TOWN OF VAIL / 2023

ELECTRIC VEHICLE
READINESS PLAN

TOWN OF VAIL

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EXECUTIVE SUMMARY

The adoption of the Go Electric Vehicle (GoEV) City Resolution established the Town of Vail's commitment to a clean mobility future. The town has recognized petroleum-fueled transportation as a major source of emissions and as a threat to the health of its constituents. Electric vehicles and micro-mobility solutions present an opportunity to achieve deep reductions in carbon pollution. The Town of Vail envisions a future in which transportation and mobility cease to create greenhouse gas emissions and local pollution. This plan aims to establish policies and programs that meet this vision and that support Colorado's statewide goal of nearly one million EVs on its roads by 2030. Topic areas include infrastructure, fleets, policy, community, and micro-mobility.

GOALS in each area are identified to achieve the desired condition of EV readiness, including the rapid and equitable adoption of electric vehicles and micro-mobility solutions. These goals include:

- A rapid expansion of public charging infrastructure, resulting in a tenfold increase in Level 2 chargers by 2030
- Lead-by-example adoption of electric fleet and transit vehicles at the Town of Vail, resulting in a 30% electric fleet by 2030
- Financial and development policies that reduce barriers to adoption and increase benefits of ownership
- Communitywide EV readiness, including a 10% year-over-year adoption rate of electric vehicles among new registrations, sufficient private charging infrastructure to meet demand, and equitable access to EVs for all
- Increased use of and access to micro-mobility solutions

A set of **STRATEGIES** to meet the goals are listed and have been critically evaluated by Town staff and stakeholders to ensure effectiveness and achievability. When implemented, the strategies will help support the adoption of electric vehicles across the Vail community. These strategies are generally intended to:

- Provide resources to support public EV charging infrastructure
- Ensure that municipal procurement of EVs occurs at every reasonable opportunity
- Reduce barriers to buying EVs and installing home charging community wide
- Create programs and incentives to encourage more equitable community adoption of EVs
- Expand micro-mobility programs and infrastructure to support adoption of low-impact modalities of travel

EQUITABLE access to EVs and electric mobility is an important aspiration in the plan. It is crucial to ensure that the benefits of electric vehicles are available and accessible to all, including underserved communities and those most impacted by air pollution and other climate impacts. Equity strategies are highlighted in Appendix B *(page 16)* and include:

- Assisting multifamily housing with nearby EV charging infrastructure
- Offering financial incentives for EV adoption
- Providing bilingual education and outreach on EVs
- Encouraging free workplace charging
- Developing EV car share programs

This plan is intended to help the Town of Vail meet its commitments to the GoEV City Resolution and establish Vail as a community in which electric vehicles and micro-mobility solutions are prioritized over petroleum-fueled transportation. The appendixes include additional information about EV technology but many more resources are available; some can be found in the reference section. As EV technology evolves and the pace of adoption increase, the plan will be updated and improved. For now, the plan provides a starting point for understanding the opportunities and challenges afforded by electric transportation, and the goals and strategies to make it a reality.

INTRODUCTION

The Town of Vail is a premier international mountain resort destination in the heart of the Rocky Mountains of Colorado. As a year-round resort community, skiing is at the heart of the economy and culture in Vail. Therefore, the town is deeply committed to reducing contributions to global climate change to preserve not only our snow, but the fragile mountain ecosystems, wildlife and watershed that constitute the local environment. To that end Vail has committed to reducing greenhouse gas emissions by 50% by 2030 and 80% by 2050.

Welcoming 2.5 million guests annually, the Town of Vail is also the first certified Sustainable Destination under the Mountain IDEAL Standard. As such, the town must meet and maintain progress on over 40 sustainability criteria, including significant community-wide reductions in greenhouse gases. In October of 2021, Vail Town Council adopted Resolution No. 48, Series of 2021, to become a designated GoEV City. This signifies the town's commitment to advancing the transition to electric vehicles (EVs). It does so by prioritizing eight goals or actions that help ensure a timely, equitable and cost-effective transition to EVs. The potential to reduce GHG emissions in the transportation sector is a critical and important development for meaningful climate action. Electric vehicles, buses, and fleets can help eliminate transportation-related emissions, improve local air quality, and lower fuel and maintenance costs, all while meeting the mobility and transportation needs of the town and community.

Electric vehicles are becoming mainstream. The U.S. market has shown the strongest growth rate in the world in new plug-in electric vehicle registrations during the first six months of 2022[1]. Major automakers have indicated that electric vehicles are the future of their business, and California has banned gas engines from new vehicles beginning in 2035. The Inflation Reduction Act of 2022 will further incentivize and encourage the transition to electric vehicles, including $1 billion for heavy duty vehicles and buses[2]. The Town of Vail must prepare for large increases in the number of EVs and the demand it will place on charging infrastructure. Fortunately, the town is well positioned as a municipal leader to take significant action to develop the infrastructure, programs, and policies needed to support the transition.

[1] The International Council on Clean Transportation: https://theicct.org/2022-update-ev-sales-us-eu-ch-aug22/

[2] Electrification Coalition: https://electrificationcoalition.org/work/federal-ev-policy/inflation-reduction-act/

The Town of Vail envisions a future in which transportation and mobility cease to create greenhouse gas emissions and local pollution. The best and most equitable way to achieve this vision is to encourage community members and visitors to walk, bike, carpool, and use public transit. If a trip requires a personal automobile, plug-in hybrid and electric vehicles offer significant environmental benefits compared with those with strictly internal combustion engines. The Town of Vail will be a leader in the adoption and use of electric fleet vehicles and the deployment of public charging infrastructure. The town will also develop policy and programs that support the rapid and equitable adoption of EVs.

Community EV readiness means that owning and operating an EV in the Town of Vail is as easy or easier than a conventional vehicle, that community awareness and adoption of EVs is widespread, that barriers to ownership are minimal, and that access to the benefits of EVs are available to all.

Micro-mobility is also a key element of Vail's transportation priorities. Town of Vail's vision elevates micro-mobility as the preferred solution to meeting climate and transportation goals. Micro-mobility is an accessible and equitable means of transportation and provides climate, and local air quality benefits, not to mention reducing congestion and traffic.

The figure below illustrates the Town of Vail's transportation priorities, with alternative modalities and micro-mobility encouraged over single-occupancy vehicles (SOVs), and electric vehicles being preferred over conventional vehicles.

Walk / Skate / Bike

Transit

Carpool/Car Share

SOV Vehicle

Transportation Priorities for Reduced Emissions
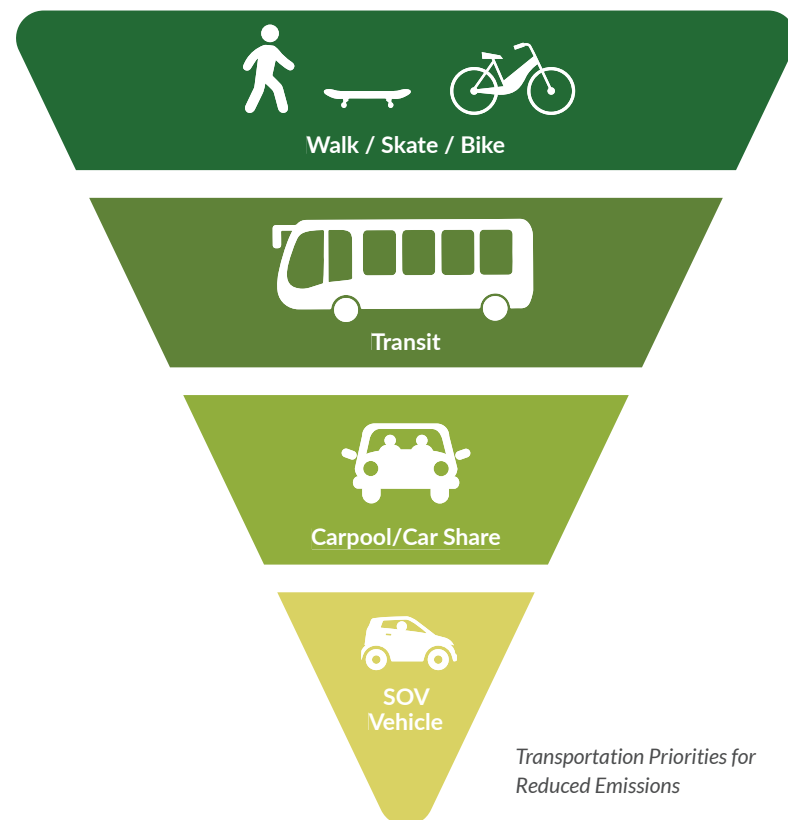
In response to the threat of climate change, the Town of Vail has adopted the goals of the 2020 Eagle County Climate Action Plan, which call for countywide greenhouse gas (GHG) emission reduction targets of 50% by 2030 and 80% by 2050 (from a 2014 baseline)[3]. The priority actions identified in the plan were selected through collaborative stakeholder input and derived from science-based targets intended to prevent catastrophic warming of the climate.

Cars, trucks and other vehicles are the second highest source of emissions in Eagle County and the Town of Vail. Emissions from transportation must be reduced in order to meet these targets. Electric vehicles offer a viable means to reducing transportation emissions today.

To understand the potential environmental benefits of electric vehicles, it is important to consider that transportation is the second highest source of greenhouse gas emissions in the Town of Vail, behind commercial buildings. Pollution from tailpipes harms air quality wherever a conventional fuel vehicle is operated, and oil spills and toxic refineries are also part of the current petroleum-based energy supply. While an electric vehicle does not have tailpipe emissions, the electricity that powers it could create carbon pollution. Electrical generation that is heavily

dependent on coal and natural gas is less beneficial than energy supplied with mostly renewable energies, like wind or solar. Fortunately, Vail is served by Holy Cross Energy (HCE), which aims to have a 100% renewable energy supply by 2030 and net-zero carbon emissions by 2035[4]. HCE has been planning for electrification of transportation since 2018 and is confident it can supply the needed power. Electricity provided by HCE comes from nearly 55% renewable energy today and this fact bolsters the environmental benefits of electrifying transportation in our region.

The Town of Vail also participates in HCE's PuRE program, ensuring that 100% of the town's electricity (including public chargers owned by the town) are powered with renewable energy. The town installed 180 KW of solar energy in 2022 to contribute renewables to the energy supply and continues to prioritize energy efficiency to reduce climate emissions. Electrifying transportation is instrumental to meeting the town's climate action goals and will require significant municipal investment to achieve a successful transition.

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[3] Climate Action Plan 2020 Update: https://hub.walkingmountains.org/download-the-climate-action-plan-for-the-eagle-county-community

[4] Holy Cross Energy 100x30 Strategic Plan: https://www.holycross.com/100x30/strategic-plan-2020/

EV CHARGING INFRASTRUCTURE

EV CHARGING INFRASTRUCTURE BACKGROUND

The Town of Vail has had charging infrastructure in place for many years but could fall behind as regional adoption of electric vehicles starts to accelerate. As of November 2022, estimates from EValuateCO, a public policy tool, show a total of 64 Level II charging ports and 5 DC fast chargers in Vail's zip code[5]. This includes public chargers and private stations located at businesses and institutions such as the hospital. Home charging numbers are not available from this source. It is expected that owners of electric vehicles will typically install charging equipment at home. However, for some multifamily and condo buildings, charging equipment may not be available and, in these cases, public charging nearby is required to close the gap in access.

To keep pace with the anticipated adoption of electric vehicles in the State of Colorado, the International Council on Clean Transportation (ICCT) estimates the need for a more than tenfold increase in Level 2 charging infrastructure by 2030[6]. DC fast chargers will also need to increase, albeit at a slower rate. (DC fast charging can deliver more energy charger per day than Level 2). The chart below shows the expected number of EV charging ports that will be required to meet public demand by 2030.

CHARGING PORTS (PLUGS) in the Town of Vail

CHARGER TYPE	CURRENT	NEEDED BY 2030
Public Level 2 Ports	26	260
Public DCFC Ports	4	16
Private Level 2 Ports	38	380
Private DCFC Ports	1	4
Total	71	670

EV CHARGING INFRASTRUCTURE GOALS

Public charging infrastructure should be rapidly expanded to keep pace with the exponential rate of EV adoption underway in Colorado. EV sales are beginning to rise in the US, and stakeholder groups such as visitors, employees, and thru-travelers on I-70 will likely demand additional charging infrastructure beyond what is currently available. The tenfold increase in charging recommended by the ICCT is equivalent to approximately 10% of public parking spaces in the Town of Vail. An engineering feasibility study of town-owned parking facilities was completed in 2022 and may be used to help understand costs associated with new stations.

The need for DC fast charging is less well-understood but is likely contingent on statewide adoption of electric vehicles and gaps in multifamily housing infrastructure. A fourfold increase in DC fast charging by 2030 would help serve East and West Vail communities and expand access in Vail Village. Public input has indicated a need for expanded public fast charging to serve residents and visitors to Vail. The following goals are suggested to support EV readiness through infrastructure investments:

1 GOAL
10% of all public parking spaces in the Town of Vail will have Level 2 EV charging capabilities by 2030 for a total of 260 charging ports.

2 GOAL
Public DC fast chargers will quadruple from 4 to 16 by 2030 to support residents without charging access, thru-travelers, and day visitors.

3 GOAL
Public charging infrastructure will consider gaps in access and be located in places that serve to improve equity and access to electrified transportation.

[5] EvaluateCO dashboard: https://atlaspolicy.com/evaluateco/
[6] International Council on Clean Transportation: Colorado Charging Infrastructure Needs to Reach EV Goals

INCREASING EV CHARGING INFRASTRUCTURE STRATEGIES

Each strategy below is ranked into three groups:

1 2 3 — GOAL NUMBERS

LOW MED HIGH — IMPACT INTENSITY

SHORT 1-2yrs | MED 2-5yrs | LONG 5+yrs — IMPLEMENTATION TIMEFRAME

1 2 — **Plan and budget for an expansion of public EV charging ports at town-owned parking facilities to meet anticipated EV growth.**

The number of new charging projects should be increased by 50% every year to match the pace of growth. Specific locations, such as parking structures, should be made EV capable as a single project to avoid redundancy in construction and installation. New charging stations should also be considered as the town acquires electric fleet vehicles.

3 — **Develop criteria to prioritize charging infrastructure.**

Public surveys, equity concerns, current station usage data, and location characteristics are some of the many criteria that could be used to prioritize the siting of new stations. A heat-map or similar tool may be useful to decision-making.

1 — **For town-owned construction projects, future-proof for EV charging with conduit and panel capacity whenever possible.**

This will save cost and effort with future installations.

1 2 3 — **Any new, modified or upgraded EV and mobility device charging station shall go through a permit process and be subject to review in light of the most current safety standards, data, and fire response strategies, and tactics available.**

Safety of building occupants, egress, and tactical response to EV fires, which can be difficult to contain, must be considered in the design and location of stations. Information from the International Code Council, National Fire Protection Association, and national fire data and standards organizations will continue to provide direction and should be consulted for life safety direction.

1 2 — **Leverage public-private partnerships to build out charging infrastructure.**

Revenue-sharing arrangements can eliminate upfront capital costs and ease the burden of station ownership on municipal organizations. Innovative companies offer microgrid capable and renewable energy for resilient charging stations. DC fast charging plazas may be best served through this type of partnership.

2 3 — **Develop criteria for expanded DC fast charging opportunities and use partners for implementation.**

Power requirements, proximity to I-70, equitable access, and parking regulations, among other issues, will need to be optimized for successful DC fast charging installations. DC fast chargers can serve gaps in charging infrastructure for multifamily housing. Grant funding is available from the State of Colorado for up to 80% of the cost of DC fast charging, and Holy Cross Energy may also be willing to contribute to such a project.

FLEET VEHICLES

FLEET VEHICLE BACKGROUND

The Town of Vail's public transit fleet consists of 33 buses. Four of these are fully electric and have been successfully operated on local bus routes for over a year. An additional six battery electric buses have been ordered with expected delivery in 2023. Charging occurs primarily at the town's Bus Barn. The facility received electrical infrastructure upgrades with future-proofed design for additional stations. A transit fleet transition plan has also been developed. The plan outlines the steps to transition to 100% battery electric buses by 2032.

In addition to the bus fleet, the Town of Vail owns 162 registered vehicles. This includes one EV: a Nissan Leaf. Fleet procurement policy now includes a focus on electric vehicles and fleet management is studying available options. The Town of Vail is likely to add several new pool electric vehicles to its fleet in the coming year. These vehicles will enable employees and key decision makers to experience electric vehicles and develop use cases for EVs.

For a successful transition to a fully electric fleet, procurement of EVs must be carefully matched with charging capacity and management of vehicle duty and charging schedules. Fleet management will take an active role in developing the appropriate strategies to accomplish fleet EV adoption and coordinate infrastructure needs with relevant departments. Light duty vehicles (LDVs) are more easily transitioned, while medium- and heavy-duty vehicles have limited availability but show promising developments. Additional electric technologies besides battery electric (such as hydrogen fuel cell) may need to be considered for some vehicles/use cases.

FLEET VEHICLE GOALS

Lead-by-example practices such as transitioning fleet vehicles to electric are some of the best ways for the Town of Vail to encourage the communitywide adoption of EVs and meet the goals of the Go EV City Resolution. The following goals are applicable to the Town of Vail's fleet, including light- and medium-duty vehicles, buses, and other vehicle types.

1 GOAL — Transition 30% of town-owned vehicles to electric by 2030.

2 GOAL — Transition 100% of town-owned vehicles to electric or zero-emission by 2050.

3 GOAL — Transition 100% of town-owned transit buses to electric by 2032.

INCREASING FLEET VEHICLES STRATEGIES

Each strategy below is ranked into three groups:

1 2 3
GOAL NUMBERS

LOW MED HIGH
IMPACT INTENSITY

SHORT 1-2yrs MED 2-5yrs LONG 5+yrs
IMPLEMENTATION TIMEFRAME

1 2 — Develop an EV fleet vehicle transition schedule based on vehicle replacement cycles, technology and performance and budgeting for infrastructure and vehicles.

1 2 — Develop an EV-first procurement policy for the Town of Vail that includes light-, medium-, and heavy-duty vehicles, and fleet lawn care equipment when available.
The town will include the total cost of vehicle or equipment ownership, including fuel and maintenance costs and carbon emissions in its procurement calculations.

1 2 3 — Increase electrical and charging infrastructure to match the pace of fleet electrification.
EV charging infrastructure must be considered in parallel with the acquisition of fleet vehicles. Coordinate between fleets, facilities, and environmental departments.

1 2 3 — Provide workforce development and education on EVs as pertinent to operation and maintenance.
It is important that staff feel comfortable and safe with new technology.

1 — Purchase light-duty EVs and develop a pilot program and policies for employee use at work and home.
Work with various departments to encourage appropriate adoption timelines.

1 2 3 — Leverage federal and state partnerships and funds to facilitate the transition.
Potential partners include the Colorado Energy Office, Federal Transit Administration, Colorado Department of Transportation, etc.

1 3 — Develop a time-of-use (TOU) charging plan for applicable charging locations.
Implement charging schedules to accommodate and reduce peak electrical demand on the grid.

EV POLICY

EV POLICY BACKGROUND

Electric vehicle policy within the control of the town may include financial, regulatory, and programmatic decisions that influence the scale and scope of EV infrastructure. EV-friendly policies may also include setting rules for EV parking and charging at town facilities, budget planning and appropriation for fleets transition, charging station upgrades, program development, and so on.

Current policies involving EVs include recently adopted

building codes which require EV capable circuits in new residential homes, 5% of parking spots with installed EV stations, and 50% EV capable parking spots in commercial and multifamily new construction. The Town of Vail does not currently institute a fee for Level 2 public charging but does require payment for the energy consumed at the public DC fast charging stations as well as a parking overstay fee.

EV POLICY GOALS

The intention of EV-friendly policy is to facilitate the rapid transition to EVs communitywide by reducing barriers to adoption and increasing benefits of ownership. This can be accomplished through regulatory updates and financial investments that support the rapid adoption of EVs and EV infrastructure.

1 GOAL
Adequately fund new public EV charging infrastructure.

2 GOAL
Reduce barriers for EV charging infrastructure development.

3 GOAL
Increase incentives for EV adoption among residents and employees.

EV POLICY STRATEGIES

Each strategy below is ranked into three groups:

1 2 3	LOW MED HIGH	SHORT 1-2yrs MED 2-5yrs LONG 5+yrs
GOAL NUMBERS	IMPACT INTENSITY	IMPLEMENTATION TIMEFRAME

1 Establish an annual line-item budget in the Town's Capital and Operations budgets for the installation and maintenance of public charging infrastructure aligned with projected growth scenarios.

3 Review and align building and development codes to incentivize EV charging infrastructure.

123 Review and update taxes and fees to develop a funding mechanism to reduce barriers to accessing an EV.

This could apply to fees associated with EV infrastructure, incentives for EV adoption, or support for charging discounts at pay-for-service charging stations.

23 Develop equitable rates for charging policies that allow for a mix of users and needs.

123 Consider tax and registration fees that can be put into place to fund public infrastructure.

123 Coordinate and advocate regionally, statewide, and nationally for EV-friendly policy.

Partners include Colorado Communities for Climate Action (CC4CA), CAC, Eagle County, and other climate-focused Non-Governmental Organizations. Leverage Vail's leadership and brand to achieve a broader climate impact.

2 Standardize and streamline the EV permitting process to remove unnecessary barriers to installation.

23 Provide town employees with workplace charging.

Conducting a periodic workplace EV survey will help identify locations where additional stations are needed. Continue to make employee charging free to use.

COMMUNITY EV READINESS

COMMUNITY READINESS BACKGROUND

Community EV readiness means that owning and operating an EV in the Town of Vail is as easy or easier than a combustion vehicle, community awareness and adoption of EVs is widespread, barriers to ownership are minimal, and access to the benefits of EVs are equitable for all.

As a Go EV City, the Town of Vail seeks to ensure that local registrations of electric vehicles reach 30% of total vehicle registrations by 2030. The current percentage of EVs on the road and registered in the Town of Vail is 2.2%. This is about 143 vehicles out of 6,474. To reach 1,942 electric vehicles (which is 30%) by 2030 will require steady uptick of 10% growth in new EV registrations year-to-year (Figure 2). Strong incentives will be needed to spur on such an ambitious growth in adoption. Additional charging infrastructure across the community – in homes, business, hotels, and institutions - will also be needed to meet the charging needs of these new vehicles.

EV GROWTH NEEDED TO REACH GOALS IN VAIL through 2030

YEAR	TOTAL EV'S	NEW EV'S	% OF NEW EV'S	ANNUAL VEHICLES TURNING OVER (assuming 8% of 6500-average useful life of about 12 years)	% OF TOTAL VEHICLES
2022	143	47	9%	520	2%
2023	190	99	19%	520	3%
2024	289	151	29%	520	4%
2025	440	203	39%	520	7%
2026	643	255	49%	520	10%
2027	898	307	59%	520	14%
2028	1205	359	69%	520	19%
2029	1564	411	79%	520	24%
2030	1975	463	89%	520	30%

COMMUNITY READINESS GOALS

To support EV awareness and adoption, education and outreach will help consumers understand the benefits and practicality of modern electric vehicles. Offering financial incentives, such as rebates, help encourage residents and employees to move forward with an EV purchase. Innovative programs such as electric car share can help improve equity and accessibility. Additional financial incentives may also be needed to alleviate the cost of charging infrastructure, especially in multifamily housing. Collaboration will leverage lessons learned and advance climate goals regionally. The following are the goals for EV and infrastructure adoption communitywide.

1 GOAL 30% of all vehicles in the Vail community will be electric by 2030.

2 GOAL 100% of all vehicles in Vail are zero emissions by 2050.

3 GOAL Community-wide charging infrastructure will increase by tenfold to 384 additional ports by 2030.

COMMUNITY READINESS STRATEGIES

Each strategy below is ranked into three groups:

1 2 3 GOAL NUMBERS

LOW MED HIGH IMPACT INTENSITY

SHORT 1-2yrs | MED 2-5yrs | LONG 5+yrs IMPLEMENTATION TIMEFRAME

123 Provide multi-lingual resources and education opportunities, including EV drive events, for residents and businesses.

Providing technical assistance on operating EVs, installing infrastructure or using public chargers will also be critical. Partnering with local NGO's and regional EV players will leverage impact.

123 Offer incentives for EV charging infrastructure for residents, multi-family developments and local businesses.

Workforce housing, lower-income neighborhoods, and multifamily housing face higher costs of entry for installing EV charging. Businesses that offer workplace charging will help encourage EV adoption.

12 Offer incentives for local residents, workforce, and the business community for purchasing and owning EVs.

The existing Energy Smart program can be utilized for offering this incentive.

1 Develop an electric car share program.

Town-owned multifamily housing could provide a pilot program. Denver provides an example of a successful E-car share program called Colorado Car Share.

13 Develop an outreach strategy for destination visitors on EV rental programs and charging infrastructure.

123 Collaborate with municipal and regional partner entities and organizations to encourage development of a roadmap to electrification and/or zero emissions of all new transit, fleets, ride share and school buses.

MICRO-MOBILITY

MICRO-MOBILITY BACKGROUND

If all Eagle County residents employed smart commuting twice per week, such as biking, telecommuting, carpooling, or using public transit, the Climate Action Collaborative (CAC) calculated that transportation-related GHG emissions would decline 17% annually. Micro-mobility solutions provide innovative and clean mobility opportunities for smart commuting and can help build a culture of alternative transportation. As defined by the U.S. Department of Transportation Federal Highway Administration, micro-mobility includes any small, low-speed, human- or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles (e-bikes), electric scooters (e-scooters), and other small, lightweight, wheeled conveyances.

Current micro-mobility programs offered by the Town of Vail include Shift Bike, a regional electric bike share program. Our partnership has grown to include Edwards Metro District and Eagle County Government and will have 155 e-bikes and 33 hub stations in 2023. The system launched in 2022 including 90 e-bikes and 20 hub stations and will continue to expand each year to provide multi-modal transportation options to the local and regional community. E-Bikes for Essentials is an existing program that provides qualified essential workers in Vail with electric bikes. This equity program is a partnership with the National Renewable Energy Laboratory and

QuietKat, a local e-bike manufacturer. E-Vail Courier is an innovative program for last mile delivery of goods to businesses in Vail's pedestrian core. The program removes oversized delivery trucks from Vail Village and replaces them with smaller electric delivery carts, returning the center of Vail to its original vision of a pedestrian village while improving safety and the guest experience and reducing emissions and air pollution from idling delivery trucks.

To encourage behavior change, the Town of Vail implemented Sole Power, a Green Commuting Challenge. Offered throughout Eagle County since 2010 to encourage human-powered commuting, including e-bikes, this free challenge allows individuals and teams to compete to log the highest number of trips and miles while working towards a county-wide goal. The program has been an effective model for behavior change and will continue.

MICRO-MOBILITY GOALS

Micro-mobility devices and shared systems offer effective ways to help people meet transportation needs while reducing related greenhouse gas emissions. Electric bikes (e-bikes) provide a great alternative to commuting as they are a quick and efficient alternative to driving a vehicle and reduce the amount of time and exertion required by traditional, non-electric bikes. Shared micro-mobility, including e-bike share programs, create a more diverse, convenient, and accessible transportation network.

Owning an e-bike is not accessible to everyone, so micro-mobility solutions like e-bike share programs help remove associated barriers: cost, storage, and other physical limitations. Micro-mobility solutions can provide an efficient alternative mode of transportation for residents to commute, reduce parking congestion issues, provide first-last mile solutions, supplement bus transit, improve quality of life, and reduce greenhouse gas emissions, furthering climate and equity related mobility goals.

1 GOAL
Expand e-bike and micro-mobility infrastructure to contribute to a comprehensive valleywide system.

2 GOAL
Provide equity programs to ensure micro-mobility is accessible and equitable.

3 GOAL
Increase use and adoption of micro-mobility year over year.

MICRO-MOBILITY STRATEGIES

Each strategy below is ranked into three groups:

1 2 3 GOAL NUMBERS

LOW MED HIGH IMPACT INTENSITY

SHORT 1-2yrs MED 2-5yrs LONG 5+yrs IMPLEMENTATION TIMEFRAME

123 Expand the current e-bike share program in partnership with Eagle County communities to create a comprehensive valleywide system.
Current partners include EagleVail and Avon.

123 Maintain and expand partnerships to continue growing the E-Bikes for Essentials program.

23 Develop an e-bike rebate program for community members.
The program should consider equity and complement Holy Cross Energy e-bike rebates.

123 Develop e-bike and other micro-mobility parking and charging infrastructure throughout municipal parking areas in the Town of Vail.
Ensure that micro-mobility charging infrastructure meets all applicable safety, electrical, and building code regulations.

123 Develop policy, infrastructure, and education to ensure safety on roads, bike paths and in the pedestrian villages.
Pedestrians and those using micro-mobility devices will benefit from increased safety measures integrated into policy, infrastructure and educational programs.
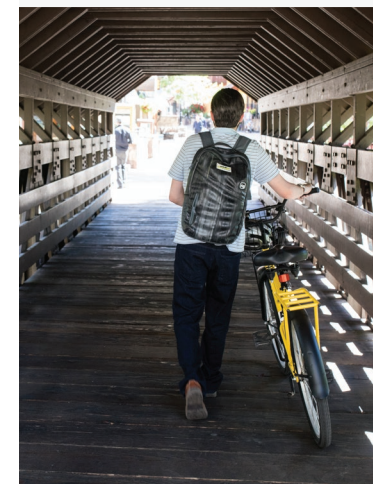
APPENDIX A:
DEFINITIONS, ACRONYMS, ABBREVIATIONS

BEV (Battery Electric Vehicle) Relies entirely on an electric battery for propulsion.

CEO Colorado Energy Office

CDOT Colorado Department of Transportation

CCS The connector type used by most EVs in North America except Tesla for direct current fast charging.

DCFC Direct Current Fast Charging

EVSE (Electric Vehicle Supply Equipment) Home charging infrastructure including a specific outlet designed for a vehicle's charging port.

EV Capable A conduit or raceway along with a free circuit that can be upgraded for electric vehicle supply equipment in the future.

EV Installed A powered circuit with installed electric vehicle charging service equipment.

EV Ready A powered circuit that terminates in an outlet into which an adapter can be plugged.

Hybrid Electric Vehicle Has internal combustion and a battery that is recharged by the vehicle.

ICE – Internal Combustion Engine Traditional vehicles rely on combustion of fossil fuels to create propulsion.

J1772 Connector Most EVs except Tesla use this connector for Level II charging.

Lithium-Ion Battery The power supply for many E-mobility devices, stores a large amount of energy in a small space.

Level I, II, and III Charging Stations Refers to the relative speed of recharging, with Level III being the fastest and also requiring direct current power.

Micro-mobility Travel using small, lightweight vehicles such as bicycles and scooters.

PHEV (Plug-in Hybrid Electric Vehicle) Has internal combustion and a plug-in electric battery which can be used alone or in combination with the gas engine to increase fuel efficiency.

Ports Refers to a connector on a charging station; many Level II stations often have two ports to allow two vehicles to charge simultaneously.

V2G (Vehicle-to-Grid) Electrical switch technology which allows bi-directional charging of a vehicle or use of a vehicle batteries electrical energy to power the grid or building needs.

Zero Emission Vehicle A vehicle that does not produce emissions from the tailpipe. Examples include hydrogen and electric battery powered vehicles.

APPENDIX B: EV EQUITY

EV EQUITY is important to ensure a just transition to clean transportation. EV equity is understood as any policy, strategy, engagement, assistance, or other resource that supports equitable access to electric transportation and its benefits. The first goal of the Go EV City resolution is to ensure that the benefits of electrified transportation are extended to low-income households and communities disproportionately affected by the harmful effects of air pollution. And while electric vehicles themselves are inherently helpful to improving air quality and reducing air pollution, the upfront cost of an EV may put it out of reach for low-to-moderate income households. EV charging is also not available at most multi-family housing complexes.

It is important to identify strategies that reduce barriers to adoption. The State of Colorado has created an EV equity study that outlines challenges to EV adoption and recommendations for a number of actions, policies, incentives, and efforts aimed at equity concerns and electric vehicles[7].

Recommendations from the study are grouped into five categories, including:

- Improving access to EV ownership
- Consumer education and outreach
- Improving access to and affordability of EV charging infrastructure
- Shared mobility programs
- Reducing air quality impacts (focusing on school bus and transit electrification grants)

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[7] Colorado EV Equity: https://energyoffice.colorado.gov/sites/energyoffice/files/documents/FINAL%202022-CEO-CO%20EV%20Equity%20Study-2022-08-06.pdf

EQUITABLE **CLEAN ENERGY**

The Urban Sustainability Directors Network published A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners. This guidebook provides principles and checklists to ensure equity is infused through all programs and planning efforts. The 12 principles for equitable design are as follows:

1. **Listen and respond.** Local governments should first listen to the communities they seek to serve. Program design should be as responsive as possible to the needs expressed by community members, and local government staff should be transparent about their resources. Ideally, this would build from preexisting community connections and engagement, and help define program goals.

2. **Partner with trusted community organizations.** Local governments should work with community organizations to design and deliver programs, and where applicable, help build the capacity of community organizations through the partnership.

3. **Recognize structural racism.** Programs targeting LMI households will not necessarily serve all disadvantaged populations. Racial analysis and baseline data must be part of an inclusive program design process to understand and address structural barriers that exist beyond income.

4. **Efficiency first.** Programs should ensure LMI households can access energy efficiency benefits as a key step to reducing energy burdens and increasing household health and comfort.

5. **Reduce financial burdens.** Programs should not add financial burdens for LMI households and should aim to reduce financial and other burdens.

6. **Increase benefits.** Programs should seek to deliver services beyond clean energy technologies and capitalize on co-benefits, such as job creation or community resilience for people of color, indigenous communities, and other historically underserved and underrepresented populations

7. **Make it easy.** Program participation should be as easy as possible for any household with effective, efficient, and culturally competent program design, outreach, and delivery.

8. **Integrate with other services.** Wherever possible, programs should align with other services for LMI households.

9. **Protect consumers and workers.** Programs should have carefully considered consumer and workforce protection elements and consumer education to avoid unintended consequences.

10. **Beyond carve-outs.** Programs should do more than set aside a small portion of benefits for LMI households, and where possible, center the needs of LMI households and other historically underserved communities in program design and delivery.

11. **Track progress.** Programs should establish and assess against baseline equity data —both quantitative and qualitative —to inform program design, establish metrics, and track progress.

12. **Long-term commitment.** Programs should provide support for LMI households beyond installing a clean energy technology, and include structures for helping with technology service, upkeep, and repair.

TOWN OF VAIL **EQUITY STRATEGIES**

The following strategies listed in this plan are intended to improve equity and accessibility to electric vehicles and micro-mobility:

- **Identify appropriate locations for expanded DC fast charging opportunities and use partners for implementation.**
  Power requirements, proximity to I-70, equitable access, use-cases and parking regulations, among other issues, will need to be optimized for successful DC fast charging installations. Grant funding is available from the State of Colorado for up to 80% of the cost of DC fast charging, and Holy Cross Energy may also be willing to contribute to such a project.

- **Develop criteria to prioritize charging infrastructure.**
  Public surveys, equity concerns, current station usage data, and location characteristics are some of the many criteria that could be used to prioritize the citing of new stations. A heat-map or similar tool may be useful to decision-making.

- **Provide town employees with workplace charging.**
  Conducting a periodic workplace EV survey will help identify locations where EV-owning employees park and may need a plug for their EV. Continue to make employee charging free to use.

- **Offer incentives for EV charging infrastructure for residents, workforce, multi-family developments and local businesses.**
  Workforce housing, lower-income neighborhoods, and multifamily housing face higher costs of entry for installing EV charging. Businesses that offer workplace charging will help encourage EV adoption.

- **Offer incentives for local residents, workforce, and the business community for purchasing and owning EVs.**
  The existing Energy Smart program can be utilized for offering this incentive.

- **Develop an electric car share program.**
  Town-owned multifamily housing could provide a pilot program. Denver provides an example of a successful electric car share program called Colorado Car Share.

- **Provide multi-lingual resources and education opportunities, including EV drive events, for local residents and businesses.**
  Providing technical assistance on operating EVs, installing infrastructure or using public chargers will also be critical. Partnering with local NGO's and regional EV players will leverage impact.

- **Maintain and expand partnerships to continue growing the E-Bikes for Essentials program.**
  Current partners include the National Renewable Energy Laboratory (NREL) and QuietKat, a local e-bike manufacturer.
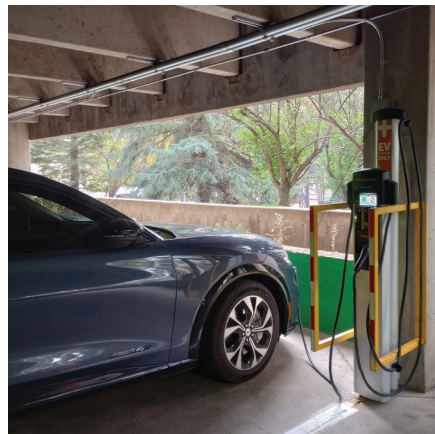
SALES

Sales of electric vehicles in Colorado are increasing rapidly thanks to new models, federal and state tax credits, and a growing awareness of the benefits of electric vehicles for the environment and the consumer. The State of Colorado has set a goal of nearly 1 million electric vehicles on the road by 2030. The figure below shows high and low growth EV scenarios in the state over the coming the decade.
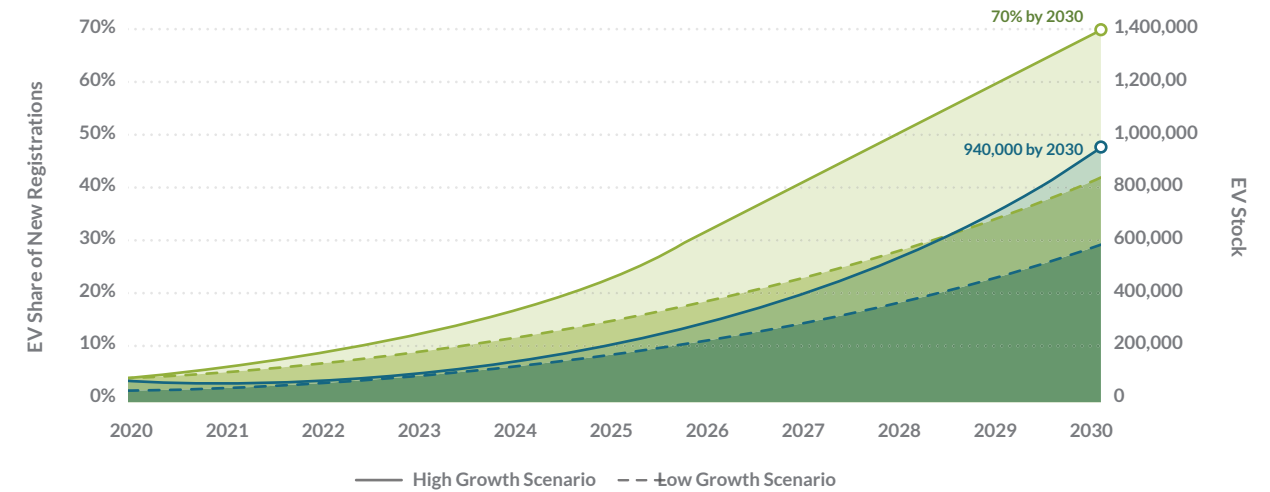
Assumed Colorado new vehicle EV share (green) and total EV stock (blue) from 2020 to 2030 for high (solid line) and low (dashed line) growth scenarios.

GROWTH

Growth of registrations of electric vehicles are on track to meet high growth predictions. The figure below shows recent EV registrations in the State of Colorado with nearly 7% of all vehicles registered in the state being electric (PHEV and BEV). The chart below shows recent EV registrations broken out by BEVs and PHEVs[8].
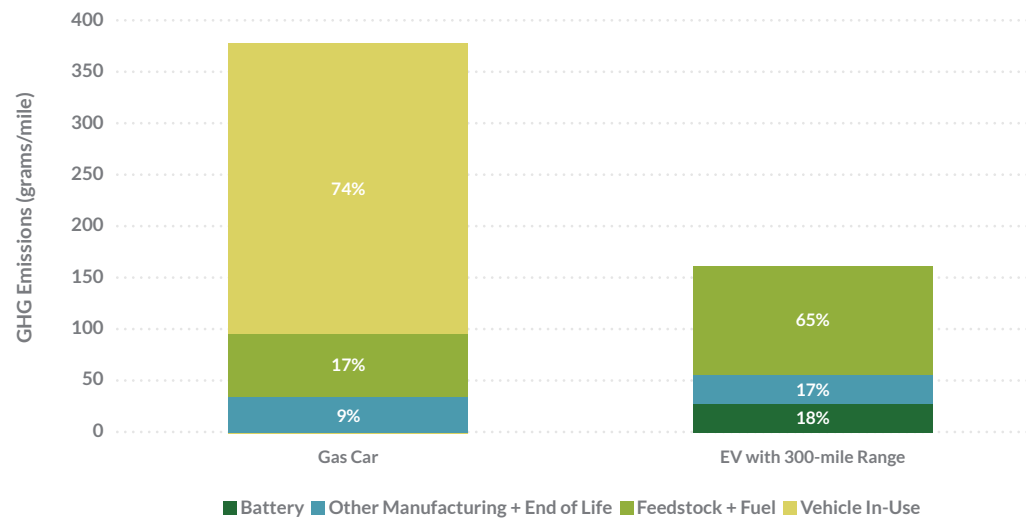

Original EV Registrations

8 Original EV Registrations: https://atlaspolicy.com/evaluateco/
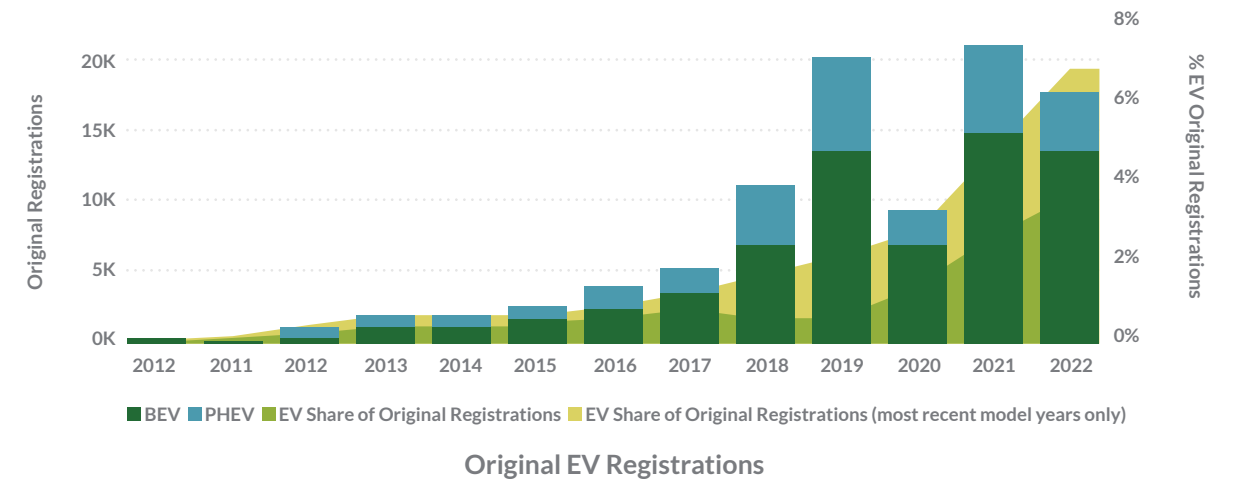
Which Type of Vehicles Have Greater Lifecycle Impacts on the Environment?

There is no denying that the manufacturing of electric vehicles creates carbon emissions, and these emissions may even be greater than the manufacturing impact of a comparable conventional gasoline vehicle. However, according to an analysis by the Union of Concerned Scientists, an electric vehicle produces the global warming potential of driving a gasoline vehicle that has an 88 mpg fuel economy[9]. The higher efficiency and cleaner fuel supply for electric vehicles ensures that their lifetime emissions are significantly less than conventional fuel vehicles. For example, driving the 2020 Tesla Model 3 Standard Range Plus in California has emissions equal to a 161 mpg gasoline car, or less than a fifth of the global warming emissions of the average new gasoline car and over 60 percent less than even the most efficient gasoline car. Besides taking advantage of cleaner electricity EVs also operate more efficiently. EVs convert 77% of energy into moving the vehicle vs 12-30% for combustion engines[10].

The figure below shows a comparison of lifecycle GHG emissions between a gas and electric vehicle. Electric vehicles produce fewer emissions thanks to higher efficiency and a cleaner energy supply.

What Are the Impacts of Electric Vehicle Batteries?

Modern EV batteries include rare earth minerals and relatively scarce materials such as lithium and cobalt. Irresponsible mining practices, especially in unregulated economies, can create serous environmental and social harm. However, major car manufacturers including Ford Motor Co. are working to eliminate unregulated sources of minerals and bring transparency to the sources of its materials. Commercial scale lithium-ion battery recycling is scaling currently to meet market demands which further reduce negative environmental impacts of new mining development. Additionally, used EV batteries are also finding new life as grid-scale energy storage[11]. Vehicle manufacturers continue to innovate battery chemistry with the potential of greatly reducing and/or eliminating some of the exotic materials in battery packs. Tesla is already using cobalt-free batteries in many of the vehicles it produces. A large factory near Reno, Nevada is under construction by a company called Redwoods Materials and will build EV battery components using recycled materials. The company is already recycling batteries from Audi, Ford, Volkswagen, and Volvo. Battery innovation, including recycling, will undoubtedly continue to improve.

Lifecycle GHGs for an Electric Vehicle and a Gasoline Car

What Battery Safety Tips Should be Followed for E-Mobility Devices?

Lithium-ion batteries power many kinds of mobility devices such as e-bikes, e-scooters, and electric vehicles. If used improperly or damaged, these batteries can become a fire hazard and produce large amounts of heat and toxic smoke in a process known as thermal runaway[12]. Extinguishing lithium-ion battery fires poses unique challenges and life safety considerations for first responders. Here are some steps you can take to lower your risk of fire and electric shock injury related to charging EVs and micro-mobility devices[13]:

- Before buying an EV, have a qualified electrician install a new dedicated circuit for your EV charging device. Older home wiring may not be suitable for EV charging.
- Never use a multiplug adapter or extension cord to charge an E-mobility device.
- Do not use an E-mobility device, charging cable or battery with obvious signs of damage.
- Only purchase and use devices that are listed by a qualified testing laboratory.

How Much Do Electric Vehicles Cost to Own and Operate?

High MSRP prices have given EVs a reputation for being out-of-reach for many consumers. A 2020 Consumer Reports Study showed that the lifetime ownership costs for electric cars offered savings of between $6,000 and $10,000 compared to gas cars[14]. Consumer Reports found that with fewer moving parts, EVs have 50 percent lower maintenance costs than gas cars. It also discovered that EV owners will spend 60 percent less on fuel for their vehicle. The higher upfront cost of an EV is mitigated somewhat by federal and state tax credits, although new requirements in Federal law will exclude foreign-made vehicles. Purchasing a used electric car is now supported by a $4,000 federal tax credit. Despite some higher up-front cost for EVs, lower fuel and maintenance costs result in significant savings over time. EV Incentives are changing rapidly. Drive Electric Colorado has compiled EV Incentives such as tax credits and utility rebates and incentives into a handy resource. More information can be found here: **https://driveelectriccolorado.org/incentives**.

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[9] Union of Concerned Scientists: https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why/

[10] Fueleconomy.gov, "All Electric Vehicles": https://www.fueleconomy.gov/feg/evtch.shtml

[11] Canary Media, "Used EV Batteries": https://www.canarymedia.com/articles/energy-storage/used-ev-batteries-are-storing-solar-power-at-grid-scale-and-making-money-at-it

[12] National Fire Protection Association, "Lithium-Ion Battery Safety": www.nfpa.org/education

[13] U.S. Fire Administration, "Electric Vehicle Charging Safety Tips": usfa.fema.gov/blog/ci-081821.html

[14] Consumer Reports, "Electric Vehicle Ownership Costs": https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf

EV VEHICLE PURCHASE/LEASE FUNDING OPPORTUNITIES

SOURCE	STATE (Tax Credit)	STATE GRANT FUNDING (CDOT/DOLA/CLEER)	FEDERAL TAX CREDIT	UTILITY PROGRAMS (Holy Cross or Xcel Energy)
Commercial Fleets	x		x	
Commercial/Ag (Offroad, Construction, Snowcats)		x		
Individuals	x		x	x**
Municipal		x		
Non-Profits	x*			

*Nonprofits can access the federal and state tax credits by 'assigning' the credit to the financing group
**Xcel Energy offers an income-based vehicle rebate

COLORADO VEHICLE TAX CREDIT

CATEGORY	2022	2023–2025
Light-Duty EV	$2,500 for purchase; $1,500 for lease	$2,000 for purchase; $1,500 for lease
Light-Duty Electric Truck	$3,500 for purchase; $1,750 for lease	$2,800 for purchase; $1,750 for lease
Medium-Duty Electric Truck	$5,000 for purchase; $2,500 for lease	$4,000 for purchase; $2,500 for lease
Heavy-Duty Electric Truck	$10,000 for purchase; $5,000 for lease	$8,000 for purchase; $5,000 for lease

2017 Climate Action Plan: https://drive.google.com/file/d/1cnONgRjr16X4y1zUVyhIvSfVxW16BZGj/view

2021 International Council on Clean Transportation, "Colorado Charging Infrastructure Needs to Reach Electric Vehicle Goals: https://theicct.org/publication/colorado-charging-infrastructure-needs-to-reach-electric-vehicle-goals/

Atlas Policy EV Dashboard: https://atlaspolicy.com/evaluateco/

Canary Media, Used EV Batteries are Storing Solar Power at Grid Scale, and Making Money Doing It: https://www.canarymedia.com/articles/energy-storage/used-ev-batteries-are-storing-solar-power-at-grid-scale-and-making-money-at-it

Colorado Energy Office, "Colorado EV Plan 2020," (2020): https://energyoffice.colorado.gov/zero-emissionvehicles/colorado-ev-plan-2020.

Colorado EV Equity: https://energyoffice.colorado.gov/sites/energyoffice/files/documents/FINAL%202022-CEO-CO%20EV%20Equity%20Study-2022-08-06.pdf

Colorado EV Plan https://energyoffice.colorado.gov/zero-emission-vehicles/colorado-ev-plan-2020

Consumer Reports, "Electric Vehicle Ownership Costs": https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf

DC Fast-Charging Corridors: https://energyoffice.colorado.gov/zero-emission-vehicles/ev-fast-charging-corridors

EarthJustice.Org: " Electric Vehicles are not just the wave of the future, they are saving lives today." : https://earthjustice.org/feature/electric-veehicles-explainer

Electrek, "Tesla Using Cobalt Free LFP Batteries": https://electrek.co/2022/04/22/tesla-using-cobalt-free-lfp-batteries-in-half-new-cars-produced/

Electrification Coalition Federal EV Policies: https://electrificationcoalition.org/work/federal-ev-policy/inflation-reduction-act/

EPA Electric Vehicle Myths: https://www.epa.gov/greenvehicles/electric-vehicle-myths#Myth5

ESC Partner Rebates: https://www.energysmartcolorado.com/wp-content/uploads/2022/03/2022-Rebates-by-Community.pdf

Five Car Sharing Programs with an EV and Equity Twist: https://www.greenbiz.com/article/five-car-sharing-programs-ev-and-equity-twist

Fueleconomy.gov, "All Electric Vehicles": https://www.fueleconomy.gov/feeg/evtech.shtml

Good2go, "Electric Car Share Program": https://evgood2go.org/

Holy Cross Energy 100x30 Strategic Plan: https://www.holycross.com/100x30/strategic-plan-2020/

Holy Cross GHG Profile: https://www.holycross.com/greenhouse-gas-emissions/

Inside EVs: "Redwood Materials to Invest $3.5 Billion On Battery Materials Factory": https://https://insideevs.com/news/600568/redwood-materials-invest-billions-battery-materials-factory/

National Fire Protection Association, "Lithium-Ion Battery Safety": https://www.nfpa.org/education

The International Council on Clean Transportation: https://theicct.org/2022-update-ev-sales-us-eu-ch-aug22/

Town of Vail Loading and Delivery: https://www.vailgov.com/government/departments/police/loading-and-delivery

Union of Concerned Scientists: https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why/

Urban Sustainability Network: "A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners": https://cadmusgroup.com/wp-content/uploads/2018/09/Cadmus-USDN-Equitable-Clean-Energy-Guidebook.pdf

U.S. Fire Administration: "Electric Vehicle Charging Safety Tips": usfa.fema.gov/blog/ci-081821.html

RESOLUTION NO. 48
Series of 2021

RESOLUTION TO DECLARE TOWN OF VAIL A "GO ELECTRIC VEHICLE (GOEV) CITY" AND PLEDGE TO IMPLEMENT STRATEGIES TO REDUCE TRANSPORTATION RELATED EMISSIONS. THE TOWN COUNCIL OF VAIL, COLORADO, HEREBY FINDS AND RECITES THAT:

WHEREAS, the petroleum-fueled transportation sector is the largest source of greenhouse gas emissions in Colorado and is a contributing factor to air pollution and climate change, threatening the health of our citizens and the sustainability of our planet.

WHEREAS, the transportation sector needs support to move toward adoption of clean energy technology, including electric vehicles (EVs) and future zero emission technologies, that reduce dependence on foreign fuels and support a healthy environment and economy. The term "electric vehicles" includes Battery Electric Vehicles, Plug-in Hybrid Electric Vehicles, and Hydrogen Fuel Cell Vehicles.

WHEREAS, electrification of cars, trucks, buses and supporting the availability of electric bicycles where travelers would otherwise use a gas-powered vehicle is needed to achieve deep reductions in carbon pollution, and the benefits grow over time as utilities transition to higher levels of renewable energy.

WHEREAS, Town of Vail adopted the Climate Action Plan for the Eagle County Community, including climate goals to cut community GHG emissions 25% by 2025, 50% by 2030, and 80% by 2050, in accordance with the Paris Accord. Electrifying the transportation sector is a necessary component for the Town to meet these goals.

WHEREAS, Town of Vail is dedicated to leading the use of clean energy, establishing policies and programs that conserve energy, promoting sustainability, and supporting Colorado's goal of nearly one million EVs on its roads by 2030.

WHEREAS, Town of Vail has demonstrated leadership and a commitment to transportation electrification by installing 12 multi-port Level 2 and 4 DCFC public EV charging stations, implementing four battery electric buses on the in-town bus route, installing charging stations at town facilities to charge battery electric buses with clean energy, piloting an electric bike share program and working regionally to expand the program, and participating in the Holy Cross Energy PuRE program to ensure 100% of electricity purchased is from renewable solar energy.
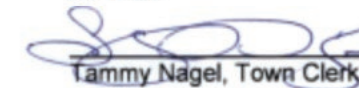
BASED ON THE FINDINGS MADE IN THIS RESOLUTION, ABOVE, BE IT RESOLVED BY THE TOWN COUNCIL OF VAIL, COLORADO:

THAT: The Vail Town Council pledges to develop policies and strategies to meet the following transportation electrification objectives:
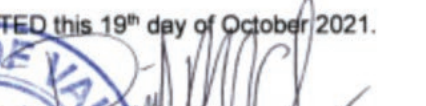
1. Improve transportation and social equity and extend the benefits of transportation electrification to low-income households and communities disproportionately affected by the harmful effects of air pollution.

2. Establish an "EV First" procurement policy to ensure that all new light duty vehicles purchased by the town are electric vehicles when the technology accommodates the needs of the vehicle use and departmental budgets can accommodate both vehicle acquisition and the associated charging infrastructure. The Town will include the total cost of vehicle ownership, including fuel and maintenance costs, and the carbon emissions impacts in its vehicle procurement calculations.

3. Support the electric vehicle charging station infrastructure needed to accommodate the transition to electric vehicles considering the availability and sustainability of resources, council priorities and budget constraints.

4. Transition to medium and heavy duty zero emission vehicles and off-road equipment as these vehicles become available in Colorado if they can fully support the needs of the departments operations and departmental budgets can accommodate both vehicle acquisition and the associated charging infrastructure.

5. Collaborate with municipal and regional partner entities and organizations to encourage development a roadmap to electrification and/or zero emissions of all new transit, fleets and ride share and school buses by 2032.

6. Transition 100% of all Town of Vail bus routes to zero-emission by 2032.

7. Work with the community on programs, policies, incentives, and regulatory approaches to transition 30% of all vehicles within the town to zero emissions by 2030 and 100% by 2050.

8. Develop partnerships with micro-mobility companies to promote the use of fossil fuel-free alternative transportation options such as electric bikes and bicycles.

INTRODUCED, READ, APPROVED AND ADOPTED this 19th day of October 2021.

David Chapin, Mayor, Town of Vail

ATTEST:

Tammy Nagel, Town Clerk

TOWN OF VAIL