others identified in this plan, including through identification of preferable locations for multifamily, EV car share and public DCFC charging stations.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Identify key data points and features to be included on the map. <ol style="list-style-type: none"> a. Key data points could include current and future land use, population density and growth projections, demographics (e.g., vulnerability mapping inputs), multifamily properties, publicly owned parcels (e.g., parking garages/lots), transit stops/routes, business districts, Boulder County Tax Assessor housing information, and deactivated charging stations. b. Coordinate with relevant agencies to gather selected data points. 2. Update the map with relevant data sources and determine regular update schedule to ensure new public charging sites are displayed. 3. Develop site selection criteria and map to determine key locations. <ol style="list-style-type: none"> a. Leverage data from existing sites (e.g., Charge Ahead Colorado data) and studies to determine highest use charging locations and known best practices to inform criteria. b. Use criteria to determine locations and recommended level of charging (Level 2 or DCFC). c. Criteria could include community demand, safety features (e.g., lighting), proximity to community amenities (e.g., grocery, retail, restaurants), distance from other stations, multifamily properties, climate equity factors, and forecasted EV adoption rates for that area. d. Consider local electrical infrastructure capacity. 	<ol style="list-style-type: none"> 1. Support map development by providing additional mapping layers and other data to include in the map. 2. Support development of site selection criteria. 3. Coordinate with Xcel Energy to understand current and future electricity connection capacity-related opportunities and constraints. 4. Coordinate with local planning departments to understand current and future land use opportunities and constraints. 5. Prioritize which sites to reach out to based on site suitability, and by prioritizing small and minority-owned businesses. 6. Use map and outreach materials developed by the Regional Team to support outreach to property owners at potential, prioritized sites in coordination with local sustainable business programs and community cultural brokers. <ol style="list-style-type: none"> a. Consider door-to-door outreach, virtual or in-person workshops, presenting at existing meetings that property owners and managers attend, or coordinated outreach with other departments. 7. Work with interested property owners to apply for funding and install charging. <ol style="list-style-type: none"> a. Coordinate with Xcel Energy (or applicable electric utility) to complete capacity assessments at identified sites with interested property owners. 8. Explore charger-sharing for properties that may have underutilized private charging stations. 9. Promote new charging infrastructure with outreach methods listed in CA-1.

<p>4. Develop supportive outreach materials that summarize benefits and available incentives for installation of charging infrastructure at priority locations.</p> <p style="padding-left: 20px;">a. Include estimated revenue potential for host sites.</p> <p>5. Share results and outreach materials with local communities to conduct outreach to identified properties or, if privately owned, to facilitate installation of charging infrastructure.</p>	
---	--

Equity Considerations

- Focus on areas with households *that may not have access to charging at home*.
- Focus on areas that can serve those with longer commutes.
- Prioritize small or minority-owned businesses for possible site selection, leveraging community cultural brokers to help conduct meaningful outreach and help businesses navigate the available resources.
- Consider carshare, transit, and other mobility networks to support clean mobility options for those without a vehicle and to address first-mile/last-mile transportation options.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support map and site selection criteria development.
- **SWEEP:** Support map and site selection criteria development.
- **Drive Clean Colorado:** Support outreach to identified property owners.
- **Boulder Transportation Connections:** Support outreach to targeted businesses and residential developments.
- **Xcel Energy Partners in Energy:** Lead map development and updates, support site selection criteria development, and develop materials to support outreach. Support assessment of local electric infrastructure capacity.
- **Other Potential Partners:** PACE, Longmont Power & Communications

Funding Considerations

- Funding Needs:
- This strategy can be completed with existing resources.

PU-2: Regional Public DC Fast Charging Installations

Work with regional partners and private industry, such as charging station manufacturers, to leverage mapping exercises to identify locations for and install DC fast charging stations. Potential DC fast charging stations could include both community charging and charging along regional corridors to serve visitors and commuters. Determine collaborative funding strategies to install DC fast charging stations.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Use results from Strategy PU-1 to identify potential sites for DC fast charging. 2. Develop outreach materials and assemble funding options to support outreach to property owners at potential sites. 3. Work with local communities to reach out to property owners at potential sites to determine interest. 4. Assess local electric infrastructure capacity. 5. Promote new stations through tourism, commuting, and other regional channels, including through leveraging existing apps, websites, and other resources. 	<ol style="list-style-type: none"> 1. Review mapping and site selection outputs to inform potential properties for outreach. 2. Coordinate with local planning departments to understand current and future land use opportunities and constraints. 3. Conduct outreach to property owners identified through mapping efforts to determine interest. <ol style="list-style-type: none"> a. Consider coordinating outreach with fast charger developers. b. Consider coordinating outreach with economic development staff or other partners who have existing relationships with the property owners. c. Consider coordinating outreach with Partners in Energy or Xcel Energy to inform potential charging station program options. 4. Work with interested property owners to apply for funding and install charging. <ol style="list-style-type: none"> a. Coordinate with Xcel Energy (or applicable electric utility) to conduct capacity assessments at identified sites with interested property owners.
<h3>Equity Considerations</h3>	
<ul style="list-style-type: none"> • Ensure charging is located in safe and accessible locations. • Focus on areas that can serve those with longer commutes. • Work with charging station vendors to consider accessibility for those who may not have smart phone access. 	
<h3>Regional Stakeholders Roles and Responsibilities</h3>	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> assembly of funding options. • Drive Clean Colorado: <u>Support</u> outreach to identified property owners and promotion of new stations. • Boulder Transportation Connections: <u>Support</u> outreach to identified property owners and promotion of new stations. • Chambers of Commerce in Boulder County: <u>Support</u> outreach to identified property owners and promotion of new stations. • Xcel Energy Partners in Energy: <u>Lead</u> case study development and assembly of funding options and develop materials to <u>support</u> promotion of new stations. <u>Support</u> assessment of local electric infrastructure capacity. • Other Potential Partners: Longmont Power & Communications 	
<h3>Funding Considerations</h3>	

Funding Resources:

- Federal Programs
 - *Coming soon* – National EV Charging Formula program (through State)
 - *Coming soon* - Competitive EV grants (apply directly)
- State Programs
 - DC Fast-Charging Plaza grants
 - Charge Ahead Colorado grants
 - *Coming soon* – Community Access Enterprise
- Xcel Energy Programs
 - EV Supply Infrastructure program
 - Community Charging hub program
 - Higher Emissions Communities rebate

PU-3: Mobility Hubs

Work with key partners to develop regional mobility hubs that include EV charging stations, car sharing, ride sharing, transit stops, micromobility, bike parking, and other multimodal connections.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Align on what mobility hubs mean to Boulder County. 2. Inventory existing mobility hub efforts and identify opportunities to integrate EV considerations. <ol style="list-style-type: none"> a. Work with local planning departments to understand current and future land use plans that may identify or support mobility hubs. b. Coordinate with local communities to request support from RTD on integrating public charging in RTD mobility hubs. c. If necessary, identify additional potential mobility hubs sites. 3. Work with regional partners to identify and pursue federal and state grant funds to advance mobility hub projects. 4. Work with local communities on outreach to potential property owner(s) and development of mobility hub(s). 5. Promote hub(s) through tourism, commuting, transportation and transit service providers, and other regional channels. 	<ol style="list-style-type: none"> 1. Coordinate with local planning departments to understand future land use planning and identify any mobility hub options to date. 2. Support potential future site identification, including leading any community engagement efforts, to understand viability and desired features. 3. Support efforts to request support from RTD in integrating public charging in RTD mobility hubs. 4. Using results from Regional Team, reach out to potential mobility hub(s) sites to determine property owner interest. 5. Work with interested property owner(s) to construct mobility hub(s). <ol style="list-style-type: none"> a. Work with local utility to conduct site assessment(s). b. Assemble funding options. c. Reach out to local community near potential sites to understand needs/interest and invite them to participate in the development. d. Determine the components of mobility hubs and develop an implementation plan. e. Construct hub(s). 6. Once constructed, promote hub(s) to community members. 7. Consider programs that leverage mobility hubs, such as discounted charging for EV carpool drivers.
Equity Considerations	
<ul style="list-style-type: none"> • Prioritize mobility hub efforts near multifamily housing or other areas that would benefit from increased mobility options. 	

- Consider subsidizing public charging to align with the cost of charging at home for those without access to home charging or providing free or discounted rates for income-qualified residents.
- Ensure charging and other mobility hub features are physically and financially accessible.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support site identification and mobility hub(s) development, including funding support.
- **SWEEP:** Support site identification.
- **Drive Clean Colorado:** Support outreach to identified property owner(s), mobility hub(s) development, and promotion of new hub(s).
- **Boulder Transportation Connections:** Support outreach to identified property owner(s), mobility hub(s) development, and promotion of new hub(s).
- **Chambers of Commerce in Boulder County:** Support outreach to identified property owner(s), mobility hub(s) development, and promotion of new hub(s).
- **Xcel Energy Partners in Energy:** Support site identification, mobility hub(s) development, and development of outreach materials to promote new hub(s).
- **Other Potential Partners:** Economic development organizations, private developers

Funding Considerations

Funding Resources:

- Federal Programs
 - *Coming soon* – National EV Charging Formula program (through State)
 - *Coming soon* - Competitive EV grants (apply directly)
- State Programs
 - DC Fast-Charging Plaza grants
 - Charge Ahead Colorado grants
 - *Coming soon* – Community Access Enterprise
 - Community-Accelerated Mobility Project: proposed funding identified in the enterprise Ten-Year Plan to develop mobility solutions that meet specific community needs, including flexible funding for electric carshare, electric vanpool, community eBike share, community charging infrastructure, and others (Colorado Energy Office, 2022).
- Xcel Energy Programs
 - EV Supply Infrastructure program
 - Community Charging Hub program
 - Higher Emissions Communities rebate

PU-4: Shared Mobility / Delivery Fleets Charging³

Work with ride-hailing companies (e.g., Uber, Lyft), car-share organizations, delivery fleets and service providers (e.g., landscaping companies, HVAC contractors, plumbers) to support fleet electrification and increase access to on-route charging.

Regional Implementation Team Activities	Local Community Activities
1. Inventory regional ride-hailing companies, car-share organizations, and service and delivery fleets operators.	1. Identify and coordinate with local service and delivery fleet operators. 2. Conduct outreach to local shared mobility companies and drivers.

³ Strategy PU-4 was elevated for short-term implementation based on community feedback of the draft plan. The work plan for this strategy has not been through the same review process as the other strategies in this plan.

<ol style="list-style-type: none"> 2. Research existing best practice examples of shared mobility and service and delivery fleet charging. 3. Research existing best practice examples of programs to encourage EV adoption by shared mobility and service and delivery fleet companies and drivers. 4. Coordinate and convene ride-hailing companies, car-share organizations, and service and delivery fleets to understand: <ol style="list-style-type: none"> a. Existing regional fleet EV adoption and charging practices. b. Barriers to expanded EV adoption and charging. c. Interest in distributed and/or centralized shared charging location(s). 5. Based on best practice research and feedback from regional organizations, collaborate on next steps to support electrification. Example next steps could include: <ol style="list-style-type: none"> 1. Inventorying available EVs suitable for shared mobility and service and delivery fleets. 2. Identifying future charging needs. 3. Developing criteria for identifying and selecting ideal shared mobility and fleet charging locations. 4. Completing a site assessment to understand needs and requirements (e.g., property ownership, permitting, electrical grid, legal, and financial). 5. Identifying and pursuing funding. 	<ol style="list-style-type: none"> 3. Support identification of sites suitable for shared mobility and service and delivery fleet charging. 4. Participate in regional working group and work with local partners to conduct outreach to property owner(s) to construct shared mobility and service delivery fleet charging. 5. Consider local programs that support and encourage EV adoption by mobility and service and delivery fleet companies and drivers.
---	---

Equity Considerations

- Prioritize engagement of shared mobility and delivery fleet drivers, to ensure that shared charging locations are convenient, accessible, and affordable to meet their needs.
- Prioritize ride-hailing and car-share charging to serve multifamily housing and areas with limited transportation and home-charging access.
- Ensure charging is physically and financially accessible for shared mobility and delivery fleet drivers.
- Consider ways to support service fleets (e.g., landscaping contractors) into the shared charging stations developed through this strategy.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support site identification and charging station/hub development, including funding support.
- **SWEEP:** Support site identification.
- **Drive Clean Colorado:** Support outreach to identified property owners, ride-hailing drivers and companies, car-share companies, and delivery fleets operators.
- **Boulder Transportation Connections:** Support outreach to ride-hailing drivers and companies, car-share companies, delivery fleet operators and property owners.

- **Chambers of Commerce in Boulder County:** Support outreach to local delivery fleet operators and property owners.
- **Xcel Energy Partners in Energy:** Support site identification, development of charging location(s), and development of outreach materials.
- **Other Potential Partners:** Economic development organizations, private developers, car-share companies, ride-hailing companies

Funding Considerations

Funding Resources:

- Federal Programs
 - *Coming soon* – National EV Charging Formula program (through State)
 - *Coming soon* - Competitive EV grants (apply directly)
- State Programs
 - DC Fast-Charging Plaza grants
 - Charge Ahead Colorado grants
 - *Coming soon* – Community Access Enterprise
 - Community-Accelerated Mobility Project: proposed funding identified in the enterprise Ten-Year Plan to develop mobility solutions that meet specific community needs, including flexible funding for electric carshare, electric vanpool, community eBike share, community charging infrastructure and others (Colorado Energy Office, 2022).
 - Vehicle Investment for Sustainable Transportation Access: proposed funding to remove high-emitting vehicles from the road to be replaced by low-emitting mobility options.
 - Fleet Infrastructure Resources: support for fleet owners seeking to install EV charging infrastructure to support medium- and heavy-duty fleet operations.
 - *Coming soon* – Clean Fleet Enterprise
 - Clean Fleet Vehicle & Technology Project Portfolio: includes proposed funding for clean vehicle purchases/leases and pilot projects for fleets to experiment with zero emission vehicle technologies (Colorado Department of Public Health and Environment, 2022).
- Xcel Energy Programs
 - EV Supply Infrastructure program
 - Community Charging Hub program
 - Higher Emissions Communities (HEC) rebate

2024-2030 Strategies

- ▶ **Vehicle-to-Grid Charging:** Explore opportunities for intelligent integration of EVs, the electric grid, and on-site solar, to increase system resilience through energy storage and peak demand management.
- ▶ **EV Charging Guide:** Establish regional public charging guidelines for local governments to use (e.g., pricing structure, signage, payment systems, accessibility, ADA, and other equity considerations) to ensure users have similar experiences. Provide these as best practices for private entities to reference.
- ▶ **Business Outreach Resources:** In collaboration with Boulder Transportation Connections, develop common messaging across the region for conducting outreach to businesses about installing charging stations. Include considerations for the business case, charger basics, and available resources to assist in charger installation (e.g., incentives, Xcel Energy programs). Work with community partners to develop messaging that’s motivating, relevant, and appropriate for small and minority-owned businesses.

- ▶ **Funding Incentives for Public Charging on Private Property:** Provide grant funding or other incentive-based funding to businesses installing public chargers (e.g., cover the remaining 20% of the Charge Ahead Colorado grant or increase the number of awardees with additional funding).

Focus Area: Plans, Codes, & Policies

This focus area aims to support the creation of plans, codes, and policies that accelerate equitable EV adoption throughout Boulder County. Strategies in this focus area include opportunities for regional alignment for policy advocacy as well as consistent local policy action around accessibility, pricing, and design of EV charging stations. In addition to the strategies listed below, this focus area supports the works of several Boulder County communities that are participating in a code cohort funded in part by the Colorado Department of Local Affairs (DOLA) (see Appendix C: EV-Ready Code Amendment). Through the cohort, these communities are receiving support from consultants to adopt the 2021 International Energy Conservation Code, along with specific amendments, including for EV-Readiness in single family, multifamily, and commercial developments.

Plans, Codes, & Policies Context

Many communities within Boulder County have already adopted plans, codes, and policies related to EVs and climate action more broadly. There are a variety of plans, codes, and policies with different implications for implementation and EV outcomes; some of these are outlined below. Generally, these efforts help to establish locally relevant specifications for EV charging and create policy commitments that support accelerated EV adoption. However, the development of local standards can also create inconsistency across the region, with the potential for confusion among developers, businesses, and residents interested in installing EV charging, or even for EV drivers themselves.

Plans

Planning processes and documents can be used by communities to support EV action, including comprehensive plans, sustainability plans, climate action plans, transportation and mobility plans, or specific EV plans. A summary of existing Boulder County community planning efforts and their connection to EV planning is included in the Where We Are Now section. This Regional Transportation Electrification Plan is not intended to overwrite existing local efforts but could inform strategies for inclusion in other planning efforts.

Codes

Communities use a variety of codes to establish standards for development. These codes present opportunities to require or incentivize development that is in line with a community's vision and values; for example, by establishing minimum efficiency standards, incentivizing public improvements such as sidewalk or bicycle infrastructure construction, or mandating the installation of EV charging infrastructure. Codes that have specific relevance for EV adoption, and which are frequently used by communities to adopt EV requirements and/or incentives, include building codes, energy codes, land use zoning codes, and parking codes. This plan does not include code-related strategies but supports the work of the regional code cohort described above and more details included the recommended amendment for EV-Ready codes are provided in Appendix C: EV-Ready Code Amendment.

Policies

In addition to plans and codes, communities can also adopt policies that encourage EV adoption and revise or remove local policies that may act as unintended barriers. For example, communities may choose to expedite permitting processes for EV charging or create pricing structures that balance the accessibility and financial viability of public charging stations. At the county scale, alignment on

certain policies may reduce confusion and support the seamless integration of EVs across the region.

Regional Highlights

- The **City of Boulder, Boulder County, Lafayette, Louisville, and Superior** have all adopted EV charging requirements as amendments to existing building, energy, or residential codes. SWEEP maintains a list of [current EV Code adoption in Colorado](#) (SWEEP, 2022).

Plans, Codes, & Policies Strategies

The following strategies were identified as priorities over the next 2 to 8 years. Detailed action plans were developed for strategies scheduled to be implemented between 2022 and 2024. Longer term strategy details will need to be developed during a plan update.

PC-1: Accessibility Advocacy

Advocate at the state and federal level for standard accessibility and ADA requirements for EV charging station locations. Considerations for standard requirements include, but are not limited to, number of required ADA EV spaces, spacing requirements around vehicles and stations, height of charging stations, grading, and signage.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Research existing best practices and identify local and regional organizations already advocating for accessibility and how that interacts with existing code requirements (e.g., City and County of Denver efforts). 2. Connect with local and regional organizations that are already advocating for accessibility, to explore whether they could take a leadership and collaborative role. 3. Through existing advocacy channels (e.g., Colorado Communities for Climate Action (CC4CA)), encourage state and federal governments to develop standard guidance and best practices for EV ADA accessibility. 	<ol style="list-style-type: none"> 1. Determine local priorities for ADA accessibility to inform regional alignment and advocacy.
Equity Considerations	
<ul style="list-style-type: none"> • Ensure engagement with site users (e.g., persons with disabilities) to discuss options and understand priorities to ensure that their needs are being met. • As their capacity allows, coordinate with Boulder County Mobility for All (M4A). 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> advocacy efforts by providing connections to state and federal agencies responsible for ADA accessibility standards. <u>Support</u> best practice development, sharing experiences with accessibility issues in Charge Ahead Colorado and other grant programs. • SWEEP: <u>Lead</u> research and development of proposed EV ADA best practices. • Xcel Energy Partners in Energy: <u>Support</u> research of local jurisdictions and other state policies regarding accessibility around the country • Other Potential Partners: Community-based organizations. 	
Funding Considerations	

Funding Needs:

- Depending on partner capacity, this strategy may be completed with existing resources or may require additional funding for compensation of a lead coordinator.

PC-2: Pricing Structure Best Practices

Develop resources, including guidance documents and tools, for establishing charging station pricing structures - including considerations for electricity costs, maintenance costs, equity, charger level, facility type, dwell time, and other relevant factors.

Regional Implementation Team Activities	Local Community Activities
<ol style="list-style-type: none"> 1. Research existing best practice guidance around EV charging pricing structures. 2. Support development of resources, based on local community pricing structures, methodologies (e.g., pricing based on kWh or time), and other best practices. 3. Consider developing separate best practices for sites serving lower-income users, including identifying funding resources to subsidize charging costs. 4. Act as resource for local communities for questions and updates to resources. 5. Share guidance with local businesses and other entities installing charging stations. 	<ol style="list-style-type: none"> 1. Share information about pricing structures at existing municipal owned stations, including how prices were established. 2. Review and inform development of guidance and tools. 3. Share guidance within relevant city departments for establishing pricing. 4. Share guidance with local businesses and other entities installing charging stations through local sustainable business programs, economic development partners, and other local partners.
Equity Considerations	
<ul style="list-style-type: none"> • Work with community-based organizations and cultural brokers to engage with and understand cost impacts of charging to low-income residents, renters, and multifamily housing residents who may rely on public charging stations. 	
Regional Stakeholders Roles and Responsibilities	
<ul style="list-style-type: none"> • State Agencies: <u>Support</u> development of pricing tools and guidance documents. <u>Provide</u> any best practice information or existing guidance. • SWEEP: <u>Lead</u> research of best practices in pricing structures. <u>Support</u> development of pricing tools and guidance document(s). • Xcel Energy Partners in Energy: <u>Support</u> research of best practices in pricing structures. <u>Lead</u> development of pricing tools and guidance document(s). • Other Potential Partners: Community-based organizations, Longmont Power & Communications 	
Funding Considerations	
<p>Funding Needs:</p> <ul style="list-style-type: none"> • This strategy can be completed with existing resources. 	

PC-3: EV Charging Design Guidelines

Develop guidelines to inform the design of new and redeveloped parking lots with EV charging stations. Leverage existing best practices and contract with a consultant to develop guidelines, if needed. The design guidelines will be available for local governments to share with developers as a supplement to code requirements, providing consistency and improving user experience. Design considerations could include recommended number of stations based on use, accessibility, lighting, proximity to building entrances, mounting approach, bollard placement, and wayfinding.

Regional Implementation Team Activities	Local Community Activities
---	----------------------------

<ol style="list-style-type: none"> 1. Research existing best practice guidelines for EV charging station design. 2. Reach out to key stakeholders, especially those on the ground, interacting regularly with EV charging station projects - to understand what design considerations would be most helpful to include. 3. If needed, develop a request for proposals (RFP) through Boulder County to contract with a consultant to develop the guidelines. 4. Work with the consultant to develop the guidelines. 	<ol style="list-style-type: none"> 1. Collect feedback from planning and building, utilities, and sustainability staff to help inform design guidelines RFP, if needed. 2. Distribute the guidelines, to planning and buildings staff and local developers.
--	---

Equity Considerations

- Ensure guidelines consider accessibility inequities.

Regional Stakeholders Roles and Responsibilities

- **State Agencies:** Support development of RFP by providing insight based on experience with Charge Ahead Colorado projects.
- **SWEEP:** Support development of RFP by providing insight based on past research.
- **Drive Clean Colorado:** Support development of RFP by providing insight based on experience with Charge Ahead Colorado projects.
- **Xcel Energy Partners in Energy:** Support stakeholder engagement to inform RFP development.
- **Other Potential Partners:** Energy Outreach Colorado

Funding Considerations

Funding Needs:
 This strategy may require funding for a consultant to develop the guidelines.

How We Stay On Course



Implementation Approach

An effective plan is cyclical in nature (Figure 11) and requires flexibility and course adjustment to be successful and to sustain progress. It will be important that strategies are evaluated and updated throughout implementation to reflect advancements and new offerings from the transportation industry and Xcel Energy.

To facilitate this adaptive implementation approach, two teams will be formed:

1. A **Project Management (PM) Team** will meet on a monthly basis. The PM Team will be comprised of a County staff member and one or two municipality staff members, with support from Xcel Energy Partners in Energy. The role of the PM Team will be to coordinate tracking and meetings with the larger Implementation Team. The PM Team will also oversee progress tracking and provide cross-pollination and supporting resources to ensure regional efforts are all working toward the plan vision and goals.
2. An **Implementation Team** will be formed to carry out the action steps identified for each strategy. Recognizing capacity limitations, this group will divide into subgroups that may be organized by focus area. Specific roles for Boulder County communities and other partners will be defined for each strategy based on leadership and influence, expertise, interest, and capacity. Each subgroup will identify deliverables and report progress out to the larger group during quarterly (or other regular interval) Implementation Team meetings. Sequencing of the strategies the subgroups will work on is illustrated in Table 3.

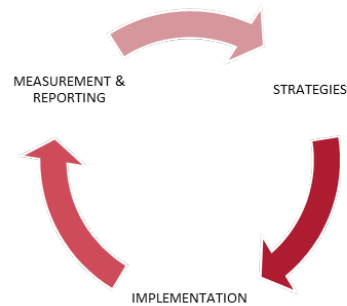


Figure 11. Actions and Tracking

Table 3: Anticipated Strategy Timeline (preliminary and subject to change)

	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Beyond
STRATEGY BY FOCUS AREA					
CA-1: Regional Community Outreach					
CA-2: Residential EV Purchasing Incentives					
CA-3: Equitable EV Carshare Program					
CA-4: EV Workforce Pipeline and Training					
CA-5: Dealership Outreach					
HW-1: Multifamily Charging Outreach					
HW-2: Equitable Multifamily Charging Incentives					
HW-3: Equitable Single-Family Home Charging Incentives					
PU-1: Mapping Public Charging Station Locations					
PU-2: Regional Public DC Fast Charging Installations					
PU-3: Mobility Hubs					
PU-4: Shared Mobility/Delivery Fleet Charging					
PC-1: Accessibility Advocacy					
PC-2: Pricing Structure Best Practices					
PC-3: EV Charging Design Guidelines					

Tracking and Reporting Progress

To ensure this plan remains on track, the PM Team will track progress toward the plan goals on an annual basis (Table 4).

Table 4: Tracking Plan Goals

2030 Goal	Baseline	2025 Interim Milestone	Metric	Data Source	Supporting Strategies (2022-2024)
Transition 30% of all vehicles registered in Boulder County to zero-emissions by 2030	3% (7,560 registered EVs at the end of 2021)	16% (41,528 registered EVs ⁴)	Percent of total registered vehicles that are EVs	Boulder County Department of Motor Vehicles (DMV), 2021	Direct: CA-1, CA-4, CA-5 Indirect: All Strategies
By 2030, install a combined 2,380 public level 2 and DCFC ports (1,920 level 2 and 460 DCFC)	582 (532 level 2 and 50 DCFC in 2021)	910 (710 level 2 and 200 DCFC)	Charging ports by type and location	Atlas Policy EValuateCO, 2022	Direct: PU-2, PU-3 Indirect: CA-3, PU-1, PC-1, PC-2, PC-3

It will be important to let the community know how things are progressing and to recognize the collaborative efforts of those involved in implementation. At critical milestones, the Implementation Team will publish updates on progress, share successes, and congratulate participants and partners through various communication channels.

Beyond the Plan Horizon

Looking beyond the plan implementation horizon (2024), it is recommended that the plan stakeholders periodically reassess the EV goals and successes achieved over the implementation period. Based on lessons learned and new resources (e.g., anticipated state EV equity plan), the plan should be updated with any necessary goal adjustments and new strategies that reflect available technologies and other advancements. With this in mind, the Planning Team identified priority strategies through 2030 that can be used to inform the plan update (see How We Are Going to Get There). Additionally, the [Xcel Energy EV Toolkit](#) can be a good resource for identifying new strategies to address unexpected barriers that may come up.

⁴ This 2025 interim milestone is calculated as a linear interpolation of the 30% by 2030 using forecasted total vehicle numbers based on County population forecasts from the State Demographer's Office.

Appendix A: Electric Vehicles 101



Note, this document was last updated July 2022 and may not reflect the latest technologies and information.

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 5** and are described in more detail in the following sections.

Table 5. 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 an internal combustion engine (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 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 (DCFC). 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 6** provides a brief explanation along with the pros and cons of both types. All currently available EVs can use either charger type.

Table 6. 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	<ul style="list-style-type: none"> • Uses standard residential wall outlet 	<ul style="list-style-type: none"> • Quicker charging


- Little to no investment in infrastructure required
- 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	<ul style="list-style-type: none"> • Requires 240 Volt outlet or hardwired charger • Electrician likely required to install • Higher infrastructure cost investment
Estimated Installation Costs	Low to no cost	\$500 to \$2,000 (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, providing a full charge in 4-6 hours, 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 7** shows the advantages and disadvantages of Level 2 and Level 3 chargers.

Table 7. 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	<ul style="list-style-type: none"> • More economical than Level 3 • Safe for long-term use 	<ul style="list-style-type: none"> • Fastest charging option available
Drawbacks	<ul style="list-style-type: none"> • Slower charging 	<ul style="list-style-type: none"> • Very expensive to purchase and install

		<ul style="list-style-type: none"> • Can cause degradation to EV batteries with frequent use
Use Case	Example locations include workplaces, recreation centers, libraries, movie theatres, transit centers, and parking lots.	Example locations include grocery stores, rest stops, gas stations, and urban parking lots.
Estimated Costs	\$2,500 to \$5,000	\$50,000 to over \$150,000

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.

Greenhouse Gas Emissions

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a report in 2018 identifying potential GHG emission reduction solutions to avoid the worst effects of climate change. Among other strategies, the IPCC states that “the transport sector must reduce its final energy use by 30% 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). As shown in Figure 1 and Figure 2, Boulder County’s transportation sector contribute to one third of GHG emissions in 2016 and on-road vehicles made up 68% of transportation emissions (Boulder County, 2016). This stresses the opportunity to reduce emission through transportation electrification of local fleets and personal vehicles.

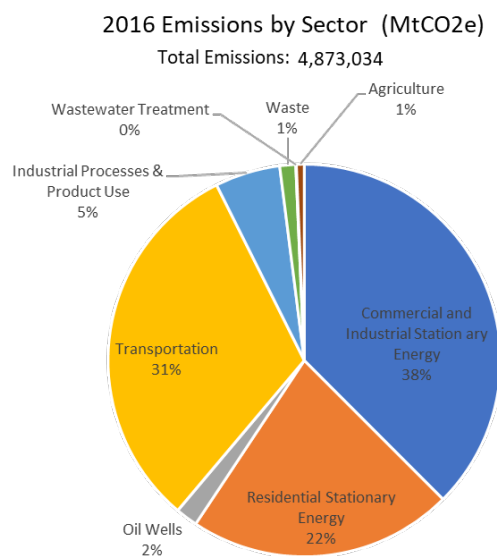


Figure 13: 2016 Boulder County GHG Emissions by Sector

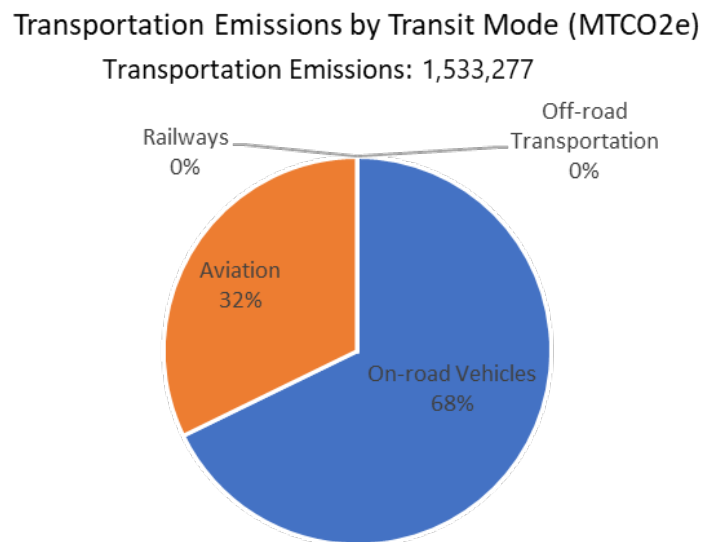


Figure 12: 2016 Boulder County Transportation Emission by Mode

Air Quality

In addition to contributing a significant portion of greenhouse gas emissions, the transportation sector also 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 PMs and CO, are harmful to respiratory health. In general, electric vehicles produce fewer tailpipe pollutants as compared to their ICE counterparts (Office of Energy Efficiency & Renewable Energy, 2020). As the fuel mix for electricity continues to decarbonize, the magnitude of air quality benefits associated with electrifying transportation will increase.

Energy Independence and Cost Stability

Over 65% 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. Avoiding dependence on foreign oil could reduce U.S. financial support going to countries with human rights violations and war crime records. Integration of EVs is an important strategy for reducing dependence on fuel imports and isolates transportation costs from the volatile petroleum market, as evidenced by the sharp increase in gas prices in 2022 partially caused by the conflict in Ukraine. Figure 14 illustrates the fluctuations in gasoline and diesel prices compared to electricity prices from 2000 to 2019.

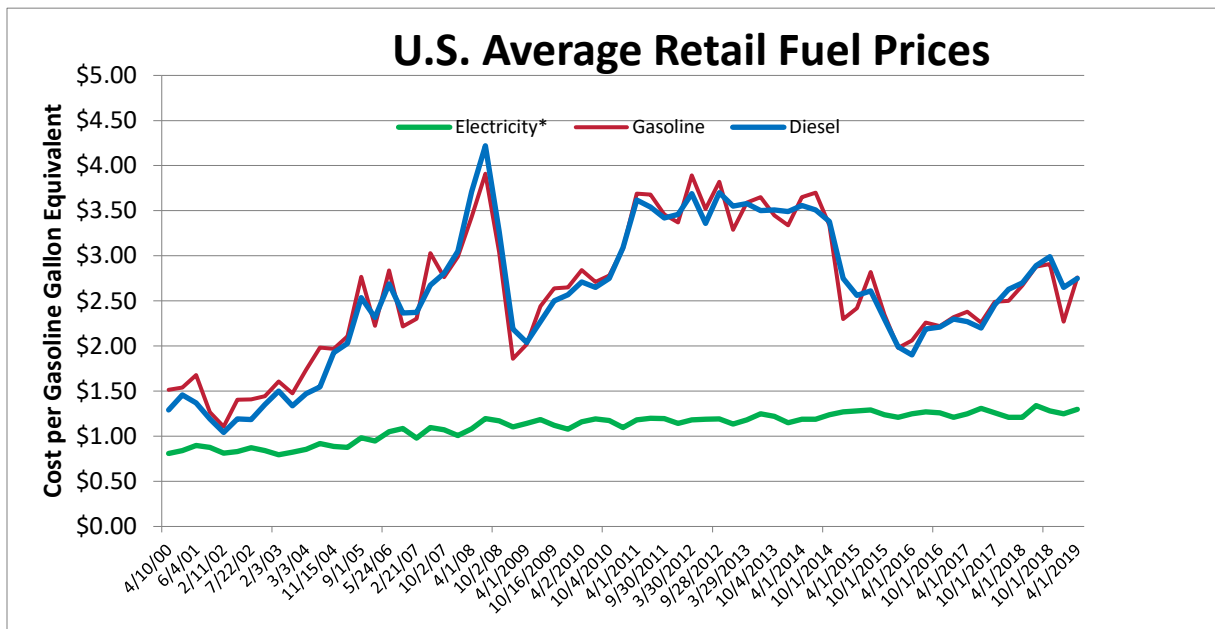


Figure 14: US Average Retail Fuel Prices. Adapted from: (Office of Energy Efficiency and Renewable Energy, 2019)

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 an ICE vehicle (Office of Energy Efficiency and Renewable Energy, 2019). 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 (US DOE, 2019). Though upfront costs of EVs are still greater, this gap is expected to decrease as batteries become more efficient.

Sustainability of EV Batteries

Battery Production Emissions

Differences in battery materials and production techniques, including the location and the energy mix for production, affect the overall sustainability of EV batteries. A battery produced using coal-fired electricity, for example, will have significantly higher emissions than one produced using cleaner power. In total, analyses of battery production (including the extraction of component minerals) suggest that emissions from manufacturing an EV battery are roughly equivalent to the emissions from manufacturing the rest of the vehicle. Some experts suggest that these emissions represent approximately 5-15% of the total life-cycle emissions of an EV in many locales, although these estimates can vary widely. The good news is that new production technologies are developing, and the overall electrical grid is becoming less carbon intensive. Some experts anticipate a 50% reduction in an EV's life-cycle emissions by 2030, and by one estimate of a fully renewable future grid EVs could eventually produce at least 90% fewer life-cycle emissions than do ICE vehicles.

Battery Production Social Impacts

Certain challenges are particularly connected with mining for minerals, such as cobalt, used in EV batteries. Unregulated cobalt mining in the Democratic Republic of Congo (DRC), which produces more than half of all mined cobalt, is linked to regular risk of injury and death due to mine collapse, lung disease from particle inhalation, and child labor concerns (with weak enforcement of health and safety standards or child labor rules). It is important to note that fossil fuel exploration and extraction has also been associated with [similar human rights abuse, conflict, and corruption](#). [The average scores on the Resource Governance Index](#) for oil-producing countries (47 out of 100) and mineral-producing countries (48 out of 100) are virtually identical, signaling that misgovernance, specifically related to child labor, remains a challenge in both sectors.

Battery Lifespan

EV batteries are designed for extended life; but, as with any other rechargeable battery, they will degrade over time. Federal regulations require that every battery in an EV sold in the U.S. come with a warranty providing coverage for a minimum of eight years or 100,000 miles. However, current estimates predict that an EV battery will last 10–20 years before it needs to be replaced. EV drivers can maximize battery life by avoiding high temperatures, overcharging, completely draining the battery, and aggressive driving patterns. After the battery's first life is over, it can be reused for energy storage, telecommunications backup services, and other applications before it needs to be recycled.

Appendix B: Xcel Energy EV Programs

In 2021, [Xcel Energy's Transportation Electrification Plan \(TEP\)](#) was approved by the Colorado Public Utilities Commission (PUC). The TEP is intended to support the State's EV goals and help position Colorado as a national leader in vehicle electrification. It includes a portfolio of programs, services, and rebates designed to benefit all drivers, all customers, and the state, by helping to reduce greenhouse gas emissions and air pollution while keeping electric bills low and benefiting the grid (Public Service Company of Colorado, 2021).

Residential Programs

[Home Wiring Rebate](#)

Xcel Energy electric service customers in Colorado who enroll in the Optimize Your Charge program and purchase an eligible Level 2 charger and/or install wiring to support an eligible Level 2 charger may apply for a rebate of up to \$500 to help cover the cost of wiring. Income-qualified customers are eligible for a higher \$1,300 rebate.

[Optimize Your Charge](#)

The Optimize Your Charge program rewards EV drivers who agree to charge during off-peak hours, with an annual \$50 bill credit.

[EV Accelerate At Home](#)

Through the EV Accelerate At Home program, Xcel Energy electric service customers can rent a Level 2 home charger, select an off-peak charging schedule, and have the charging station installed and maintained by Xcel Energy. EV Accelerate At Home participants pay a \$13.29 per month rental fee through their Xcel Energy electricity bill and are also eligible for the Wiring Rebate and Optimize Your Charge bill credit described above.

[EV Purchase / Lease Rebate for Vehicles](#)

In addition to helping customers overcome cost barriers related to EV charging, Xcel Energy offers income-qualified electric service customers up to \$3,000 off the cost of a used EV, or \$5,500 off the cost of a new EV. The rebates are instant and non-taxable when income-qualified customers buy or lease from a Colorado-based car dealer in Xcel Energy's [EV Dealer Network](#),

Residential Income Qualification Requirements

To be eligible for income-qualified programs, customers must demonstrate a household income below:

- 60% of the state of Colorado's median income
- 200% of the relevant federal poverty level
- 80% of the area median income

OR be currently enrolled in any of the following programs:

- State of Colorado Low-Income-Energy Assistance Program (LEAP)
- Energy Outreach Colorado's Colorado Affordable Residential Energy Program (CARE)
- Colorado's Weather Assistance Program (WAP)
- Xcel Energy income-qualified demand side management program
- Xcel Energy income-qualified Community Solar Gardens program
- Supplemental Nutrition Assistance Program (SNAP)
- Temporary Assistance for Needy Families program (TANF)

Multifamily Programs

Xcel Energy supports home charging for those who live in multifamily housing such as apartments or condominiums and will install, own, and maintain a dedicated service connection for EV charging, including the necessary transformer upgrades, service conductors, and a new meter. Additionally, Xcel Energy will install, own, and maintain the EV Supply Infrastructure, including new service panels, conduit and wiring between the new meter and the charger. For more information on all Multifamily Charging programs, visit the [Xcel Energy website](#).

Assigned Parking

Xcel Energy will own, install, and maintain EV supply infrastructure and charging equipment for a monthly fee when residents have dedicated parking spaces with charges tied to their utility bills.

Multifamily properties meeting income-qualified criteria or located in an HEC are eligible for an enhanced incentive of \$800 per charging station under the Assigned Parking program.

Shared Parking

Xcel Energy will own, install, and maintain EV supply infrastructure and charging equipment for a monthly fee, with a new meter installed for shared charging equipment.

Alternatively, multifamily housing property owners may install, own, and maintain their own charging equipment from an Xcel Energy approved list. Xcel Energy will install, own, and maintain the EV supply infrastructure and install a new meter for the shared chargers.

Multifamily properties meeting income-qualified criteria or located in an HEC are eligible for an enhanced incentive of \$2,200 per charging station under the Shared Parking program.

New Construction

New multifamily construction properties may earn a rebate for every parking spot with EV charging enabled. Xcel Energy will provide up to \$2,000 for EV Ready, EV Capable, or EV Installed ports that are in excess of those required by applicable building codes.

Commercial Programs

EV Advisors

Xcel Energy's EV Advisors are available to guide businesses through a customized EV charging plan and support identification of applicable resources and incentives.

EV Support Infrastructure (EVSU)

Xcel Energy will provide no- to low-cost turn-key construction services for infrastructure at public charging sites receiving Xcel Energy commercial electric service in Colorado.

Critical Peak Pricing Program

The Critical Peak Pricing program is designed to incentivize charging during off-peak hours, at times of day when cleaner generation allows for more sustainable charging. This program is available to customers receiving Xcel Energy commercial electric service in Colorado, with EV charging on a secondary voltage service where the electric power and energy is used solely for EV charging and is metered separately from other loads.

Income Qualified and Higher Emissions Communities Enhanced Incentives

Commercial customers that meet income-qualified criteria or are located in HECs are eligible for enhanced rebates. Please visit the [Xcel Energy website](#) to learn more about income qualification criteria, HEC eligibility, and benefits.

Fleet Electrification Advisory Program (FEAP)

Xcel Energy's Fleet Electrification Advisory Program begins with an analysis to help determine the best course of action for fleet electrification. In partnership with Sawatch Labs, participating in FEAP allows fleet operators to assess individual vehicles - to determine if the vehicle owner's driving needs could be met with an electric vehicle (EV). Additionally, FEAP assesses charging site suitability and estimates the cost of infrastructure installation. Finally, FEAP helps advise on rate plans and pilot programs to lower costs. For more information visit [Xcel Energy's FEAP webpage](#).

To learn more about available residential and commercial EV programs, visit [Xcel Energy's website](#) or contact your community's account representative.

Appendix C: EV-Ready Code Amendment

The Plans, Codes, & Policies focus area aims to support the creation of plans, codes, and policies that support large-scale and equitable EV adoption throughout Boulder County communities. EV-ready codes prepare homes and buildings for the current transition to electric vehicles. Ensuring a home or business has adequate electrical capacity at the time of construction is most cost effective. Retrofitting a building later to support EV charging costs many times more than including this capability upfront. With most charging occurring at home, EV codes are crucially important for multifamily dwellings where residents may not own the property or have the ability to install charging infrastructure.

In 2022, a separate energy code cohort of communities within Boulder County and beyond⁵ collaborated with building department and sustainability staff on consistency and strengthening of energy codes, with support from expert consultants. Therefore, the Regional Transportation Electrification stakeholder group leveraged this separate but parallel energy code cohort for EV-readiness code recommendations and best practices. The primary objective of the energy code cohort work was to reduce energy use and climate emissions in the built environment through community collaboration and consistency on strengthening, updating, and adopting energy codes both now and in future code cycles, aiming for net-zero new construction by the mid-2030s. This project includes two parts:

- Collaboration on reviewing and adopting the 2021 International Energy Conservation Code (IECC), with supporting amendments.
- A plan for each community to reach 100% net-zero new construction by the mid-2030s.

During part one, the energy code cohort deliberated and came to consensus on a set of supporting amendments that will accompany communities' adoption of the 2021 International Energy Conservation Code (IECC) for both residential and commercial construction. These amendments included expanded solar-ready, EV-readiness, electric-preferred standard, and efficiency strengthening requirements. The cohort communities who have not already adopted the 2021 IECC are working towards adopting this consistent set of supporting amendments. Part 2 is set to begin after the finalization of this document.

The recommended amendment includes different levels of readiness and recognizes that different building types have different charging needs. Figure 15 describes these different levels and Table 8 specifies the requirements by building type and minimum requirements of the different levels of readiness.

⁵ There is some overlap between the community partners participating in the Regional Transportation Electrification stakeholder group and the communities collaborating in the energy code cohort.



Figure 15: EV Readiness Terminology

Building Type	Minimum EV installed Spaces	Minimum EV Ready Spaces	Minimum EV Capable Spaces
Single-family Duplex, Townhome	N/A	1 space	N/A
Group A, B, E, M	10%	5%	10%
Group F, I, R-3, R-4	2%	0%	5%
Group R-1, R-2	15%	5%	40%
Group S-2 parking garages	10%	5%	N/A

Table 8: EV Infrastructure Requirements

(In I-code terminology, Group A is Assembly, B is Business, E is Education, F is Factory & Industrial, I is Institutional, M is Mercantile, R-1 is transient residential, R-2 is apartments and other non-transient residential, R-3 and R-4 are small group homes including halfway houses, rehab centers, care facilities, etc., and S is Storage.)

Appendix D: Works Cited

- Atlas Public Policy. (2022). *EValueCO*.
- Boulder County. (2016). *Boulder County 2016 Greenhouse Gas Inventory*.
- Boulder County. (2020). *Boulder County Transportation Master Plan*. Retrieved from <https://assets.bouldercounty.org/wp-content/uploads/2020/02/transportation-master-plan-tmp-update-technical-document-final.pdf>
- Cambridge Systematics. (2022). *Draft Outcomes for the COlorado Energy Office Community Access Enterprise Ten Year Plan*. Retrieved from <https://drive.google.com/file/d/1m3eg12jkogYZnUidxfSi8hye5TQKfT0I/view>
- Center for Neighborhood Technology. (2017). Retrieved from Housing and Transportation (H+T) Affordability Index: <https://htaindex.cnt.org/map/>
- Colorado Department of Public Health and Environment. (2022). *Clean Fleet Enterprise Ten-Year Plan*.
- Colorado Energy Office. (2022). *Community Access Enterprise Ten-Year Plan*.
- DMV Data. (2020, October 25).
- Drive Change. Drive Electric. (2019). *Learn the Facts*. Retrieved August 8, 2019, from Drive Change. Drive Electric. Web site: <https://driveelectricus.com/learn-the-facts/>
- E Source. (2020). *Colorado Energy Office: Electric Vehicle Awareness Market Research*. Retrieved from <https://drive.google.com/file/d/15dmFXJ5RLT2U2Mc3b1Cfqu8xOTrCqAAi/view>
- Environmental Protection Agency. (2019, August 23). *Greenhouse Gas Inventory Data Explorer*. Retrieved from Greenhouse Gas Emissions: <https://cfpub.epa.gov/ghgdata/inventoryexplorer/>
- EPA. (2019, December 16). *EPA reclassifies Denver area to "Serious" nonattainment for ozone*. Retrieved from News Releases: <https://www.epa.gov/newsreleases/epa-reclassifies-denver-area-serious-nonattainment-ozone>
- EPA. (2020, April 30). *Carbon Monoxide (1971) Maintenance Areas (Redesignated from Nonattainment) by State/County/Area*. Retrieved from Green Book: https://www3.epa.gov/airquality/greenbook/anayo_co.html
- EPA. (2022). *EJScreen*. Retrieved from <https://ejscreen.epa.gov/mapper/>
- E-Source. (2020, June 30). *Colorado Energy Office: Electric Vehicle Awareness Market Research*. Retrieved from Education and Awareness Roadmap Final Deliverable: <https://drive.google.com/file/d/15dmFXJ5RLT2U2Mc3b1Cfqu8xOTrCqAAi/view>
- Institute for Transportation And Development Policy. (2019, May 23). *The High Cost of Transportation in the United States*. Retrieved from Institute for Transportation And Development Policy Web site: <https://www.itdp.org/2019/05/23/high-cost-transportation-united-states/>

- International Council on Clean Transportation. (2021, February). *Colorado charging infrastructure needs to reach electric vehicle goals*. Retrieved from <https://theicct.org/sites/default/files/publications/colorado-charging-infra-feb2021.pdf>
- IPCC. (2018). *Summary for Urban Policy: What the IPCC Special Report on Global Warming of 1.5C Means for Cities*. Intergovernmental Panel on Climate Change.
- MEAN. (2022). *MEAN's 2050 Carbon Neutral Vision*. Retrieved from <https://mean.nmppenergy.org/means-2050-carbon-neutral-vision>
- Office of Energy Efficiency & Renewable Energy. (2020). *Reducing Pollution with Electric Vehicles*. Retrieved from Electric Vehicles: <https://www.energy.gov/eere/electricvehicles/reducing-pollution-electric-vehicles>
- Office of Energy Efficiency and Renewable Energy. (2018, August 23). *Electric Vehicle Benefits*. Retrieved from Electric Vehicles: <https://www.energy.gov/eere/electricvehicles/electric-vehicle-benefits>
- Office of Energy Efficiency and Renewable Energy. (2019, September 27). *Alternative Fuels Data Center*. Retrieved from United States Department of Energy Web site: <https://afdc.energy.gov/fuels/prices.html>
- Office of Energy Efficiency and Renewable Energy. (2019, August 23). *Saving on Fuel and Vehicle Costs*. Retrieved from Electric Vehicles: <https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs>
- Pan, S., Roy, A., Choi, Y., Eslami, E., Thomas, S., Jiang, X., & Gao, O. (2019, June 15). Potential impacts of electric vehicles on air quality and health endpoints in the Greater Houston Area in 2040. *Atmospheric Environment*, 207, 38-51. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1352231019301840?via%3Dihub>
- Platte River Power Authority. (2022). *Our Energy Future*. Retrieved from Platte River Power Authority: <https://www.prpa.org/2030-goal/>
- Poudre Valley REA. (2022). Retrieved from <https://www.pvrea.coop/80by30>
- Public Service Company of Colorado. (2021). *Transportation Electrification Plan 2021-2023*. Retrieved from https://www.xcelenergy.com/staticfiles/xeresponsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/20A-0204E-_2021-2023_TEP_Updated.pdf
- State Demography Office. (2021). *Colorado Demographic Profiles*. Retrieved from <https://gis.dola.colorado.gov/apps/ProfileDashboard2/>
- SWEEP. (2022). *Master List: EV Building Codes*. Retrieved from https://docs.google.com/spreadsheets/d/17MXkN7IUkYkBPbaNgXPIrUzZ_C7bh7w5pzlvs-LoBOY/edit#gid=391516650
- U.S. Census Bureau. (2019). *U.S. Census Bureau*. Retrieved from OnTheMap: <https://onthemap.ces.census.gov/>
- UNFCCC. (2019). *What is the Paris Agreement?* Retrieved from United Nations Framework Convention on Climate Change Web site: <https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement>
- Union of Concerned Scientists. (2015). *Cleaner Cars from Cradle to Grave, How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions*.

United Power. (2022). *Our Cooperative Roadmap*.

US Census Bureau. (2020, April 22). *Tenure by Units in Structure*. Retrieved from 2018: ACS 1-year Estimates Detailed Tables:

https://data.census.gov/cedsci/table?q=B25032%3A%20TENURE%20BY%20UNITS%20IN%20STRUCTURE&g=1600000US0883835&tid=ACSDT1Y2018.B25032&hidePreview=false&vintage=2017&layer=VT_2018_160_00_PY_D1&cid=DP05_0001E&t=Units%20and%20Stories%20in%20Structure%3AOwner%2FR

US Census Bureau. (2021). *Quick Facts: Boulder County, Colorado*.

US DOE. (2019, September 20). *Charging at Home*. Retrieved from US Office of Energy Efficiency & Renewable Energy Web site: <https://www.energy.gov/eere/electricvehicles/charging-home>

Winn, R. (2019). *Electric Vehicle Charging at Work*. Retrieved from https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/EV_Charging_at_Work.pdf

Xcel Energy. (2019). *Carbon Free 2050*. Retrieved from Xcel Energy Web site: https://www.xcelenergy.com/carbon_free_2050

Xcel Energy. (2021). *Power Generation*.