Colorado Electric Vehicle Plan

IN SUPPORT OF THE EXECUTIVE ORDER, *SUPPORTING COLORADO'S CLEAN ENERGY TRANSITION* | JANUARY 2018

Contents

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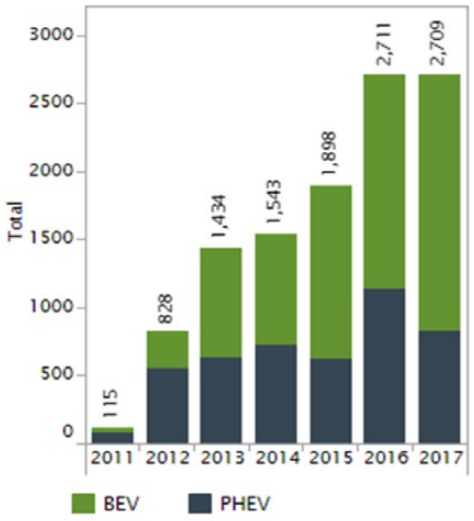
Introduction and Background

The State of Colorado is rapidly emerging as a leader in the electric vehicle (EV) market. According to the ZEV Sales Dashboard, as of August 2017 there were 11,238 EVs in Colorado. Over the first eight months of 2017, EV sales were up 73% over the same period in 2016. Battery electric vehicles (BEV) comprised 70% of total EV sales with plug-in hybrid electric vehicles (PHEV) making up the remainder. Colorado currently ranks 8th in the nation for highest market share[1] and seventh for number of EVs per capita.[2] In 2016, *The Washington Post* named Colorado the best place in the country to buy a new electric vehicle.[3]

In 2015, the Colorado Energy Office's *Colorado EV Market Implementation Study* indicated while individual EV owners realized savings from reduced fuel and maintenance costs, early rates of adoption also provided environmental and economic benefits to the state as a whole.[4] A 2017 study prepared by Southwest Energy Efficiency Project (SWEEP) for the City and County of Denver found driving a BEV in the Denver metro area reduced greenhouse gas (GHG) emissions by 43% compared to a gasoline vehicle.[5] In January of 2017, the U.S. Energy Information Administration reported for the first time since the late 1970s, U.S. carbon dioxide emissions from the transportation sector exceeded those from the electric power sector.[6]

Colorado ZEV Sales Annual Comparison

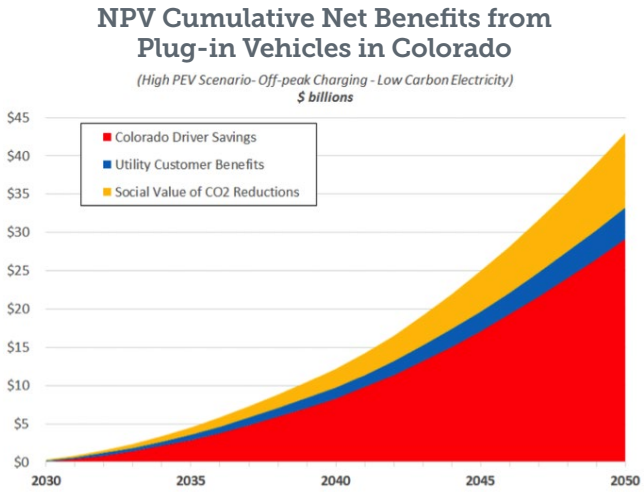


Source: ZEV Sales Dashboard

With increased adoption, the State of Colorado stands to reap significant air quality benefits. Under the *Colorado EV Market Implementation Study's* high growth rate projection, by 2030 Colorado could have close to one million EVs on the road.[7] By achieving this growth rate, Colorado could experience an annual reduction of ozone forming pollutants estimated at 800 tons of nitrogen oxide (NO_x), 800 tons of volatile organic compounds (VOC), and up to 3 million tons of GHG.[8] The air quality benefits from transportation electrification will only increase as utilities add more carbon-free electricity generation. In 2025, a BEV charging in Denver will reduce NO_x emissions by 84 percent, VOC emissions by 99 percent, and GHG emissions by 49 percent compared to a new gasoline vehicle.[9]

1 Alliance of Automobile Manufacturers. 2017. ZEV Sales Dashboard.
2 US DOE Office of Energy Efficiency and Renewable Energy. 2017. Transportation Analysis Fact of the Week #1004.
3 The Washington Post. Fung, B. 2016. The states where it pays to buy a new electric car.
4 Colorado Energy Office. 2015. Electric Vehicle Market Implementation Study.
5 City and County of Denver. 2017. Opportunities for Vehicle Electrification in Denver Metro area and Across Colorado.
6 U.S. Energy Information Administration. 2017. Today in Energy. Power Sector Carbon Dioxide Emissions Fall Below Transportation Sector Emissions.
7 Colorado Energy Office. 2015. Electric Vehicle Market Implementation Study.
8 Estimates calculated by Regional Air Quality Council using GREET. 2017.
9 City and County of Denver. 2017. Opportunities for Vehicle Electrification in Denver Metro area and Across Colorado.

Colorado will also experience substantial economic benefits from this transition. Under a moderate growth scenario forecasted by M.J. Bradley & Associates (MJB&A), Colorado could see a statewide net present value of $7.6 billion in cumulative net benefits by 2050. Under a high growth scenario, cumulative net benefits could grow to more than $43 billion.[10] These benefits accrue from cost savings to EV drivers, reduced electric bills for utility consumers, and monetized benefits that come from reduced GHG emissions.



Source: MJB&A, Electric Vehicle Cost-Benefit Analysis, 2017

Finally, in Rocky Mountain Institute's *From Gas to Grid,* a literature review of more than 150 studies, found the savings from greater EV adoption are equal to $54,468 (NPV) in total lifetime benefits per vehicle. These savings accrue from fuel savings and ratepayer, EV owner, and GHG emissions benefits, as well as other benefits to the grid.[11]

Despite the recent growth in Colorado's EV market, barriers to adoption remain. Lack of public charging, particularly EV fast-charging along major transportation corridors, remains a major barrier to greater adoption. Consumers are apprehensive about the availability of public charging including both local, community-based charging stations and fast-charging stations along Colorado's transportation corridors.[12] In a survey of current and potential EV drivers, respondents indicated there are numerous locations in Colorado they are less likely to travel to due to lack of charging, with half indicating lack of charging availability as a significant factor in the decision not to purchase an EV. Build-out of an EV fast-charging network is likely to require significant public funding due to the high cost of installation. In addition, high operational costs combined with low utilization may create a challenging business case, further highlighting the need for short-term public investment.[13]

Supporting Colorado's Clean Energy Transition

In July of 2017, Governor John Hickenlooper announced Colorado would join the U.S. Climate Alliance and signed Executive Order D 2017-015, "Supporting Colorado's Clean Energy Transition." Recognizing the importance of EV fast-charging corridor stations in stimulating growth of the EV market, the executive order directs state agencies to develop a plan to electrify Colorado's transportation corridors:

> "The Colorado Energy Office, the Regional Air Quality Council, and the Colorado Department of Public Health and the Environment are directed to develop, in coordination with other state agencies and in alignment with the Volkswagen Mitigation Trust, a statewide Electric Vehicle plan by January 1, 2018 to build out key charging corridors that will facilitate economic development and boost tourism across the state while reducing harmful air pollution."

10 M.J. Bradley & Associates. 2017. Electric Vehicle Cost-Benefit Analysis. Plug-in Electric Vehicle Cost-Benefit Analysis: Colorado.
11 Rocky Mountain Institute. 2017. From Gas to Grid. Building Charging Infrastructure to Power Electric Vehicle Demand.
12 Colorado Energy Office. 2015. Electric Vehicle Market Implementation Study.
13 City and County of Denver. 2017. Opportunities for Vehicle Electrification in Denver Metro area and Across Colorado.

The Colorado EV Plan was developed in partnership with the Colorado Energy Office (CEO), Regional Air Quality Council (RAQC), Colorado Department of Public Health and Environment (CDPHE), and Colorado Department of Transportation (CDOT). The plan begins with a description of existing programs and strategies that support the goal of building a network of EV fast-charging stations. It then sets out a series of actions and strategies to electrify Colorado's corridors while ensuring the benefits that come with widespread adoption of EVs are achieved.

The plan also includes a series of goals and strategies that go beyond EV fast-charging corridors to further accelerate adoption of EVs and ensure Colorado remains a leader in the EV market. Given the dynamic nature of the EV market, the Colorado Electric Vehicle Plan is presented as a living document. On an annual basis, the plan will be revisited and updated as needed to ensure Colorado remains responsive to a changing market.

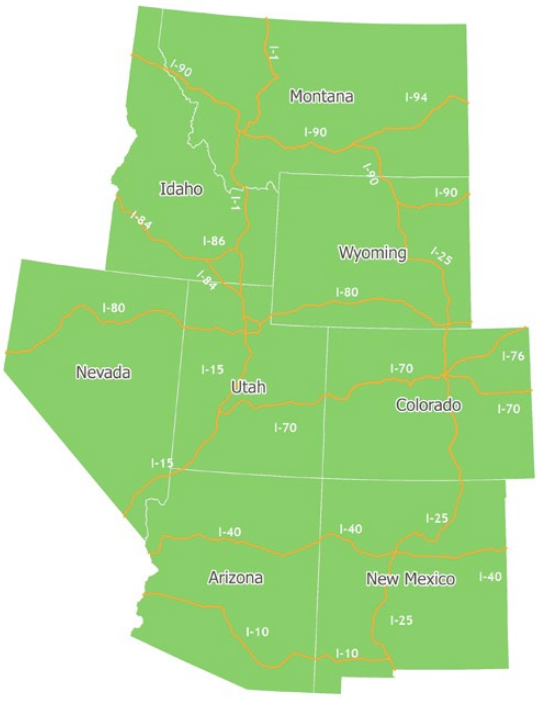
Colorado's Strong Foundation

Colorado is well-prepared to meet the challenge of electrifying its transportation corridors. From multi-state planning initiatives, long-standing alternative fuel infrastructure and vehicle grant programs to Colorado-based planning and research efforts, the State of Colorado has a strong foundation on which to build out a network of fast, convenient, and reliable corridor charging stations.

REGIONAL ELECTRIC VEHICLE WEST MEMORANDUM OF UNDERSTANDING

In October of 2017, the governors of eight Western states signed the Regional Electric Vehicle West memorandum of understanding (REV West MOU). The REV West MOU creates a framework for collaboration in developing an Intermountain West Electric Corridor. Interstates 70, 76 and 25 are included under Colorado's commitment. The MOU calls for creating a coordinating group to carry out the goals of the plan including promoting purchase of EVs and developing voluntary minimum standards for EV fast-charging corridors across the eight states.[14]

Intermountain West EV Corridor

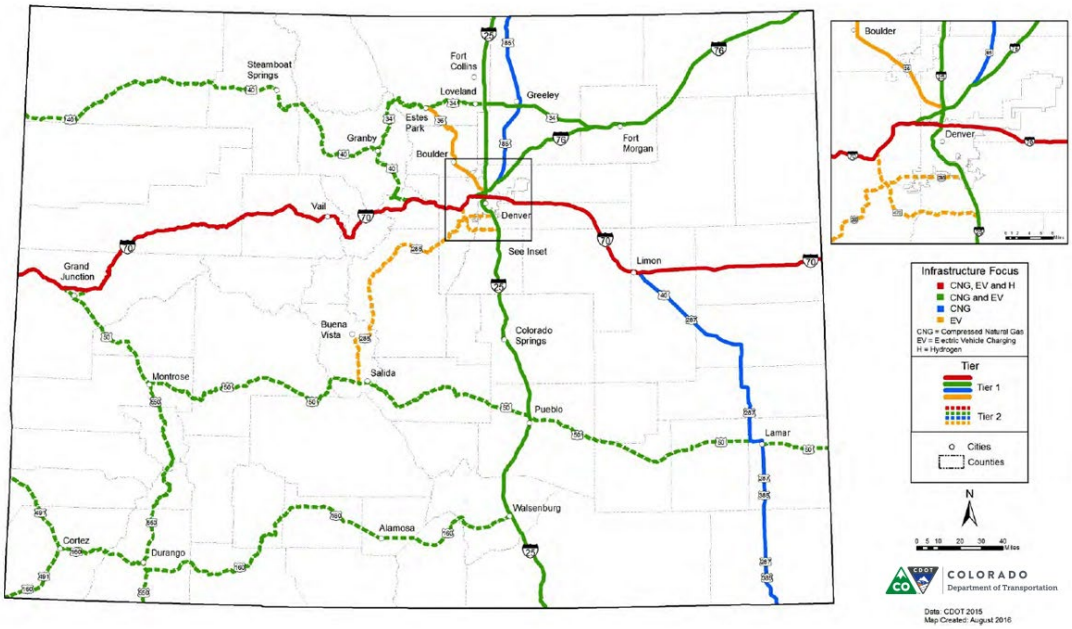


FAST ACT CORRIDOR DESIGNATIONS

As part of the federal FAST ACT alternative fuel corridor nomination process, the State of Colorado convened stakeholders from CDOT, CEO, RAQC, Colorado's five metropolitan planning organizations, and the Statewide Transportation Advisory Committee to identify potential corridors by priority and appropriate fuel type. While three interstates were ultimately designated, the State considers each of the 15 nominated corridors to be a statewide priority. While the state will seek to develop EV charging and other alternative vehicle fueling infrastructure along each of the corridors, it will focus initially on Tier I and II corridors as established through the nomination process. The map will also be updated as new corridor priorities and alternative fuel technologies develop, and alignment with other statewide and regional efforts including the REV West Plan and Colorado EV Plan will be maintained.

14 MOU between Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming. 2017. Regional Electric Vehicle Plan for the West.

FAST ACT Corridor Designations



Source: CDOT

ALTERNATIVE FUEL INFRASTRUCTURE AND VEHICLE GRANT PROGRAMS

CEO and RAQC have partnered to develop and administer two grant programs that address the barriers of limited alternative fuel vehicle and charging infrastructure as well as the additional cost of alternative fuel vehicles (AFV), which results in fewer AFVs on the road. Together, these grant programs make it easier and more cost-effective for developers and site hosts to build out EV charging infrastructure, and for fleets and the motoring public to transition to EVs.

- **Charge Ahead Colorado** was launched in 2013 to provide grants for EVs and community-based EV charging stations to improve air quality and accelerate the deployment of EVs across the state. To date, the program has made awards to more than 600 stations across Colorado and 100 EVs in the 7-county Denver metro area.
- **ALT Fuels Colorado** was launched in 2014 to provide grants for compressed natural gas (CNG), electric, and propane vehicles, and for construction of publicly-accessible alternative fueling and charging stations. To date, the program has made awards to 10 CNG stations and 887 alternative fuel vehicles. In 2018, CEO will modify the program to begin funding EV fast-charging corridor stations.

VOLKSWAGEN AND ELECTRIFY AMERICA

As part of the national Volkswagen Diesel Emissions Settlement, the State of Colorado will receive $68.7 million from the environmental mitigation trust. Funds may be used to incentivize the purchase of low-emission vehicles and transit, and for development of zero emission vehicle fueling and charging infrastructure. CDPHE serves as the lead agency in administering Colorado's allocation and has coordinated with CDOT, CEO, RAQC, and other agencies in drafting the state's Beneficiary Mitigation Plan. Colorado's plan proposes that 15 percent, the maximum percentage allowed under the terms of the settlement, be allocated for light duty EV charging stations. The funding will be available for both community-based and EV fast-charging corridor stations.

The national settlement also requires that VW invest $2 billion over 10 years in zero emission vehicle infrastructure and education programs. Electrify America, a newly-created subsidiary of VW, will administer this investment. Funds will be spent in $500 million increments over four 30-month cycles. In the first cycle, Electrify America will focus on building a long-distance network of fast-charging stations along high-traffic corridors across the country. In Colorado, stations will be built along I-70, I-25 and I-76. Electrify America has also selected Denver as one of 17 metro areas in the nation for additional investment and plans to install numerous charging stations in the metro area.[15]

RESEARCH AND STUDIES

Strategic planning by state and local agencies with support from the National Renewable Energy Laboratory (NREL) has informed development and implementation of EV programs and incentives. In 2017, the City and County of Denver, RAQC, CDOT, CEO, and NREL collaborated on two complementary studies, one on multi-family and corridor stations[16] and the second on charging infrastructure needs and siting based on traffic flow data and other critical data.[17] These studies contain recommendations on station siting, design, location, and incentive levels and will be used to inform the build-out of Colorado's EV fast-charging network.

OUTREACH, EDUCATION, AND STAKEHOLDER ENGAGEMENT

A number of statewide programs and partnerships have been developed to support greater adoption of EVs and investments in charging infrastructure. Refuel Colorado, launched in 2013, employs fleet coaches around the state who educate public and private fleets on the costs and benefits of converting to AFVs. Fleet coaches engage a variety of stakeholders in building local support for AFV adoption and help facilitate group buy programs, which are partnerships between a local organization and one or more dealerships that provide deep discounts on new EVs.

The Colorado Electric Vehicle Coalition (CEVC), a statewide group of EV stakeholders committed to accelerating EV adoption, was created in 2015. This coalition is chaired by CEO and works to improve statewide coordination, disseminate information about stakeholder activities, and promote EV adoption. The Coalition consists of thought leaders, educators, automobile dealers and manufacturers, state agencies, local governments, nonprofit organizations, utilities, and other stakeholders.

Colorado Electric Vehicle Plan — EV Fast-Charging Corridors

A lack of EV fast-charging stations along major transportation corridors limits the ability of EV drivers to engage in intra- and interstate travel, a major barrier for current and prospective EV owners. Colorado currently has 53 EV fast-charging stations (138 EV fast-charging ports).[18] It is estimated that to support the medium growth scenario projected in the *EV Market Implementation Study*, a total of 204 stations (817 EV fast-charging ports) will be required, with many installed along Colorado's transportation corridors. Under the high growth scenario, as many as 632 stations (2,530 ports) will be needed.[19] To help address this barrier, the State of Colorado envisions a network of EV fast-charging stations along major transportation corridors that provides quick, convenient, and reliable charging and allows a driver in an EV to travel from one side of the state to the other without experiencing range anxiety.

15 Electrify America. 2017. Our Plan.

16 City and County of Denver. 2017. Opportunities for Vehicle Electrification in Denver Metro area and Across Colorado.

17 National Renewable Energy Lab. 2017. Electric Vehicles in Colorado: Anticipating Consumer Demand for Direct Current Fast Charging.

18 U.S. Department of Energy. 2017. Alternative Fuels Data Center Alt Fueling Station Locator.

19 National Renewable Energy Lab. 2017. Electric Vehicles in Colorado: Anticipating Consumer Demand for Direct Current Fast Charging.

ACTION #1: Build out Colorado's EV fast-charging infrastructure through public-private partnerships and in coordination with other programs and funding sources.

- **Strategy 1:** In first quarter 2018, CEO will modify its ALT Fuels Colorado program and provide grants to public and private entities to build EV fast-charging corridor stations.

  ALT Fuels Colorado (AFC) has a successful track record of funding publicly-accessible AFV fueling infrastructure. In 2018, CEO will modify its AFC program and using existing program funds, launch a competitive application process to solicit proposals for development of EV fast-charging stations at multiple sites along Colorado's Tier I and II transportation corridors. CEO anticipates providing grants for 50–60 stations (200–240) ports.

- **Strategy 2:** Integrate a portion of Colorado's VW Settlement allocated for EV charging infrastructure into ALT Fuels Colorado, accelerating public investment in electrification of Colorado's major transportation corridors.

  Colorado's VW plan proposes to spend $10.4 million on light duty electric vehicle charging stations. Approximately $6.8 million is allocated for EV fast-charging stations along Tier I and II corridors. Beginning in mid-2018, CEO will integrate this funding into ALT Fuels Colorado to ensure rapid deployment of VW funds and development of EV fast-charging corridors.

- **Strategy 3:** Coordinate with other entities, including Electrify America, to ensure that optimal fast-charging infrastructure is developed along Colorado's interstates.

  Electrify America has proposed to install stations along Interstates 70, 25, and 76.[20] CEO will coordinate with Electrify America and other entities, as needed, to ensure stations receiving grant funds are sited in a way that provides optimal coverage, ensures a consistent user experience, and maximizes the ability for Coloradans to engage in long distance travel in an EV.

- **Strategy 4:** Increase funding for installation of EV fast-charging stations.

  The projected funding allocated for EV fast-charging stations in the Colorado EV Plan will be critical to initiating build-out of Colorado's EV fast-charging network. As Colorado's EV stock grows, the need for publicly-available fast-charging will increase. CEO, working with state partners and others, will explore opportunities for increased funding beyond what is currently allocated through ALT Fuels Colorado.

ACTION #2: Support interstate EV travel and a consistent user experience across the Intermountain West.

- **Strategy 1:** CEO will work with REV West states to develop minimum voluntary guidelines for EV fast-charging stations.

  The REV West MOU requires that signatory states develop "voluntary minimum standards for EV charging stations, including standards for administration, interoperability, operations, and management."[21] CEO will work with REV West states to facilitate regular exchange of information and where possible, work to ensure that development of Colorado's EV fast-charging corridors is consistent with best practices and minimum guidelines developed through the REV West MOU.

20 Electrify America. 2017. Our Plan.

21 MOU between Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming. 2017. Regional Electric Vehicle Plan for the West.

- **Strategy 2:** Establish connectivity between Colorado's EV fast-charging corridors and those of bordering REV West states.

  CEO will develop corridor locations that connect Colorado's interstates with those of neighboring states, ensuring that where possible, stations are sited within 30 to 50 miles of the closest station in bordering REV West states, helping to facilitate travel by EV across the Intermountain West.

ACTION #3: Develop new strategic partnerships that support greater investment in EV fast-charging and increase utilization of charging infrastructure.

- **Strategy 1:** CEO and RAQC will engage Colorado utilities (Investor-Owned, Municipal, and Cooperatives) in the planning and deployment of community-based and EV fast-charging corridor stations to help identify strategies that drive greater EV adoption, improve air quality, and maximize benefits to ratepayers.

  Utilities will play a critical role in electrifying Colorado's transportation sector. Utilities, with the support of the Public Utilities Commission or appropriate governance body, should investigate the wide range of actions they may take to support the emerging EV market. Examples include providing education and outreach to station developers and utility customers and members, developing rates specific to EV fast-charging stations, implementing time of use rates for residential charging, making investments in make-ready infrastructure and underserved markets such as multi-family, streamlining station installation, and taking steps to future-proof EV fast-charging technology.

- **Strategy 2:** Working in partnership with Refuel Colorado fleet coaches, state and local governments, community organizations, auto manufacturers and dealerships, and others, explore partnerships that accelerate build-out of community-based and corridor fast-charging stations and adoption of EVs.

  CEO will work with Refuel Colorado coaches to engage stakeholders along proposed EV fast-charging corridors to explore partnerships and strategies that create an attractive environment for investments in fast-charging infrastructure. Examples include financial support, lead-by-example initiatives, sponsorships, group buy programs, and other strategies that reduce risk of investment while encouraging greater adoption of EVs.

- **Strategy 3:** Prioritize communities along Tier I and II corridors for funding through Charge Ahead Colorado during build-out of EV fast-charging corridor stations.

  CEO and RAQC will explore ways to prioritize grants for charging stations in communities along EV fast-charging corridors. Expanding local charging infrastructure supports development of local and regional charging networks, leading to increased adoption of EVs and greater use of state-supported community-based and EV fast-charging corridor stations.

ACTION #4: Update signage policies and requirements to increase public wayfinding and awareness of EV fast-charging locations along highway corridors in Colorado and the Intermountain West.

- **Strategy 1:** Update CDOT signage criteria to accommodate EV fast-charging locations and establish a process for signing of new publicly-accessible stations that meet updated criteria.

  CDOT will update existing signage criteria to ensure appropriate signage for Colorado's emerging network of EV fast-charging stations. Updated criteria will include items such as plug compatibility, distance from highway interchange (urban vs. rural), hours of operation, and availability of water and restroom facilities.

- **Strategy 2:** Deploy signage for existing publicly-accessible EV fast-charging locations that meet updated signage criteria in 2018.

  CDOT will engage existing EV fast-charging station owners and site hosts in order to identify locations that meet newly developed criteria. For those owners and site hosts interested in signage, CDOT will work to deploy by end of 2018.

- **Strategy 3:** Work with REV West MOU states and other stakeholders to develop consistent voluntary signage standards for EV fast-charging stations across the signatory states.

  CDOT and other state agencies will work with REV MOU states to develop best practices and voluntary standards for corridor signage. Where possible, CDOT will work to ensure a consistent user experience for EV drivers throughout Colorado and the Intermountain West.

ACTION #5: Leverage the benefits associated with adoption of EVs by encouraging creative partnerships, increased access, and new infrastructure that support and complement the build-out of Colorado's EV fast-charging network.

- **Strategy 1:** CEO, RAQC, and CDPHE will engage state and local partners to develop strategies and initiatives that increase access to EVs and associated benefits for disadvantaged populations.

  For Colorado to fully leverage the benefits that come from greater adoption of EVs, it is critical that Coloradans have access to this emerging market. Working with a variety of partners and stakeholders, CEO, RAQC, and CDPHE will explore strategies that increase access to EVs and charging infrastructure for low income and environmental justice communities.

- **Strategy 2:** CEO and the Colorado Tourism Office will develop an initiative that enables Colorado Welcome Centers to host EV charging stations for visitors as part of Colorado's EV charging network.

  Colorado Welcome Centers are located on major transportation corridors and at border crossings around the state. With more than one million visitors each year, Welcome Centers are well-placed to educate Coloradans and visitors about the benefits of EVs while also serving as site hosts to EV fast-charging infrastructure.

- **Strategy 3:** CEO, the Colorado Tourism Office, and other state agencies will develop initiatives that encourage development of EV fast-charging infrastructure along Colorado's 26 Scenic and Historic Byways.

  Taking scenic drives is the second highest trip motivator for summer Colorado trips. It is second only to visiting a state or national park. Of the 52% of summer travelers who say they took a scenic drive, 45% say it was the top reason for their trip to Colorado.[22] Integrating Scenic and Historic Byways into Colorado's EV fast-charging network ensures that stations are located in areas with the potential for high utilization.

- **Strategy 4:** CEO and the Colorado Tourism Office will develop initiatives that encourage development of EV charging infrastructure at key Colorado tourist destinations.

  Each year Colorado plays host to more than 82 million visitors that come to experience cultural attractions, ski areas, state and national parks, and other recreational opportunities. CEO will partner with the Colorado Tourism Office to explore strategies that lead to development of EV charging infrastructure at a variety of tourist destinations.

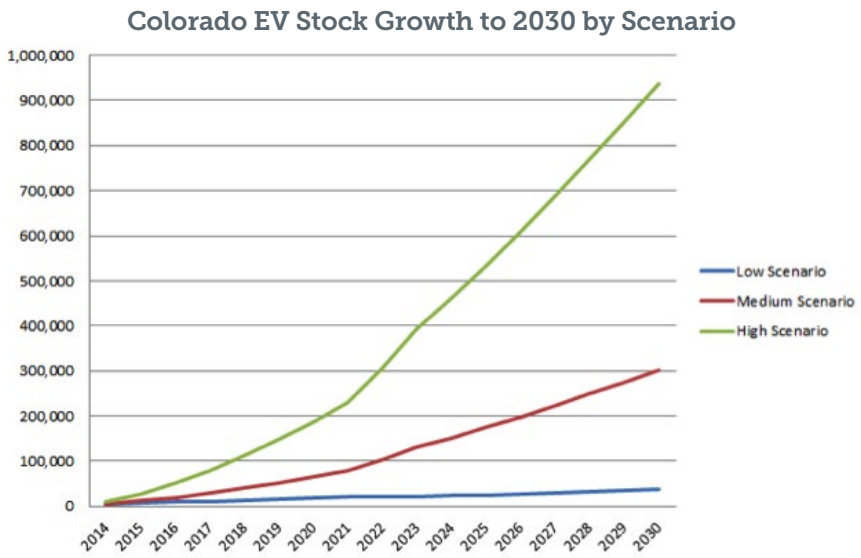
Colorado Electric Vehicle Plan—Accelerating EV Adoption

The following goals, actions, and strategies go beyond corridor electrification to further accelerate adoption of EVs and ensure Colorado remains a leader in the EV market.

GOAL #1: Increase adoption of EVs in the light duty sector by taking steps to achieve the high growth scenario of approximately 940,000 EVs in Colorado by 2030, as projected in the Colorado *EV Market Implementation Study.*[23]

- **Strategy 1:** Increase funding for community-based charging stations to complement build-out of Colorado's EV fast-charging network.

  Charge Ahead Colorado has a successful track record of providing grants for community-based Level II and fast-charging stations in Colorado. While funding is set to increase over time as the number of EVs that contribute to the Electric Vehicle fund grows and VW funds are integrated, current funding projections fall short of what is needed to support build-out of Colorado's EV charging network. CEO, RAQC, and its partners will explore opportunities to increase funding for EV charging infrastructure beyond what is currently projected.



Source: Electric Vehicle Market Implementation Study

22 Office of Economic Development and International Trade. 2016. Colorado Tourism Office Summer Advertising Effectiveness Report, Strategic Marketing & Research Insights-CTO. Analysis Conducted by Colorado Tourism Office.

23 Colorado Energy Office. 2015. Electric Vehicle Market Implementation Study.

- **Strategy 2:** CEO and the CEVC will explore strategies that result in greater EV model availability in Colorado and increased EV options at Colorado dealerships.

  Zero Emission Vehicle (ZEV) regulations, particularly in California, have resulted in automakers focusing their ZEV offerings in California while outside the state, the market is and will continue to be challenging.[24] The four top metropolitan areas in California for EV penetration have 25 to 30 electric models available, suggesting a correlation between model availability and sales.[25] The CEVC consists of auto manufactures and trade groups along with other industry and community stakeholders who can help develop strategies that ensure greater EV model availability in Colorado and promote EV sales.

- **Strategy 3:** CEO and the CEVC will work with auto manufacturers, auto dealerships, and financing arms to use the assignability of Colorado's tax credit to grow EV sales.

  In 2016, the Colorado General Assembly passed legislation making the $5,000 state AFV tax credit assignable at the point of sale. This change allows a buyer to assign the tax credit to a financing agency, reducing the vehicle's price at the time of sale. As of December 2017, only one manufacturer offered this benefit to customers. CEO, RAQC, and the CEVC will engage dealers and manufacturers and encourage them to offer this to their customers and educate their sales staff on the use of the tax credit as a strategy to increase EV sales.

- **Strategy 4:** CEO will provide updated guidance and best practices for group buy programs in 2018.

  Group buy programs have proven to be a particularly effective strategy for stimulating purchase of EVs. In fiscal year 2017, CEO and Refuel Colorado fleet coaches facilitated six group buy programs resulting in the purchase of 292 EVs. In 2018, CEO will update the 2016 Group Buy handbook with strategies appropriate to this dynamic market.

- **Strategy 5:** CEO, RAQC, CDPHE and CDOT, with the support of the CEVC, will review the Colorado EV Plan annually and update in response to changing market dynamics and planning requirements.

  The EV Market Implementation Study projections for EV growth diverge significantly by 2030. A variety of factors are likely to influence customer demand and the rate of adoption including battery costs and manufacturer commitments to the sale of EVs. The EV market is extremely dynamic and as a result, frequent updates to the Colorado EV Plan are needed to ensure goals, actions, and strategies remain appropriate to the needs of the market.

GOAL #2: Increase the number of electric transit vehicles in Colorado to 500 by 2030.

- **Strategy 1:** CDOT's Division of Transit and Rail will continue to utilize its Consolidated Call for Capital Projects to support the purchase of electric transit, increase incentive levels, and add support for charging infrastructure once Colorado's VW Settlement funds are integrated into the program in 2018.

  As of August 2017, there were 36 electric buses in Colorado, all owned and operated by the Regional Transportation District as mall shuttle buses. A portion of Colorado's VW Settlement will be used to make replacement of diesel transit buses with electric buses less expensive than replacement with a new diesel. While funding is projected to incentivize up to 30 electric buses, anticipated advances in technology should result in more vehicle options and reduced acquisition costs, making electric transit vehicles more appealing to both urban and rural transit providers.

24 Automotive News. 2016. ZEV Mandates Get Harder to Ignore, With 10 States under California mandate, Market Can't be Ignored.
25 ICCT. 2017. Update: California's electric vehicle market.

- **Strategy 2:** Provide education and outreach through Refuel Colorado on the availability of funding for electrified transit options.

  Electric and alternative fuel transit vehicles have been eligible under the Consolidated Call for Capital Projects from its inception, but the relatively high cost of electric transit buses and associated charging infrastructure have limited applicant demand. Integration of Colorado's VW Settlement funds should help offset these incremental costs and encourage greater interest among transit agencies statewide. Refuel fleet coaches will engage agencies interested in transitioning to electrified transit vehicles.

GOAL #3: Increase the number of public and private employers in Colorado that provide workplace charging to employees.

- **Strategy 1:** Increase the number of public (non-state agencies) and private employers with more than 25 employees that take the EV Wired Workplaces pledge to 60 by 2020.

  Thirty workplaces in Colorado that offer EV charging to their employees have been recognized through EV Wired Workplaces, Drive Electric Northern Colorado, or the U.S. Department of Energy's (DOE) Workplace Charging Challenge. Workplace charging is one of the most effective ways to increase adoption of EVs. The DOE estimates that employees with access to charging at work are six times more likely to purchase an EV. Through the EV Wired Workplaces program, CEO and RAQC recognize employers that provide workplace charging to their employees.

- **Strategy 2:** Increase the number of State workplaces with more than 25 employees that offer workplace charging to 25 by 2020.

  Three state agencies currently provide workplace charging at 13 workplaces. None of these agencies have been recognized under the EV Wired Workplaces program, and there is not a consistent approach from one agency to the next. To support broader adoption by State agencies, in 2018 DPA and CEO, working with other State agencies, will develop a policy for workplace charging. State agencies with workplace charging will be encouraged to take the EV Wired Workplaces pledge.

- **Strategy 3:** CEO and RAQC will prioritize workplace charging grant applications through Charge Ahead Colorado.

  Workplace charging station proposals submitted to Charge Ahead Colorado may be prioritized when applicants demonstrate employer support and employee interest. Successful applicants will be encouraged to participate in the EV Wired Workplaces program. In addition, Refuel Colorado will prioritize Colorado workplaces for education and outreach.

GOAL #4: Develop strategies and partnerships that prepare property owners for future investments in EV charging infrastructure and electrify challenging facility types.

- **Strategy 1:** Increase the local adoption of building, parking, and zoning codes that accommodate and support EV charging.

  CEO will integrate EV-readiness building code amendments for commercial and residential buildings into its energy code training and technical assistance for interested local jurisdictions. CEO will also engage with municipalities and other partners about the development of parking zoning requirements that support EV adoption.

- **Strategy 2:** CEO and RAQC will prioritize grants through Charge Ahead Colorado in or near multi-family housing (MFH) in which the facility owner and a high percentage of tenants demonstrate interest in purchasing an EV.

  Installing EV charging stations at MFH faces significant challenges. Since 24% of Coloradans and 44% of Denver residents live in MFH, installing charging infrastructure at these facilities helps ensure access for a significant percentage of Coloradans.[26] To date, Charge Ahead Colorado has funded stations at 17 MFH facilities. CEO and RAQC will work to bring this total to 50 facilities by 2020. In addition, Refuel Colorado fleet coaches will prioritize education and outreach to MFH facilities.

- **Strategy 3:** CEO and RAQC will work with key stakeholders including utilities to develop strategies that encourage installation of EV charging stations in public/private parking garages and parking lots.

  EV charging stations located in parking garages and parking lots tend to experience greater use and longer dwell times. These facilities typically have limited electric service allowing for few, if any, new loads including EV charging stations. CEO and RAQC will investigate ways to utilize Charge Ahead Colorado to incentivize electrification of these facilities.

GOAL #5: The State of Colorado will lead by example by accelerating purchase of EVs for agency fleets and investment in EV charging infrastructure.

- **Strategy 1:** State agencies will prioritize purchase of EVs for light-duty applications, increasing the number of EVs in operation or on order from 32 in January 2018 to at least 200 by end of 2020.

  As of January 2018, the State of Colorado had 15 EVs (2 BEVs and 13 PHEVs) in operation with approximately 17 new EVs (12 BEVs and 5 PHEVs) on order. As new models come online and battery costs decrease, purchase of EVs and installation of charging stations at State agencies will increase. An assessment of AFV opportunities conducted in 2015 can provide guidance to State agencies.[27]

- **Strategy 2:** DPA and CEO will work with state agencies to identify and address barriers in the state's vehicle planning and procurement processes that limit increased adoption of EVs.

26 City and County of Denver. 2017. Opportunities for Vehicle Electrification in Denver Metro area and Across Colorado.

27 Colorado Energy Office. 2015. Colorado State Fleet Opportunity Assessment. https://www.colorado.gov/pacific/energyoffice/reports

CEO and DPA, with the support of state agencies, will take steps to ensure vehicle planning and procurement processes support increased adoption of EVs across state agency fleets. DPA and CEO will continue to provide guidance and support to state agencies to facilitate the transition to electric vehicles.

- **Strategy 3:** DPA and CEO will investigate establishing a price agreement for EV charging stations.

  Bulk purchase opportunities through a state procurement could bring down the price of charging infrastructure, simplify the decision-making process, and create consistency across state and local charging infrastructure.

- **Strategy 4:** The state will update Executive Order D 2015-013 "Greening of State Government" by incorporating these goals.

  Executive Order 2015-013, "Greening of State Government," sets goals for petroleum reduction and associated greenhouse gas emissions and directives to achieve these goals. The state will add relevant goals from the Colorado EV Plan to the executive order to ensure state agencies prioritize purchase of EVs when replacing light duty vehicles.

Topics for Future Action

The EV market in Colorado is extremely dynamic. New technologies and market trends continue to evolve at a rapid place. CEO, state agencies, and the CEVC will work to develop strategies and goals for the following areas beginning in 2018.

- **Topic #1:** With the rise of transportation network companies (TNCs), advent of autonomous vehicles (AV), and a growing share of travel taking place with Transportation as a Service (TaaS) options, transportation models are changing. Vehicles in these models will likely be driven many more miles and will be well-suited for electrification. The state will explore opportunities to partner with cities, TNCs, and manufacturers to support electrification of TNCs and AVs.
- **Topic #2:** Much of what is included in the Colorado EV Plan focuses on developing the infrastructure needed to support the growing EV market. Achieving the projected benefits from widespread EV adoption will require greater education on EVs. In 2018, CEO, its partners, and the CEVC will work to develop strategies that drive consumer demand for EVs.
- **Topic #3:** Currently EV owners pay a $50 annual registration fee to support charging and highway infrastructure. Twenty dollars of this registration fee goes to the Electric Vehicle Grant Fund, which is used to provide grants for EV charging infrastructure, and the remainder goes to the Highway Users Tax Fund for formula disbursement to the state, counties, and municipalities. CDOT and CEO will continue investigating options for maintaining infrastructure maintenance funding as the percentage of drivers contributing to the gas tax declines.

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