



An Electric Vehicle Action Plan for Englewood

April 2023



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An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

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

The content of this plan is derived from a series of planning workshops hosted by Xcel Energy's Partners in Energy. Xcel Energy is the main electric and gas utility serving the City of Englewood. Partners in Energy is a two-year collaboration to develop and implement a community's energy goals. In 2019, Partners in Energy launched an EV-specific planning process to help communities develop plans to meet their EV goals. For more information about the planning process, see Appendix A: Planning Process.

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City of Englewood Electric Vehicle Action Plan



About this Plan

Over the course of six months in 2022 and 2023, City of Englewood staff brought together key stakeholders, Xcel Energy, and community residents to develop this Electric Vehicle (EV) Action Plan as a roadmap for increasing the use of EVs in the Englewood community. The plan contains four focus areas (fleets, public charging, public adoption, and policy), a set of measurable goals, and strategies to achieve each goal. This work is in support of Englewood’s existing sustainability goals, as well as regional and state EV efforts intended to reduce greenhouse gas emissions, reduce transportation costs, and improve air quality.

EV Vision and Goals

Vision

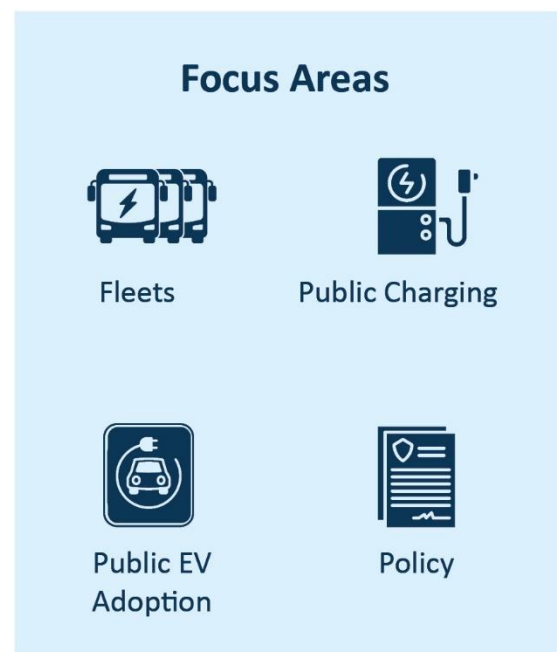
The City of Englewood supports its sustainability goals through electric vehicle adoption that is accessible, inclusive, sustainable, cost-effective, and innovative.

Goals

- 20% of light-duty vehicles in Englewood zip codes are electric by 2030
- 5 City facilities have public charging stations by the end of 2024
- 20% of City light-duty fleet vehicles are electric by 2030
- 100% of multifamily properties with 30 units or more have public charging within a quarter mile by 2030





2022 EV Baseline

- 10 public EV charging ports in Englewood
- About 2% of light-duty vehicles in Englewood’s zip codes are electric



Roadmap for Achieving this Vision & Goal

To achieve this vision, the City of Englewood EV Action Plan is divided into four focus areas with strategies for implementation in each area.

FOCUS AREAS	SUMMARY	STRATEGIES
 <p>Fleets</p>	<ul style="list-style-type: none"> Leading by example by electrifying the City fleet and supporting fleet electrification for local businesses and organizations 	<ul style="list-style-type: none"> 1-1: Develop a City Fleet Vehicle Replacement Plan 1-2: Adopt a City Fleet Electric-First Vehicle Procurement Policy 1-3: Explore the Feasibility of Electrifying the Englewood Trolley
 <p>Public Charging</p>	<ul style="list-style-type: none"> Supporting installation of public charging at strategic and equitable locations 	<ul style="list-style-type: none"> 2-1: Map Ideal Public Charging Station Locations 2-2: Install Public Charging Stations at City Facilities 2-3: Encourage Local Businesses to Install Public Charging Stations 2-4: Work with Large Employers to Install Public Charging Stations
 <p>Public EV Adoption</p>	<ul style="list-style-type: none"> Conducting outreach to those who live, work, and visit Englewood, with an emphasis on equitable access 	<ul style="list-style-type: none"> 3-1: Increase EV Awareness and Share Resources with Those Who Live, Work, and Visit Englewood 3-2: Explore Electric Micromobility Options 3-3: Encourage Multifamily Properties to Install Charging Stations
 <p>Policy</p>	<ul style="list-style-type: none"> Integrating proactive EV policy into regional plans, transportation plans, and codes as appropriate 	<ul style="list-style-type: none"> 4-1: Participate in the Arapahoe County Regional EV Planning Process 4-2: Adopt EV-Ready Codes 4-3: Establish Design Guidelines for Public Charging Stations

INTRODUCTION



In the past six years, the City of Englewood (the City) has taken a series of steps toward planning for its electric vehicle (EV) future. Its 2017 Energy Action Plan established a foundation for communitywide, energy-related sustainability efforts. More recently, the City's 2022-2025 Sustainability Plan provides a broad set of goals that includes reducing greenhouse gas emissions and improving air quality through clean transportation, which led to the creation of this EV Action Plan.

The City is also partnering with the Englewood Downtown Development Authority (EDDA) to increase micromobility and explore EV charging within the district. Leading by example, the City is participating in Xcel Energy's Fleet Electrification Advisory Program to determine which of the City's 74 light-duty fleet vehicles are good candidates to be replaced with EVs.

What Is an EV Action Plan?

This EV Action Plan is a roadmap to guide Englewood toward achieving its desired EV future. With its Energy Action Plan and this EV Action Plan, the City of Englewood is part of a network of more than 35 Colorado communities that have developed and implemented EV and Energy Action Plans through Xcel Energy's Partners in Energy offering.

The EV goals and strategies outlined in this plan were developed collaboratively over an 8-month timeframe with an EV Planning Team (see Acknowledgements) through a series of project management meetings, interviews with key stakeholders, and three planning workshops with broad community representation (see Appendix A: Planning Process for details). Partners in Energy also supports 18 months of plan implementation in the form of marketing and communications, data tracking and analysis, mapping,

program expertise, and project management. Implementation of this plan will begin immediately after the plan is finalized.

The components of Englewood's EV Plan are detailed below:

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

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

Where We Go From Here Describes Englewood's EV vision and goals.

Where We Go From Here Identifies focus areas and strategies to achieve the defined vision and goals, along with targets that quantify success in each focus area.

How We Stay On Course Outlines how Englewood will track progress toward targets, goals, and vision, and how it will adapt to a changing landscape during implementation.

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

Why an EV Action Plan?

The City of Englewood created this plan to support its Sustainability Plan goals, which include reducing greenhouse gas emissions and improving air quality, as well as increasing equitable access to resources and reducing operating costs. The following sections provide a deeper look at how these benefits can be achieved through EV adoption.

Greenhouse Gas Emissions

The City recently completed a greenhouse gas emissions inventory that identified transportation as the second largest contributor to emissions in 2021 (City of Englewood). This aligns with a 2018 Intergovernmental Panel on Climate Change (IPCC) report, which 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). Currently, 39 percent of Xcel Energy's energy mix is carbon-free - with a goal of enabling all vehicles to run on 100% carbon-free electricity by 2050. As the fuel mix for electricity continues to decarbonize, EVs will provide a clear pathway to reducing greenhouse gas emissions in Englewood.

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 nitrogen oxide (NOx) and volatile organic compounds

(VOCs) contribute to ground-level ozone, which in addition to PM and carbon monoxide (CO), are harmful to respiratory health. Arapahoe County has been considered a non-attainment zone for 8-hour Ozone since 2018, and five Higher Emissions Communities census block groups exist within Englewood. [Higher Emissions Communities](#) are defined as those with environmental burdens linked to transportation and with a presence of disproportionately impacted communities. EVs produce fewer tailpipe pollutants as compared to their gas- and diesel-powered counterparts, providing immediate air quality benefits, even for those who don't drive an EV (Office of Energy Efficiency & Renewable Energy, 2020).

Lower Fuel & Maintenance Costs

While cost savings vary based on vehicle type, driving patterns, and geographic region, the average driver spends about half as much money in fuel and maintenance costs by driving an EV compared to a traditional gas- or diesel-powered vehicle (Office of Energy Efficiency and Renewable Energy, 2019). The average US household spends about 13% of its 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). With a median household income in Englewood of 12% less than the state median, along with recent economic pressures, a transition to vehicles with lower relative operating costs could be especially valued (US Census Bureau, 2022). Lower operating costs are also a significant motivating factor for electrifying public fleets.



Photo Courtesy of Southeast Motors

WHERE WE ARE NOW



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

Geography

Englewood is a 6.6 square mile, home rule, suburban municipality located on the west end of Arapahoe County, Colorado. It is part of the Denver–Aurora–Lakewood Metropolitan Statistical Area and the Front Range Urban Corridor. Being surrounded by other communities, a regional approach to EV planning is critical. Transportation options are varied and include light rail, bus lines, a free local trolley, and bike trails and lanes.

Population

Englewood is home to more than 33,000 residents in over 15,000 households. The median household income is \$66,399, which is lower than the state median of \$75,231; just over 12% of residents live below the poverty level. Lower median household incomes mean that until the used EV market develops, the upfront cost of a new EV may be a barrier to adoption. It will be important to promote electric micromobility options, EV leasing options, financial incentives, and the lower fuel and maintenance costs of EVs when engaging the community on EV adoption. Because more than 8% of Englewood residents speak a language other than English, outreach materials may need to be translated to reach all community members. Englewood has a significant population of younger residents - 22% of residents are between 25-34 (US Census Bureau, 2022). Communication messages and channels should resonate with younger individuals and families.

EV Adoption and Infrastructure

EV adoption is escalating nationwide, as shown by monthly sales of battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in the US (Figure 1).

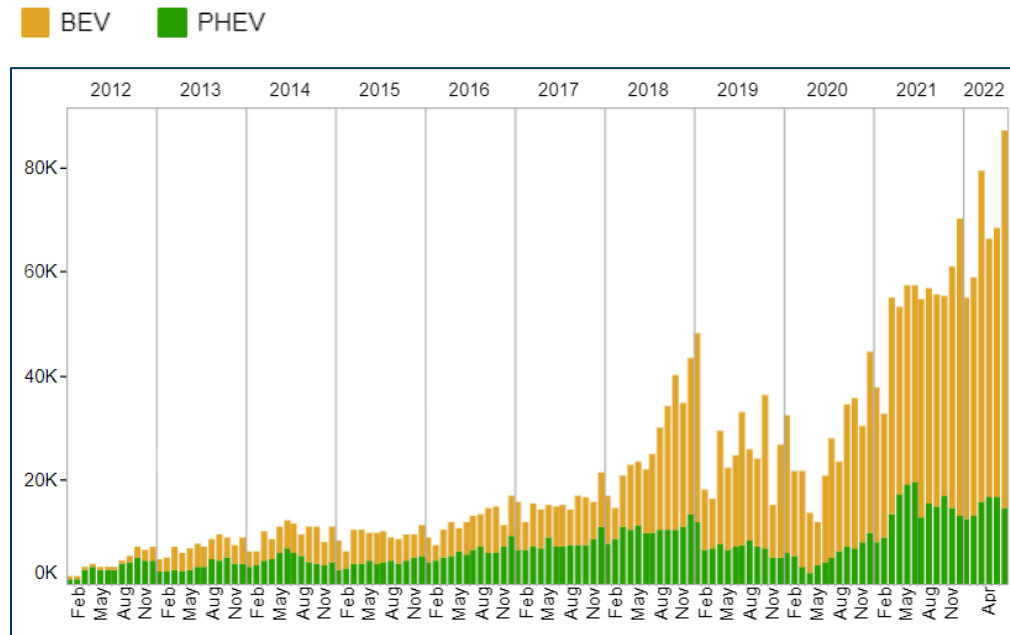


Figure 1: Monthly EV Sales in the United States, (Alliance for Automotive Innovation, 2022)

EV sales are also escalating rapidly in Colorado, making up 10.5% of all new car sales in the state in 2022, compared to 6.5% in 2021 (Colorado Sun, 2023). In total, EVs make up 1.5% of Colorado's total light-duty market share. By comparison, EVs make up 0.7% of market share in Englewood's zip code 80110 and 2.7% of market share in Englewood's 80113 zip code (Atlas Public Policy, 2022). This disparity between the two areas of Englewood highlights the importance of equity when implementing this plan.

EV adoption is a function of many factors, and availability of public charging infrastructure is one of those factors. Public charging stations in Englewood are shown in Figure 2. As of this writing, there are six Level 2 ports in three locations throughout the city (orange) and four Level 3 (DC fast charging) ports in one location in the city (blue).

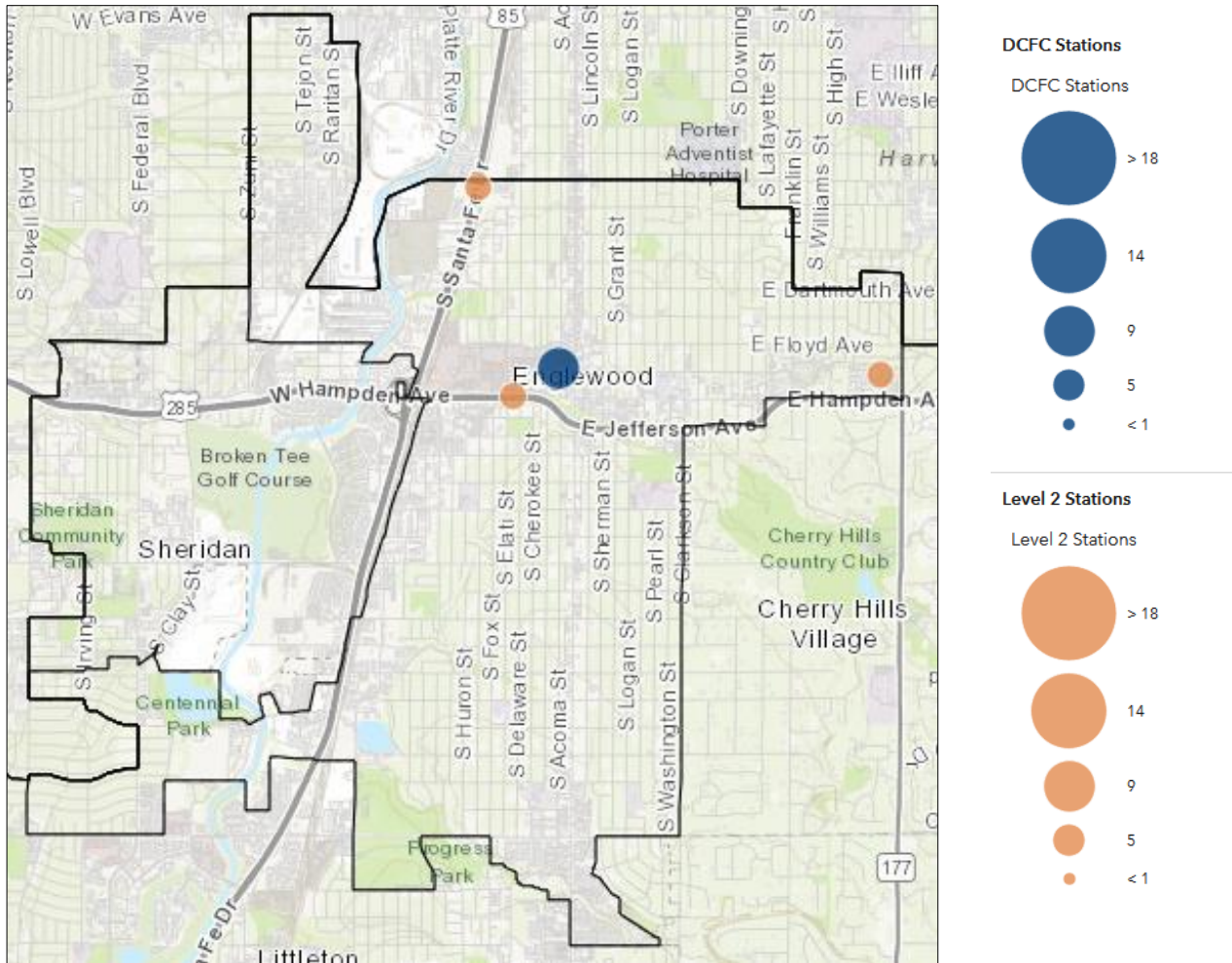


Figure 2: Public Charging Station Locations in Englewood (US Department of Energy, 2023)

Housing Characteristics

Two major housing factors influence a resident's ability to convert their personal vehicle to an EV: home ownership and housing type. Homeowners are more able to install EV charging because they do not need to seek permission of the property owner to do so, and they are the direct recipient of any resulting increase in property value.

Alternatively, renters 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. Single-family residences are more likely to have a personal garage or carport where a charging station could be installed. Other housing types, like multifamily buildings, are more likely to rely on street parking or shared parking facilities. In Englewood, 48% of homes are owner-occupied, and 54% of homes are single-family detached, which are both lower than the State averages (US Census Bureau, 2020). Another key factor influencing EV adoption is vehicle ownership. Households with two or more vehicles may be more willing to electrify at least one vehicle. Many households

in Englewood (40%) have 1 vehicle, followed by 32% with 2 vehicles, 19% with 3 or more vehicles, and 9% with no vehicles (US Census Bureau, 2022). EV outreach should be targeted toward single-family homeowners with multiple vehicles or should be attentive to the challenges faced by renters, residents who do not live in single-family homes, and those with one or fewer vehicles.

Commuting Characteristics

Of Englewood residents, 73% drive alone to work, 9% carpool, 4% use public transportation, 2% walk, 1% bike, 8% work from home, and 2% get to work through other means. The mean travel time to work is about 25 minutes (US Census Bureau, 2022). EVs may be an attractive option to the high percentage of residents who drive to work, especially because all EVs currently on the market can easily accommodate this commute time (several models have ranges close to 400 miles). Those who use public transportation or bike to work may be interested in mobility solutions such as electric bikes and scooters for their full commutes or for the first or last leg of their commutes.

Transportation and Housing Costs

Housing and transportation costs make up 37% of the median household income for Englewood residents. Transportation alone accounts for 16% of income (Center for Neighborhood Technology, 2022). The cost savings associated with driving an EV is a significant opportunity to reduce transportation costs for Englewood residents (see Appendix B: Electric Vehicles 101).

Related Planning Efforts

Englewood Energy Action Plan

The City's [Energy Action Plan](#) was completed in 2017 and focused on implementing energy efficiency upgrades in municipal facilities, promoting lighting efficiency in the city's medical sector, developing a sustainable business program, and raising awareness of Xcel Energy and other energy programs for community residents. Most recently, the City worked with Partners in Energy to promote energy efficiency opportunities to multifamily properties. Lessons learned from these efforts will be used to support successful implementation of this EV Action Plan.

Englewood Sustainability Plan

The City's [2022-2025 Sustainability Plan](#) provides a broad, updated set of goals and actions to reduce greenhouse gas (GHG) emissions and overall environmental impact. The Sustainability Plan includes the following goals supported by this plan:

- Improve public health outcomes through better air quality.
- Infrastructure designed and maintained in an economic, equitable, and ecological manner.
- Increased access to multimodal transportation options, and ensuring most needs are met within a travel distance of 15 minutes.

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. 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-duty vehicles.

In addition to the plans described above, the City is participating in the Arapahoe County regional EV planning process currently underway through Partners in Energy. By participating, Englewood can share its own EV planning experience with other communities and find ways to align with and support regional EV efforts.

WHERE WE GO FROM HERE



Vision Statement

The EV Planning Team developed the following vision statement to guide the planning process as a reflection of what Englewood’s EV future should look like.

The City of Englewood supports its sustainability goals through electric vehicle adoption that is accessible, inclusive, sustainable, cost-effective, and innovative.

Goals

Working together, the team set goals to measure plan success:

- 20% of light-duty vehicles in Englewood zip codes are electric by 2030.
- 5 City facilities have public charging stations by the end of 2024.
- 20% of City light-duty fleet vehicles are electric by 2030.
- 100% of multifamily properties with 30 units or more have public charging within a quarter mile by 2030.

Figure 3 illustrates this last goal, prioritizing public charging access near multifamily residents who often do not have home charging options.

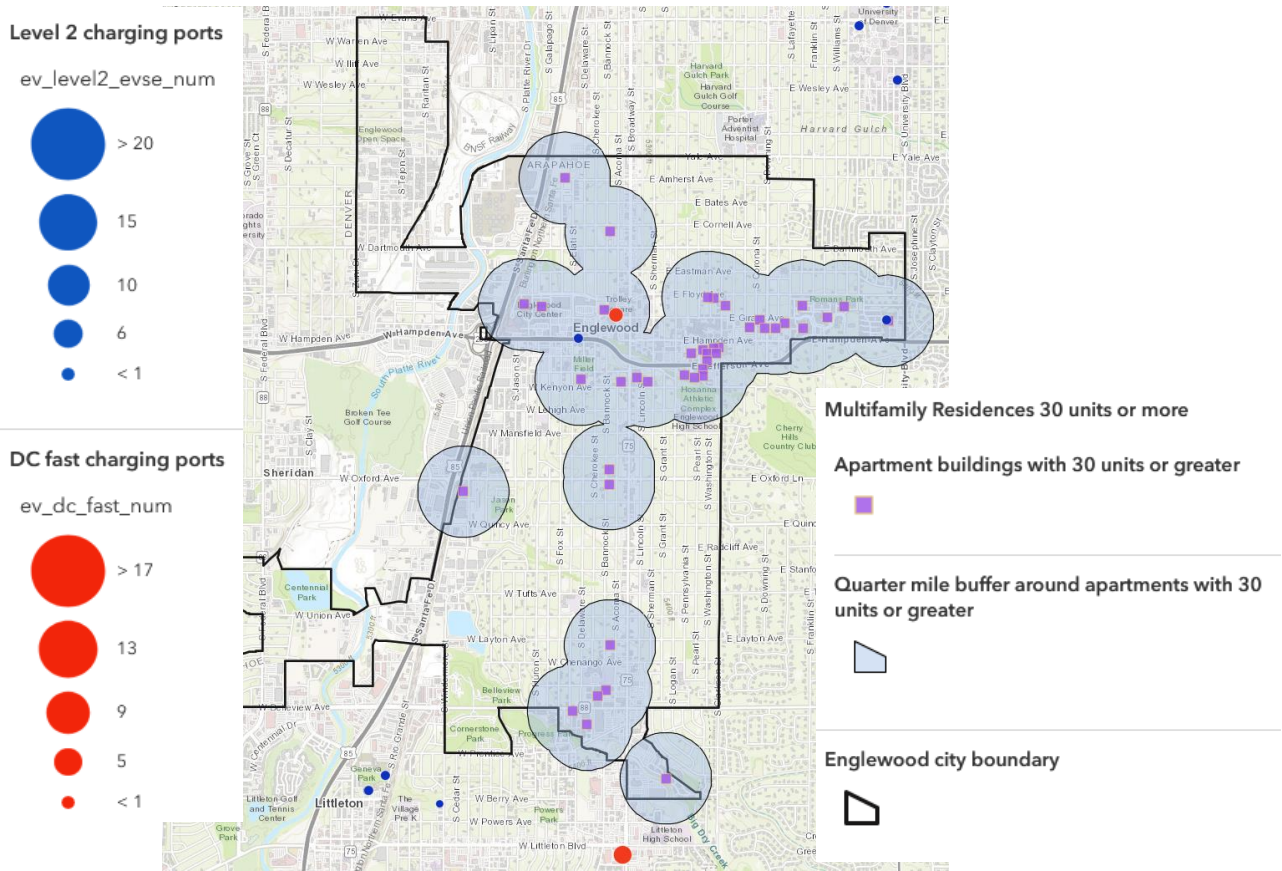


Figure 3: Public Charging Near Multifamily Properties Goal Illustration

Focus Areas

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



Focus Area 1. Fleets: Leading by example by electrifying the City fleet and supporting fleet electrification for local businesses and organizations.



Focus Area 2. Public Charging: Supporting installation of public charging at strategic and equitable locations.



Focus Area 3. Public EV Adoption: Conducting outreach to those who live, work, and visit Englewood, with an emphasis on equitable access.



Focus Area 4. Policy: Integrating proactive EV policy into regional plans, transportation plans, and codes as appropriate.

These focus areas were chosen to provide a more specific and comprehensive definition to how the City will advance EV adoption throughout the community.

HOW WE GET THERE



For each focus area, the EV Planning Team identified strategies to outline how Englewood will reach its EV goals and targets to help evaluate success for each strategy. Collectively, the focus areas provide a work plan of actionable steps to achieve Englewood’s EV vision (Figure 4).

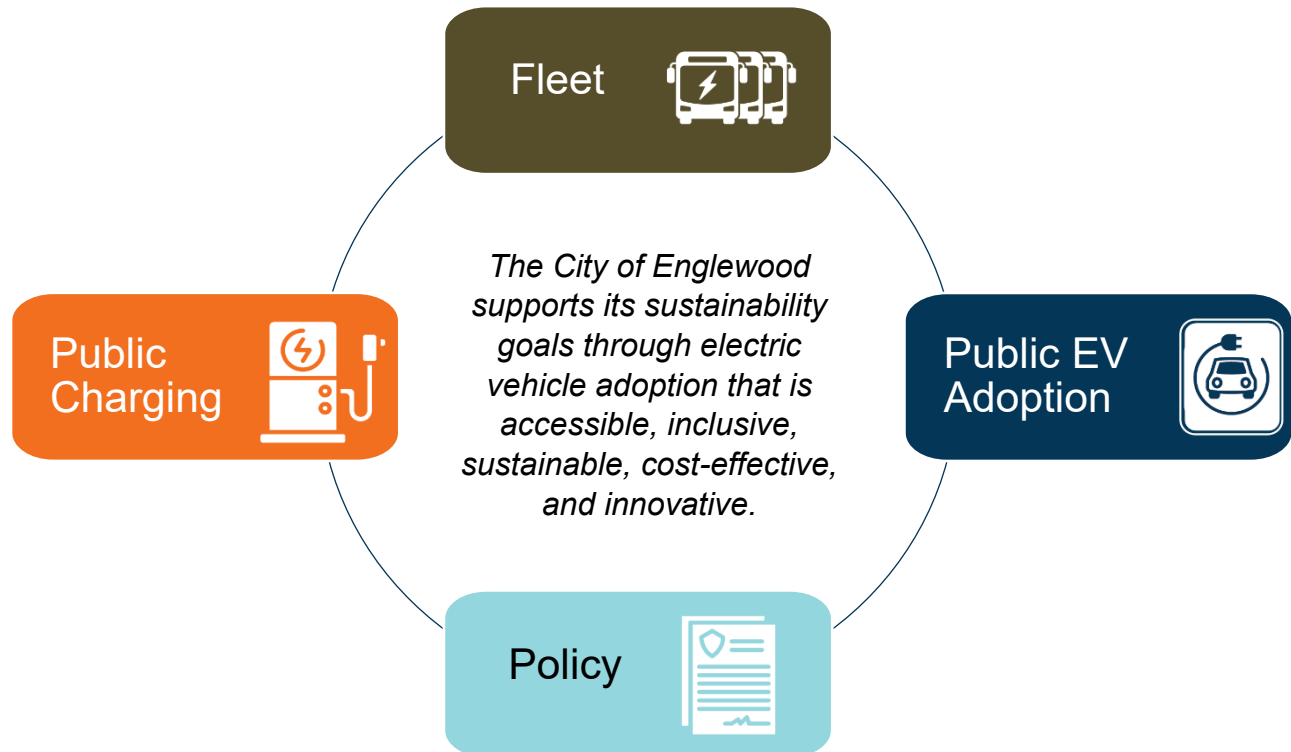


Figure 4: EV Vision and Focus Areas



Focus Area 1: Fleet

Fleet electrification increases EV visibility within the community and provides reductions in operational costs and GHG emissions. While the technology is still in progress for several types of special use and heavy-duty vehicles, many options for light-duty vehicles are currently available. In particular, fleet vehicles that take short trips and return to a designated parking location are ideal EV candidates, due to the predictability of use for battery range planning and charging infrastructure siting.

Initiatives from federal and state governments and Xcel Energy, as well as commitments from auto manufacturers to stop manufacturing gas-powered vehicles, indicate that fleet managers should immediately begin planning for fleet electrification. For many organizations, this means restructuring procurement, budgeting, capital project planning, and operations. Many purchasing policies consider upfront cost and operational costs separately. Some purchasing policies do not consider operational costs at all. Looking at upfront and operational costs over the life of an electric vehicle is the best way to show the true financial value of electrification.

Related Goals

- 20% of City light-duty fleet vehicles are electric by 2030.
- 5 City facilities have public charging stations by the end of 2024.

Strategies

The following strategies for this focus area demonstrate the City's commitment to leading by example through electrifying its own fleet so it can realize the benefits of electrification. Implementation details for each strategy are found in the following sections.

- Strategy 1-1: Develop a City Fleet Vehicle Replacement Plan
- Strategy 1-2: Adopt a City Fleet Electric-First Vehicle Procurement Policy
- Strategy 1-3: Explore the Feasibility of Electrifying the Englewood Trolley

Leading by Example

The City of Englewood has already begun exploring opportunities to electrify its fleet, consisting of more than 300 vehicles and pieces of equipment. In 2022, the City participated in Xcel Energy's [Fleet Electrification Advisory Program](#) (FEAP) to evaluate 70 vehicles for electric replacements, to identify ideal models to replace selected vehicles, and to identify ideal charging sites to support electrification.

Strategy 1-1: Develop a City Fleet Vehicle Replacement Plan

Using the results from the FEAP assessment, develop a plan to replace existing City fleet vehicles with electric options¹.

Audience

- City Fleet

Target

- Develop a vehicle replacement plan by the end of 2024

Available Resources

- Xcel Energy FEAP and EV Supply Infrastructure (EVS) program
- Colorado Energy Office (CEO) Charge Ahead Colorado grants
- Climate Mayors' EV Purchasing Collaborative discounts
- *(Anticipated)* Colorado Department of Public Health and Environment (CDPHE) Clean Fleet Enterprise
- *(Anticipated)* Infrastructure Investment and Jobs Act (IIJA) competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **Chris Edelstein, Public Works:** Lead participation in FEAP and plan development.
- **Partners in Energy:** Support coordination with Xcel Energy EV Team.

Timeline

- **Q2-Q4 2023:**
 - Develop a vehicle replacement plan for the 24 vehicles that were identified as suitable for electrification through FEAP, including:
 - Current vehicle type and age
 - Recommended replacement models
 - Replacement timelines (typically ~8-10 years)
 - Budget request timelines
 - Available financial incentives
 - Identify infrastructure needs associated with fleet electrification and incorporate into capital project planning and budgeting.
- **Q1-Q4 2024:**
 - Participate in FEAP with all fleet vehicles and incorporate results into plan.
- **Ongoing:**
 - Purchase EVs and install needed charging infrastructure.

¹ This plan would not include Police Department vehicles. At the time of the writing of this plan, these were determined unsuitable for EV replacements because they are not parked long enough between uses to suitably charge.

Strategy 1-2: Adopt a City Fleet Electric-First Vehicle Procurement Policy

Develop and adopt an internal City policy that requires staff to choose an EV for fleet vehicle replacements or new additions whenever the vehicle is readily available, meets the needs, and where the incremental costs associated with total cost of ownership is cost-effective.

Audience

- City Council
- City Fleet

Target

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

Available Resources

- Example Electric-First Procurement Policies from other communities
- Xcel Energy FEAP and EVSI program
- CEO Charge Ahead Colorado grants
- Climate Mayor's EV Purchasing Collaborative discounts
- *(Anticipated)* CDPHE Clean Fleet Enterprise
- *(Anticipated)* IIJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **Chris Edelstein, Public Works:** Lead policy development and adoption.
- **Partners in Energy:** Provide policy language examples.

Timeline

- **Q3 2023-Q4 2024**
 - Research policy language from other organizations.
 - Draft policy language.
 - Present policy to City Council for approval.
- **Ongoing:**
 - Implement the policy
 - Collect feedback from staff and revise as needed.

Strategy 1-3: Explore the Feasibility of Electrifying the Englewood Trolley

Coordinate with the Arapahoe County Transportation Improvement Plan - exploring micromobility and transit options to include investigating technology options, cost implications, and funding resources for replacing the Englewood Trolley with an electric model to provide a cost-effective, zero-emission shuttle service that improves local air quality and saves on fuel costs.

Audience

- City Council
- RTD

Target

- Develop a feasibility study by the end of 2024

Available Resources

- Xcel Energy EVSI program
- *(Anticipated)* Infrastructure Investment and Jobs Act (IIJA) grants for buses and bus facilities
- *(Anticipated)* Colorado Department of Transportation (CDOT) Clean Transit Enterprise

Roles and Responsibilities

- **Partners in Energy:** Lead research efforts.
- **John Voboril, Community Development:** Lead coordination with Transportation Improvement Plan efforts.
- **Nancy Fenton, Community Development:** Lead coordination with RTD and procurement efforts, as appropriate.

Timeline

- **Q4 2023-Q4 2024**
 - Research examples of trolley electrification (e.g., Estes Park).
 - Research funding opportunities.
 - Procure estimates for an electric trolley, as appropriate.
 - Estimate infrastructure needs and associated costs in coordination with Xcel Energy, as appropriate.
 - Develop a feasibility report with recommendations for next steps, based on findings, as appropriate.
 - Present findings to City Council.



Focus Area 2: Public Charging

Most charging can be done at home or work, where vehicles are typically parked for a longer period of time and a consistent charging schedule can be established. Home and workplace charging can be less complex to install, especially if Level 1 charging is used, requiring no infrastructure upgrades. However, public charging plays a critical role in completing the charging infrastructure pyramid (Figure 5).

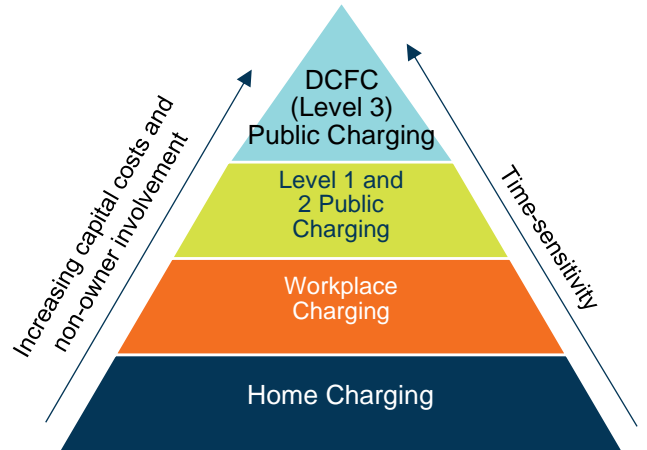


Figure 5: EV Charging Infrastructure Pyramid

Public charging is a visible indicator of a community's commitment to EVs, assuring residents and visitors that they will be able to recharge their vehicle when needed. Public charging also provides a charging option for those who are not able to charge at home or work. Those who live in multifamily properties, rental homes, or older homes without garages may not have access to charging at home because they may not have decision making power to install a charging station or they may face existing infrastructure limitations. When identifying where to place public charging, areas with these types of housing characteristics are often a good place to start.

Leading by Example

The City of Englewood has already identified the following five facilities suitable for installation of public charging: Centennial Park, Pirate's Cove/Belleview Park, Broken Tee Golf Course, Englewood Recreation Center, and Malley Recreation Center.

Related Goals

- 100% of multifamily properties with 30 units or more have public charging within a quarter mile by 2030.
- 5 City facilities have public charging stations by the end of 2024.
- 20% of light-duty vehicles in Englewood zip codes are electric by 2030.

Strategies

The following strategies provide a phased approach for building Englewood's charging network - to ensure that stations are accessible and well-utilized, and to ensure that property owners are connected to funding resources for public charging stations. Implementation details for each strategy are found in the following sections.

- Strategy 2-1: Map Ideal Public Charging Station Locations
- Strategy 2-2: Install Public Charging Stations at City Facilities
- Strategy 2-3: Encourage Local Businesses to Install Public Charging Stations
- Strategy 2-4: Work with Large Employers to Install Public Charging Stations

Strategy 2-1: Map Ideal Public Charging Station Locations

Review community demographics, travel patterns, attractions, equity factors, and existing charging stations to identify locations where public charging would be most used and most critical for driving adoption equitably throughout the city. The produced map can be used to support Strategies 2-2 and 2-3.

Audience

- EV Action Team
- Potential EV charging station site hosts

Target

- Identify 5 potential charging sites by the end of 2023

Available Resources

- US Department of Energy (DOE) Alternative Fuels Data Center (AFDC) dataset of existing charging stations
- CDOT National EV Infrastructure planning resource map demonstrating upgrades needed at existing DCFC station locations
- CDOT National EV Infrastructure DC fast charging station corridor map
- CEO map of eligible locations for enhanced incentives through Charge Ahead Colorado
- Xcel Energy Higher Emissions Communities (HEC) map

Roles and Responsibilities

- **Partners in Energy:** Lead map development.
- **Mel Englund, Sustainability and Chris Edelstein, Public Works:** Inform site criteria and identification of potential sites.
- **Greater Englewood Chamber of Commerce and Englewood Downtown Development Authority:** Support identification of potential sites.

Timeline

- **Q2-Q3 2023**
 - Develop site selection criteria (e.g., HEC areas, public properties, multifamily buildings).
 - Using criteria, identify data points and features to be included in map.
 - Develop map.
- **Q4 2023**
 - Use map to identify ideal charging station locations.
 - Develop a list of potential property owners for outreach purposes.

Strategy 2-2: Install Public Charging Stations at City Facilities

Evaluate City-owned facilities to understand which are suitable for public charging based on current and potential facility use and infrastructure; install charging stations accordingly.

Audience

- City facility users (e.g., public, City employees)

Target

- Install public charging stations at 5 City facilities by the end of 2023

Available Resources

- Xcel Energy EVSI program
- Xcel Energy HEC rebates
- CEO Charge Ahead Colorado grants
- *(Anticipated)* CEO Community Access Enterprise
- *(Anticipated)* IJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **Chris Edelstein, Public Works:** Lead installation of charging stations, development of operating plan, and exploration of additional sites.
- **Mel Englund, Sustainability:** Lead outreach to facility users.
- **Partners in Energy:** Support coordination with Xcel Energy EV Team, identification of additional sites using map developed in Strategy 2-1, and development of outreach materials for facility users.

Timeline

- **Q2-Q4 2023**
 - Continue with plan to install charging stations at Centennial Park, Pirate's Cove/Belleview Park, Broken Tee Golf Course, Englewood Recreation Center, and Malley Recreation Center.
 - Develop a plan for operating stations (e.g., ownership model, fees for charging, maintenance).
 - Provide outreach to facility users about using the charging stations.
- **Q4 2024**
 - Explore potential additional locations to determine feasibility, informed by experience from existing charging stations.
 - For any identified feasible locations, work with Xcel Energy to conduct site assessments at City facilities that have not been evaluated yet.
 - Estimate cost of installing charging stations, along with total cost of operating charging stations.
 - Based on assessments, develop a timeline for installing charging stations at suitable facilities.

Strategy 2-3: Encourage Local Businesses to Install Public Charging Stations

Share information on the benefits of installing EV charging stations, along with financial and technical resources to support businesses that are interested in installing EV charging stations on their property or in a business corridor.

Audience

- Englewood businesses

Target

- Engage with 15 businesses by the end of 2023

Available Resources

- Xcel Energy EVSI program and HEC rebates
- CEO Charge Ahead Colorado grants
- Federal EV charging tax credits
- *(Anticipated)* CEO Community Access Enterprise
- *(Anticipated)* IJJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **Drive Clean Colorado:** Co-lead development and implementation of outreach plan.
- **Mel Englund, Sustainability:** Co-lead development and implementation of outreach plan.
- **Angela Forster, Greater Englewood Chamber of Commerce:** Support development and implementation of outreach plan.
- **Partners in Energy:** Support development and implementation of outreach plan.

Timeline

- **Q2 2023**
 - Use map developed in Strategy 2-1, along with local knowledge of businesses and business models, to identify potential businesses that would be ideal for EV charging stations.
 - Develop an outreach plan that includes information on available financial and technical assistance resources. As part of the plan:
 - Illustrate business case for installing EV charging stations.
 - Develop peer exchanges for businesses (i.e., Idea Lab 101).
- **Q3 2023-Q1 2024**
 - Implement outreach plan.
 - Connect interested businesses with Xcel Energy EV Advisors to explore available programs, conduct site assessments, and provide support for next steps.
- **Q2 2024**
 - Celebrate businesses that choose to install public EV charging stations.

Strategy 2-4: Work with Large Employers to Install Public Charging Stations

Connect large employers (50+ employees) who own their buildings – including Craig Hospital, Swedish Medical Center, and Englewood Public Schools – with technical and financial assistance resources to support installation of public charging stations.

Audience

- Englewood large employers

Target

- Engage with 5 large employers by the end of Q1 2024

Available Resources

- Xcel Energy EVSI program
- Xcel Energy HEC rebates
- CEO Charge Ahead Colorado grants
- Federal EV charging tax credits
- *(Anticipated)* CEO Community Access Enterprise
- *(Anticipated)* IIJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **John Voboril, Community Development:** Lead inventory of large employers.
- **Mel Englund, Sustainability:** Lead outreach to large employers.
- **Partners in Energy:** Support outreach to large employers.

Timeline

- **Q2 2023**
 - Inventory large employers and prioritize which should be the focus of initial outreach efforts.
 - Incorporate prioritized employers into outreach plan in Strategy 2-1.
- **Q3 2023-Q1 2024**
 - Conduct direct outreach to prioritized employers, to encourage public charging installation projects, focusing on those eligible for federal, state, and utility funding resources.
 - Connect interested employers with Xcel Energy EV Advisors - to explore available programs, conduct site assessments, and provide support for next steps.
- **Q2 2024**
 - Celebrate large employers that choose to install public EV charging stations.



Focus Area 3: Public EV Adoption

Communitywide adoption of EVs provides Englewood the opportunity to improve air quality, reduce GHG emissions, and save on transportation costs.

Because more than 70% of Englewood residents drive alone to work, encouraging individuals to choose an EV for their next vehicle is a key strategy to reaching this plan's goals (US Census Bureau, 2022). For those who use other forms of transportation, there are opportunities to achieve EV benefits by electrifying buses, carshare programs, and micromobility options.

Despite progress made toward electrifying vehicles across Colorado, many barriers to EV adoption still exist. The largest barriers include misconceptions about EVs and the cost of purchasing an EV. In a 2020 Colorado study, 66% of respondents who drive EVs indicated they have a fear of running out of EV charge before reaching their destinations, even though the typical daily community of most (80%) is 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 price of most available EVs. While the price of EVs relies on factors beyond the reach of local communities, such as supply chain issues, Englewood can work with Xcel Energy and state agencies to develop and promote the benefits of EVs and programs that bring down the upfront cost, promote the used EV market, and advance affordable shared e-mobility options.

Leading by Example

The City of Englewood became a member of Drive Clean Colorado, a nonprofit organization dedicated to improving air quality through clean transportation. Drive Clean Colorado provides education, outreach, and advisory services to help community members transition to EVs and other efficient mobility choices.

Related Goal

20% of light-duty vehicles in Englewood zip codes are electric by 2030.

Strategies

The following strategies are intended to overcome barriers to public adoption, including ensuring that community members are well aware of existing resources and have options to choose an EV no matter their housing and commuting characteristics. Implementation details for each strategy are found in the following sections.

- Strategy 3-1: Increase EV Awareness and Share Resources with Those Who Live, Work, and Visit Englewood
- Strategy 3-2: Explore Electric Micromobility Options
- Strategy 3-3: Encourage Multifamily Properties to Install Charging Stations

Strategy 3-1: Increase EV Awareness and Share Resources with Those Who Live, Work, and Visit Englewood

Launch an educational campaign to share information on the benefits of EVs and available resources, to encourage Englewood community members and visitors to choose EVs and through strategy 3-2, other electric mobility options.

Audience

- Englewood residents, employees, and visitors

Target

- Host a minimum of two EV-related community events per year in 2023 and 2024

Available Resources

- CO EV statewide educational campaign
- Xcel Energy home charging programs and EV purchase/lease rebate
- Drive Clean Colorado assistance
- CDOT E-Mobility Education and Awareness grants
- Federal and State EV tax credits
- *(Anticipated)* CEO Community Access Enterprise

Roles and Responsibilities

- **Drive Clean Colorado:** Co-lead development and implementation of outreach plan.
- **Mel Englund, Sustainability:** Co-lead development and implementation of outreach plan.
- **Angela Forster, Greater Englewood Chamber of Commerce:** Support development and implementation of outreach plan.
- **Partners in Energy:** Support development and implementation of outreach plan.

Timeline

- **Q2 2023**
 - Develop an outreach plan for the educational campaign, that includes:
 - Events (e.g., Ride and Drives, Block Parties)
 - Electronic communications (e.g., e-newsletters, social media)
 - Community feedback surveys to inform outreach efforts
 - Guidance for those interested in purchasing/leasing an EV (e.g., [8 Tips for Starting Your EV Journey](#))
 - Coordination with engagement efforts identified in Strategy 3-2
 - Translation services to reach non-English speakers
- **Q3 2023-Q3 2024**
 - Implement outreach plan.
- **Q4 2024**
 - Evaluate results of educational campaign (e.g., survey results, peer feedback, progress toward target) to inform future outreach efforts.

Strategy 3-2: Explore Electric Micromobility Options

Engage community members in understanding the potential of implementing programs that increase access to e-bikes, e-scooters, and other electric micromobility options. This strategy directly supports an equitable approach to EVs by expanding electric mobility options for those who may not be able to afford an electric car. This strategy also supports the Sustainability Plan and Englewood Downtown Development Authority priorities related to micromobility.

Audience

- Englewood residents, community organizations, businesses, and institutions

Target

- By the end of 2024, host a minimum of three community feedback opportunities to capture community thoughts on micromobility in Englewood.

Available Resources

- CDOT E-Mobility Education and Awareness grants
- *(Anticipated)* CEO Community Access Enterprise e-bike rebates

Roles and Responsibilities

- **Mel Englund, Sustainability:** Lead development and implementation of engagement plan and development of recommendations.
- **Drive Clean Colorado:** Support engagement efforts.
- **Partners in Energy:** Support engagement efforts, with a focus on supporting recommendations from EDDA study.

Timeline

- **Q3 2023**
 - Conduct research on electric micromobility options.
 - Include electric micromobility (e.g., State e-bike rebate) as part of Strategy 3-1 educational campaign.
 - Review recommendations from EDDA Multimodal and Parking Study to identify opportunities for supporting micromobility in the study area.
 - Develop an engagement plan - to collect community feedback around electric micromobility options - that includes potential users, site hosts, and service providers (e.g., Lyft scooters, B-cycle). Ensure that the plan includes translation services.
- **Q4 2023-Q2 2024**
 - Implement engagement plan.
- **Q3 2024**
 - Use results of engagement plan and inventory of available resources to develop recommendations for new electric micromobility programs.

Strategy 3-3: Encourage Multifamily Properties to Install Charging Stations

Share information on the benefits of installing EV charging stations, along with financial and technical resources, to support multifamily properties that are interested in installing EV charging stations for their residents.

Audience

- Multifamily property owners and managers

Target

- Engage with 10 multifamily property owners or managers by the end of Q2 2024

Available Resources

- Xcel Energy Multifamily EV Solutions programs and HEC rebates
- CEO Charge Ahead Colorado grants
- Federal EV charging tax credits
- *(Anticipated)* CEO Community Access Enterprise
- *(Anticipated)* IJA competitive Discretionary Grant Program for Charging and Fueling Infrastructure

Roles and Responsibilities

- **Mel Englund, Sustainability:** Co-lead identification of properties for outreach and lead outreach to multifamily property owners.
- **Partners in Energy:** Co-lead identification of properties for outreach using mapping results; lead development of collateral.

Timeline

- **Q4 2023-Q2 2024**
 - Using the mapping results from Strategy 2-1 and results from existing multifamily outreach efforts, develop a prioritized list to inform which multifamily properties to target with outreach.
 - Develop collateral, including outreach flyers and resident survey templates, that properties can use to understand demand for charging.
 - Conduct targeted outreach to prioritized multifamily properties, including property owners, managers, and HOA boards.
 - Connect interested properties with Xcel Energy EV Advisors to explore available programs, conduct site assessments, and provide support for next steps.



Focus Area 4: Policy

As EV technology evolves and becomes more widespread, policy updates can help reduce unnecessary barriers and ensure that infrastructure is safe, accessible, and consistent. In the context of EVs, policies can include integration into community and regional plans as well as updates to development codes and standards.

EV-friendly development codes prepare communities for the EV future and save on costs. The cost to install EV-capable infrastructure during new construction is four to six times less expensive compared to retrofitting the building (Southwest Energy Efficiency Project, n.d.). As more communities across the state explore EV-related policies, regional collaboration can help ensure that policies are consistent and avoid duplication of efforts.

Leading by example, the City of Englewood is participating in a regional EV planning process led by Arapahoe County and is updating Englewood development codes.

Related Goal

This focus area indirectly supports all goals.

Strategies

The following strategies for this focus area are intended to coordinate local and regional policy updates to support public adoption of EVs. Implementation details for each strategy are found in the following sections.

- Strategy 4-1: Participate in the Arapahoe County Regional EV Planning Process
- Strategy 4-2: Adopt EV-Ready Codes
- Strategy 4-3: Establish Design Guidelines for Public Charging Stations

Leading by Example

The City of Englewood is participating in a regional EV planning process led by Arapahoe County and is updating Englewood development codes.

Strategy 4-1: Participate in the Arapahoe County Regional EV Planning Process

Continue participating in the Arapahoe County regional EV planning process to ensure that Englewood's priorities are reflected there and to leverage synergies.

Audience

- Arapahoe County regional EV planning team

Target

- None identified

Available Resources

- No additional resources necessary

Roles and Responsibilities

- **Mel Englund, Sustainability:** Lead participation in planning process.
- **Partners in Energy:** Support participation in planning process.

Timeline

- **Q2-Q3 2023**
 - Continue participation in planning process.
 - Share Englewood's EV Action Plan with the regional planning team to identify areas of alignment.
- **Q4 2023-Q4 2024**
 - Participate in the implementation of the regional plan.

Strategy 4-2: Adopt EV-Ready Codes

As part of Englewood’s building code update process, adopt EV-ready/EV-capable building codes to ensure that new development can accommodate EV charging station installations in residential and commercial infrastructure.

Audience

- City Council
- Developers

Target

- Adopt EV-ready/EV-capable building codes by end of Q2 2023, in conjunction with Englewood’s update to 2021 building codes

Available Resources

- Code language and experience from other communities with EV-ready/EV-capable codes (e.g., City and County of Denver)
- CO Department of Local Affairs (DOLA) Code Cohort EV-ready code language, factsheet, and customizable PowerPoint slides
- State model energy code language, required for all building code updates after July 1, 2023 (under development, but draft requirements available)
- City and County of Denver’s revised (2023) EV-ready codes which include “Universal” spaces to accommodate accessibility requirements²

Roles and Responsibilities

- **Community Development (Building Division):** Lead code updates.
- **Christine Brinker, Sustainability Commission:** Support code updates by sharing resources.

Timeline

- **Q2 2023**
 - Inventory resources and examples to inform code updates
 - Continue building code updates, ensuring EV-ready/EV-capable requirements for residential and commercial uses are included.
- **Q1-Q4 2024**
 - Ensure that any future building code updates after July 1, 2023 meet the minimum EV-ready requirements per state law.

² Universal spaces are large enough to accommodate a wheelchair van but are not exclusively reserved for disabled citizens.

Strategy 4-3: Establish Design Guidelines for Public Charging Stations

Develop guidelines to inform the design of new and redeveloped parking lots and on-street parking with EV charging stations. Share guidelines 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.

Audience

- Community Development Department
- Developers

Target

- Develop design guidelines by the end of 2024

Available Resources

- US Access Board Design Recommendations for Accessible EV Charging Stations
- Example guidelines from other communities (e.g., Boulder County regional effort, Denver code language which includes “Universal” spaces to accommodate accessibility needs)
- Siting and Design Guidelines for Electric Vehicle Supply Equipment
- Technical & Design Guidelines for EV Charging Infrastructure

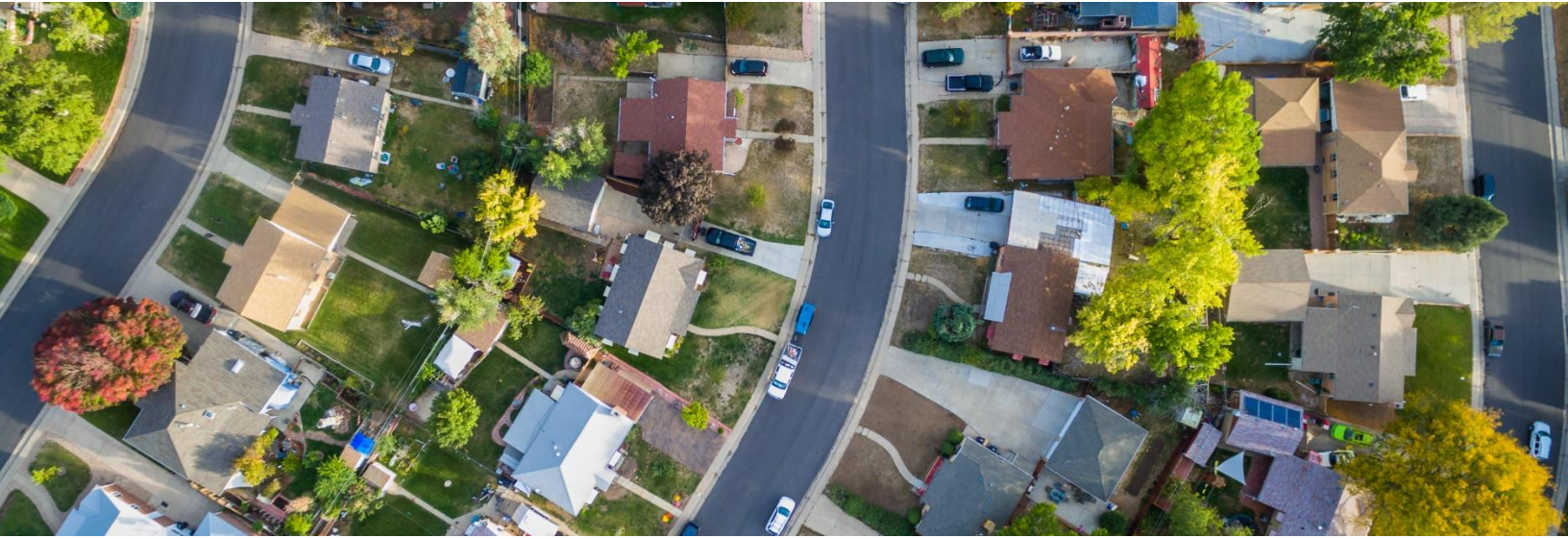
Roles and Responsibilities

- **Community Development (Planning and Zoning, Building Division):** Lead stakeholder engagement and development of guidelines.
- **Mel Englund, Sustainability:** Support stakeholder engagement.
- **Partners in Energy:** Lead research and support stakeholder engagement.

Timeline

- **Q3 2023-Q1 2024**
 - Research existing best practice standards for EV charging station design.
 - Identify key stakeholders, especially those on the ground, interacting regularly with EV charging station projects.
 - Engage key stakeholders to understand what design considerations would be most helpful to include in design guidelines.
- **Q2-Q4 2024**
 - Develop standards.

HOW WE STAY ON COURSE



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

Implementation of the plan will be divided into two main roles as described in Figure 6.

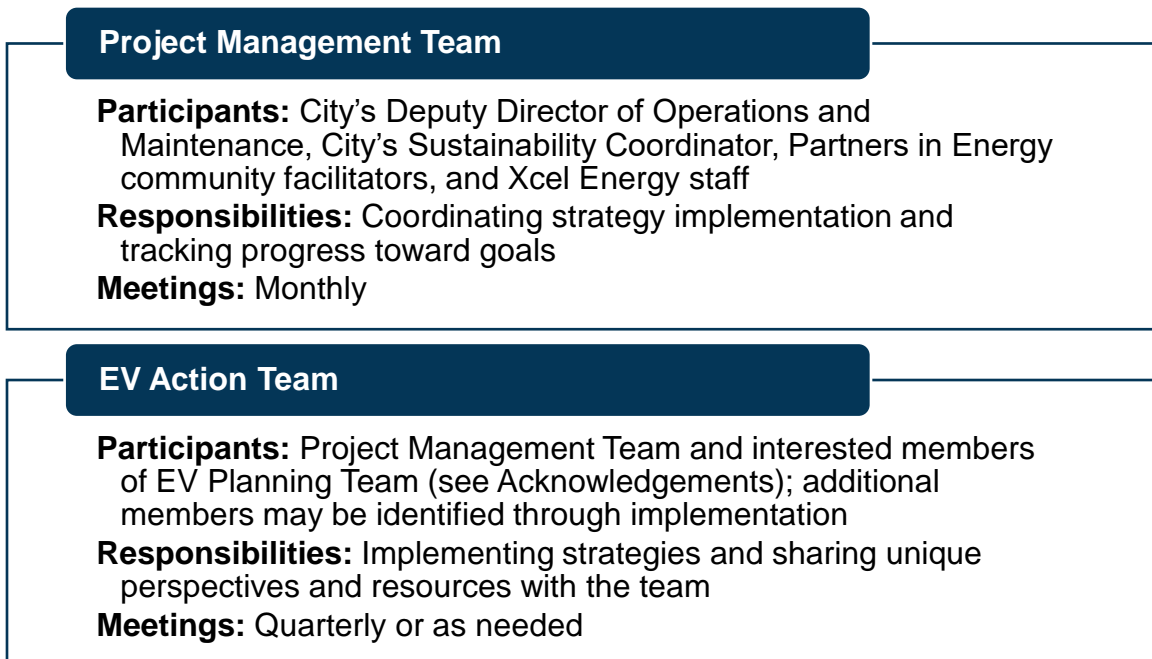


Figure 6: Implementation Team

Table 1 illustrates an anticipated timeline for the EV Action Team to implement plan strategies.

Table 1: Strategy Implementation Timeline

Strategy	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024
Strategy 1-1: Develop a City Fleet Vehicle Replacement Plan							
Strategy 1-2: Adopt a City Fleet Electric-First Vehicle Procurement Policy							
Strategy 1-3: Explore the Feasibility of Electrifying the Englewood Trolley							
Strategy 2-1: Map Ideal Public Charging Station Locations							
Strategy 2-2: Install Public Charging Stations at City Facilities							
Strategy 2-3: Encourage Local Businesses to Install Public Charging Stations							
Strategy 2-4: Work with Large Employers to Install Public Charging Stations							
Strategy 3-1: Increase EV Awareness and Share Resources with Those Who Live, Work, and Visit Englewood							
Strategy 3-2: Explore Electric Micromobility Options							
Strategy 3-3: Encourage Multifamily Properties to Install Charging Stations							
Strategy 4-1: Participate in the Arapahoe County Regional EV Planning Process							
Strategy 4-2: Adopt EV-Ready Codes							
Strategy 4-3: Establish Design Guidelines for Public Charging Stations							

Tracking Progress

The Project Management Team will track and report metrics for plan goals and targets on a biannual basis (Table 2 and Table 3). The results will be used by the Project Management Team and EV Action Team to understand the impact of strategy implementation and adjust course as necessary. These results will also be shared with City Council and the wider community to provide transparency about the implementation process and recognize the collaborative efforts of those involved.

Table 2: Goal Metrics

Goal	2023 Baseline	Data Source
20% of City fleet vehicles are electric by 2030	0%	City Public Works Department (Operations and Maintenance)
100% of multifamily properties with 30 or more units have public charging within a quarter mile by 2030	5%	Partners in Energy
5 City facilities have public charging stations by the end of 2024	0	City Public Works Department (Operations and Maintenance)
20% of light-duty vehicles in Englewood zip codes are electric by 2030	2%	EValueCO Tool

Table 3: Target Metrics

Strategy	Target
Strategy 1-1: Develop a City Fleet Vehicle Replacement Plan	Develop a vehicle replacement plan by the end of 2024
Strategy 1-2: Adopt a City Fleet Electric-First Vehicle Procurement Policy	Adopt an electric-first vehicle procurement policy by the end of 2024.
Strategy 1-3: Explore the Feasibility of Electrifying the Englewood Trolley	Develop a feasibility study by the end of 2024
Strategy 2-1: Map Ideal Public Charging Station Locations	Identify 5 potential charging sites by the end of 2023
Strategy 2-2: Install Public Charging Stations at City Facilities	Install public charging stations at 5 City facilities by the end of 2023
Strategy 2-3: Encourage Local Businesses to Install Public Charging Stations	Engage with 15 businesses by end of 2023
Strategy 2-4: Work with Large Employers to Install Public Charging Stations	90% of large employers who own their own buildings in Englewood have public charging stations by 2030
Strategy 3-1: Increase EV Awareness and Share Resources with Those Who Live, Work, and Visit Englewood	Host a minimum of two EV related community events per year by the end of 2024

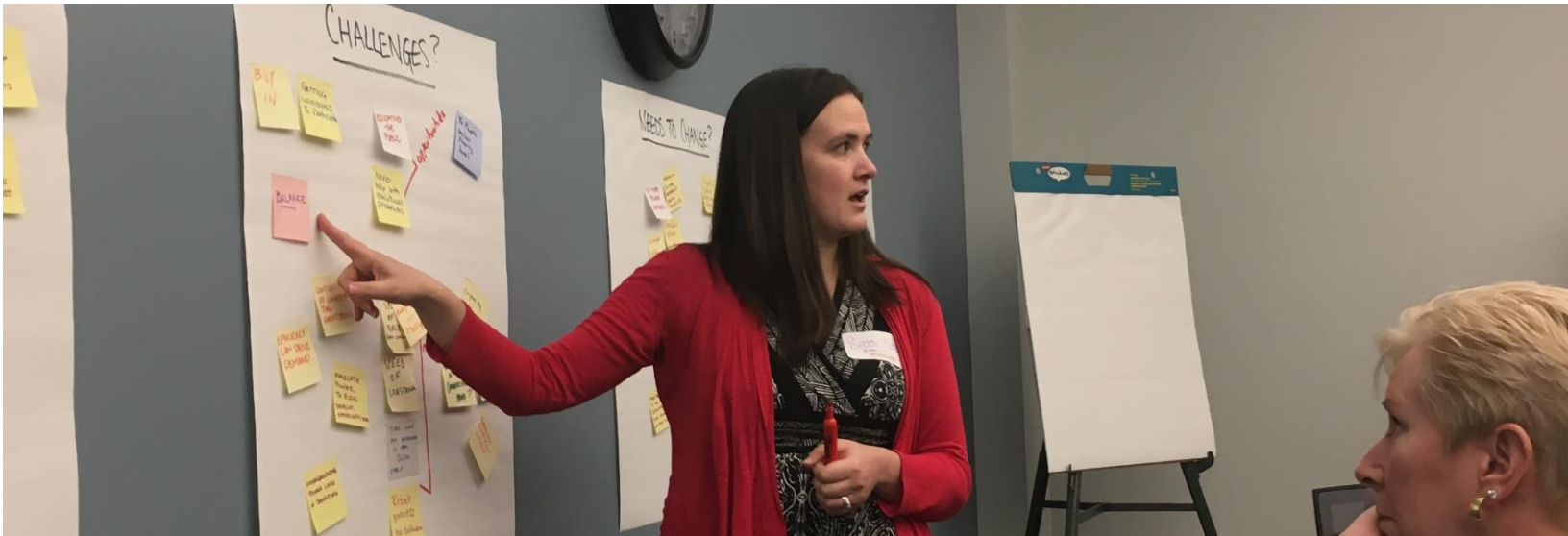
Strategy 3-2: Explore Electric Micromobility Options	Host a minimum of three community feedback opportunities to capture community thoughts on micromobility in Englewood
Strategy 3-3: Encourage Multifamily Properties to Install Charging Stations	Engage with 10 multifamily property owners or managers by the end of Q2 2024
Strategy 4-1: Participate in the Arapahoe County Regional EV Planning Process	None identified
Strategy 4-2: Adopt EV-Ready Codes	Adopt EV-ready building codes by end of Q2 2023, in conjunction with Englewood’s update to 2021 building codes Ensure that all new multifamily buildings include EV-ready wiring for all projects permitted after new building codes are in effect
Strategy 4-3: Establish Design Guidelines for Public Charging Stations	Develop design guidelines by the end of 2024

Adapting to a Changing Landscape

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

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

APPENDIX A: PLANNING PROCESS



About Xcel Energy's Partners in Energy

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

Plan Development Process

The content of this plan is derived from a series of project management team meetings, community stakeholder listening sessions, and three planning workshops - to understand and incorporate local EV priorities. Every other week, project management team meetings with representatives from City staff and Xcel Energy Partners in Energy were held throughout the planning period, from August 2022 through April 2023.

The planning process was guided by an EV Planning Team comprised of community stakeholders including City staff, business representatives, nonprofit organizations, residents, and state agencies. The EV Planning Team attended three workshops held in October 2022, December 2022, and February 2023. The first workshop served to create a shared understanding of the Partners in Energy process and to begin establishing a vision, goal, and set of focus areas for the plan. Workshop 2 served to fine tune these elements as well as draft an initial set of strategies and targets for the plan. Workshop 3

focused on action planning and preparing for implementation. The final plan was reviewed by the full EV Planning Team.

To develop a deeper understanding of perspectives not represented on the EV Planning Team, listening sessions were held with Integrated Family and Community Services; multifamily property developers, managers, and owners; Craig Hospital; Swedish Medical Center; Englewood Public Schools; and local businesses, to understand barriers to and opportunities for EV adoption in Englewood. Notes from these sessions were shared with the EV Planning Team in order to inform plan development.

Plan Review Process

The draft plan was reviewed by the full EV Planning Team to ensure it reflected the outcomes of the planning process. The plan was then shared publicly on Englewood Engaged in order to increase community awareness about this effort, as well as collect community feedback to inform the final plan and plan implementation. As part of the public review, the City and Drive Clean Colorado partnered together to host an “Energize & Electrify” event at Nixon’s Coffee House on March 25, 2023. The event included an opportunity to look at EVs in person, as well as take a survey about their EV interests and comment on the draft EV Action Plan through Englewood Engaged. The public comment period was open from March 17 to April 2, 2023. Table 4 lists the comments received through Englewood Engaged.

Table 4: Public Comments on Draft Plan

General Plan Comments
New commercial buildings need electric charging stations
Great idea
Good idea, I agree with the electric switch. Better for our community and believe it or not our atmosphere helping the ozone.
The plan is impressive. It is understandable. Stressing those things that the City of Englewood can do for itself is encouraging and hopeful. I would ask if there is any way that Englewood School District could electrify its bus fleet. Lightning eMotors in Loveland CO does school bus conversions. They also might help the City convert some of its fleet vehicles.
Where is the plan?
Responses to the Question: What Would You Like to See Incorporated into the City’s EV Action Plan
I would like to see a plan for responsibly disposing EV batteries.
Switching the Englewood Trolley to an EV and expanding coverage to include nights and weekends, and expand the route to go further south Broadway so that it's easier to get to more businesses in the city (i.e. Western Sky, Chuze fitness, Jamie's, etc.)
Charging station locations and a means to use electric vehicles to provide a public electric vehicle use for local connections and connections to regional mass transit

After public review closed, the draft plan and the public comments received were presented at the April 3, 2023 City Council meeting. At this session the City Council

gave approval to move the plan forward for potential adoption. The plan was formally adopted by City Council at the April 17, 2023 City Council meeting.

Plan Implementation

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

APPENDIX B: ELECTRIC VEHICLES 101



Note, this document was last updated in March 2023 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 is outlined in **Table 5** and 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 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 fewer tailpipe emissions than a traditional ICE vehicle. 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 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 that then powers the electric motor. The benefit of this system is that the ICE can run at a constant speed to greatly increase the vehicle's fuel efficiency compared to traditional ICE vehicles. However, the battery cannot be charged by an external electricity source, which means the vehicle always relies on the gasoline engine.

Charging Stations



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

Residential Charging Stations

Residents have two options for charging at home. Level 1 chargers use standard 120-volt AC outlets and can take 8 to 12 hours to fully charge a depleted battery. Level 2 chargers require a 240-volt AC outlet and can fully charge a depleted battery in 4 to 6 hours. Residents can charge during off-peak hours to reduce the impact on the grid.

Table 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 • Little to no investment in infrastructure required 	<ul style="list-style-type: none"> • Quicker charging • Some models have available Wi-Fi controls to allow residents to take advantage of time-of-day electric rates • In the case of multifamily housing, the controls could be managed by a property manager.
Drawbacks	<ul style="list-style-type: none"> • 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 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 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 charge 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 • Can cause degradation to EV batteries with frequent use
Estimated Costs	\$2,500 to \$5,000	\$50,000 to more than \$150,000

Benefits of EVs

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

Reduce GHG Emissions

EVs can significantly decrease GHG emissions associated with on-road transportation, which overtook electricity generation as the largest source of GHG emissions in the US in 2017 (Environmental Protection Agency, 2019). The amount of emissions reduction depends on the electricity generation fuel mix of the local electricity grid. National trends suggest that electric utilities are improving the emissions from electricity generation at a faster rate than fuel economy is improving in ICE vehicles. EV charging can be paired

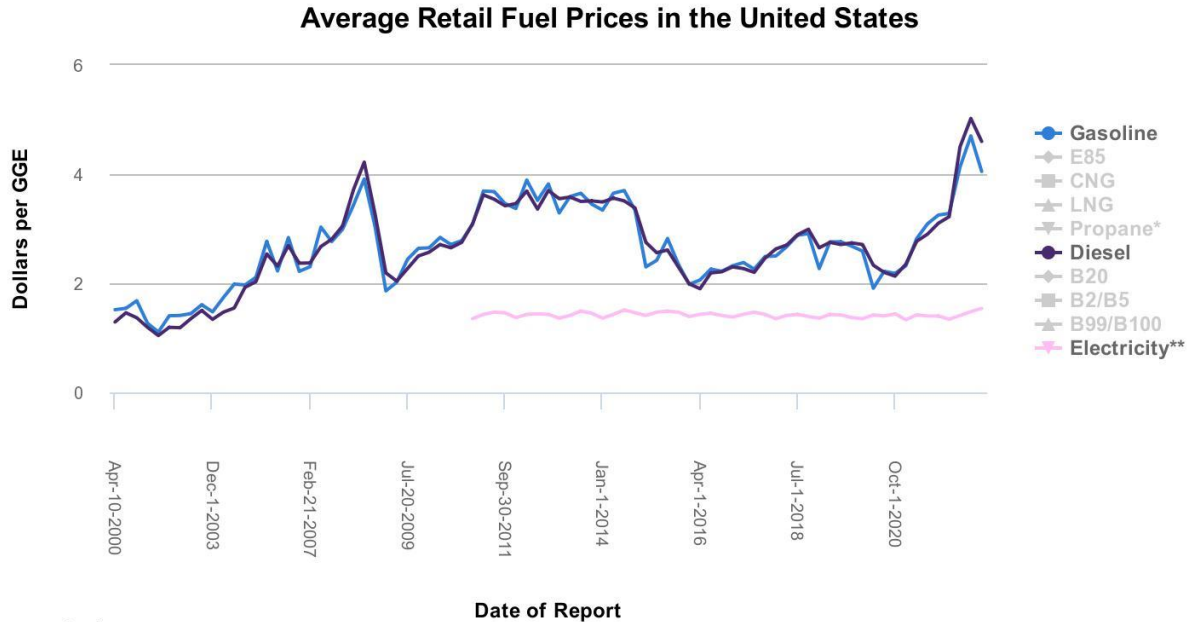
with residential roof-top solar, commercial solar parking structures, and community solar to further reduce associated GHG emissions. Xcel Energy has goals to reduce carbon emissions 80% by 2030 and to be carbon free by 2050 (Xcel Energy, 2019). By transitioning to cleaner energy sources, Xcel Energy is supporting its customers in reaching their customers' community goals of achieving carbon neutrality.

Air Quality

Use of traditional ICE vehicles contribute to Ozone and fine particulate (PM_{2.5}) air pollutants, especially along heavily traveled routes. These pollutants have been linked to respiratory problems such as asthma, cardiopulmonary disease, and premature death for people with chronic exposure. These pollutants are significantly reduced in HEVs and PHEVs and completely eliminated in BEVs. A study of the Houston area found that moderate to complete vehicle electrification would reduce Ozone by 1 to 4 parts per billion (ppb) and PM_{2.5} by 0.5 to 2 micrograms (one-millionth of a gram) per cubic meter (µgm³). This change was estimated to prevent 114 to 246 premature deaths annually, significantly reduce asthma exacerbation by 7,500 cases, and reduce school loss days by 5,500 (Pan, et al., 2019).

Energy Independence and Cost Stability

Over 65% of the petroleum imported to the US in 2018 was used for transportation fuel. Transitioning to EVs shifts the fuel source to more domestically available sources such as coal, nuclear, natural gas, and renewable energy. Integration of EVs is an important strategy for reducing dependence on fuel imports and isolates transportation costs from the volatile petroleum market (Office of Energy Efficiency and Renewable Energy, 2018). **Figure 7** illustrates fluctuations in gasoline and diesel prices compared to those in electricity prices from 2000 to 2020.



Last updated: January 2023
 Printed on: January 23

Figure 7. U.S. Average Retail Fuel Prices. Source: [Alternative Fuels Data Center: Fuel Prices \(energy.gov\)](https://www.energy.gov/alternative-fuels-data-center/fuel-prices)

Lower Fuel & Maintenance Costs

While cost savings vary based on vehicle type, driving patterns, and geographic region, the average driver spends about half as much money in fuel and maintenance costs by driving an EV compared to a traditional ICE 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.

Quieter Ride

Due to fewer moving parts and lack of a gas engine, EVs are quieter than ICE vehicles and at low speeds can be almost fully silent. Some EVs come with artificial engine noise that can be turned on to mimic the acceleration sound and alert pedestrians to the vehicle's presence.

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. Acknowledging that emissions can

vary, estimates show that even with emissions from battery production, an EV's lifecycle emissions are significantly less than a gas-powered car (Figure 8).

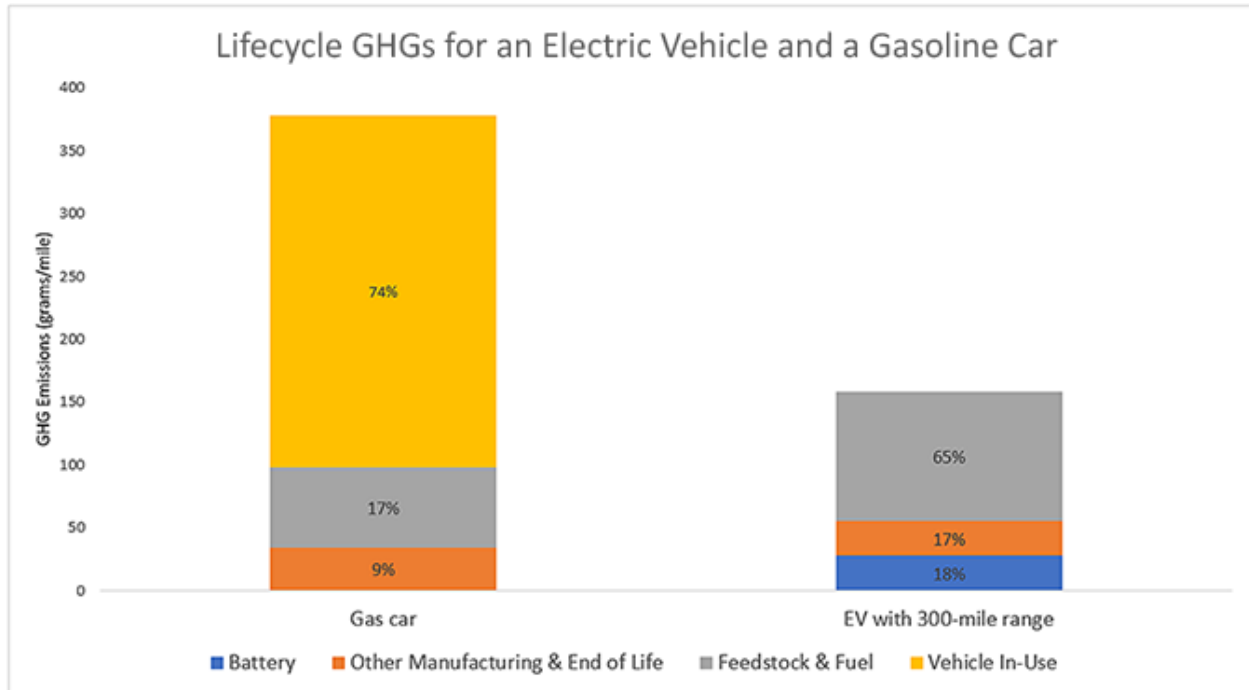


Figure 8: Lifecycle Emissions for an EV and a Gas-Powered Car, (U.S. Environmental Protection Agency, 2021)

As the overall electrical grid is becoming less carbon intensive, battery emissions will reduce and widen the gap between total emissions of EVs and gas-powered 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, 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 (Baumann-Pauly, 2020). 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 (Natural Resource Governance Institute, 2021).

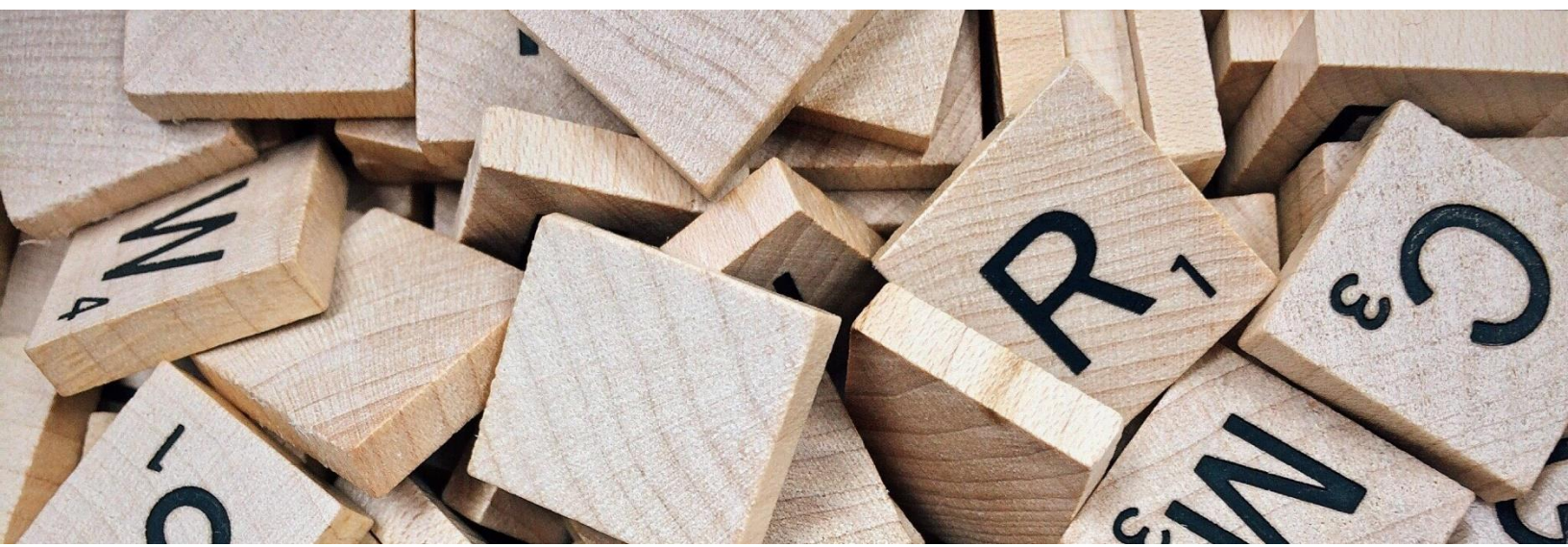
The U.S. is also supporting the expansion of domestic manufacturing of batteries for EVs and the electrical grid and for materials and components currently imported from other countries. Funding through the Infrastructure Investment and Jobs Act and match funding is expected to create responsible and sustainable domestic sourcing of the critical materials used to make lithium-ion batteries—such as lithium, cobalt, nickel, and graphite. By 2030, North America EV battery manufacturing production capacity will be

capable of supporting the manufacture of roughly 10 to 13 million all-electric vehicles per year (Gohlke, Zhou, Wu, & Courtney, 2022).

Battery Lifespan and Recycling

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. The U.S. is preparing now for advanced technologies and processes for EV battery recycling and reuse. For more information about EV battery recycling, visit the U.S. Department of Energy's [ReCell Center](#).

APPENDIX C: GLOSSARY OF TERMS



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

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

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

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

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

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

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

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

Greenhouse Gases (GHG): Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the

earth's atmosphere are water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃).

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

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

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

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

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

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

Level 3/DC Fast Charging Station: Uses an industrial 480-volt DC outlet and can charge a battery to 80% in 20 to 30 minutes; used in commercial settings where the anticipated charge time is limited (e.g., supermarket, gas station); will be used on Alternative Fuel Corridors – a national network of major thoroughfares supporting EVs and other alternative fuels.

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

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

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

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

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

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

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

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